

The Friendship and Relationship Interactions in the Elderly Networks Description (FRIEND) study

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The Friendship and Relationship Interactions in the Elderly Networks Description (FRIEND) study

Anne-Nicole Stewart Casey

A thesis in fulfilment of the requirements for the degree of
Doctor of Philosophy



School of Psychiatry
Faculty of Medicine

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People living in long-term residential aged care need supportive relationships and positive interactions. However, current evidence suggests that people with cognitive-functional impairment experience few friendships, negative interactions are common and many residents feel completely isolated. This thesis aims to describe the friendships, social relationships, and personal friendship schema of people living in a Sydney residential aged care facility. The research uses multiple social network analysis methods, including semi-structured interviews, standardised survey assessments, and observations. The thesis explores associations between social networks and self-report measures of perceived social support and adult attachment profiles. It describes staff- and observer-perceptions of residents' multi-valenced relationships and explores associations between relationship characteristics and engagement and social isolation. The thesis introduces a novel psychosocial method for analysis of observational field note data. The novel method is applied to describe patterns and quality of co-resident interactions involving residents with dementia and to identify possible personal and environmental factors that influence interactions. Residents experienced few friendships and many residents had no positive relationships. Most residents perceived little support and felt isolated. Residents' perceptions of support or isolation and difficulty with relationships may have been influenced by their position within the larger network and by environmental factors including care unit location and lack of staff facilitation. The size and quality of resident networks were correlated with personal attributes including residents' cognitive and physical capacities and attachment style. Most residents were able to articulate friendship clearly. Their views of friendship had likely changed little upon entering residential care as they applied long-held schema within a dramatically different social context. Despite multiple barriers to relationships, residents with dementia wished to reach-out to coresidents to connect in positive and meaningful ways. Only a few had friendships. Moreover, staff- and observer-report indicated negative relationships were common and interactions that began positively often ended in rejection and disconnection. These results indicate a pressing need for individually tailored interventions and a sharper focus on residents' social health.

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LIST OF ABBREVIATIONS AND TERMS

ADLS	Activities of Daily Living. Including bathing, dressing, eating (see also IADL)
AFFILIATIVE	(re behaviour) promoting close association, connection, cohesion among individuals within a group
ALTRUISM	Thinking/acting unselfishly out of concern for the welfare of others
ANTAGONISTIC	(re behaviour) actively hostile, contentious, opposing, resistant
APA	American Psychological Association
APS	Australian Psychological Society
BEHAVIOUR	Observable and inferred mental and physical responses, actions, or activities
DSM-V	Diagnostic and Statistical Manual of Mental Disorders, 5th edition
IADL	Instrumental Activities of Daily Living (housework, cooking, managing finances)
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10 th revision
OLDER	All people aged 65 and over independent of ethnicity, and Aboriginal and Torres Strait Islander people aged 50–64 years
RACF	Residential Aged Care Facility
SALIENCE	Cognitive, emotional, or physical characteristics that make stimuli contrast or ‘stand out’ from other stimuli based upon

	immediate or past experience; level or degree of stimuli contrast
SOCIAL ENGAGEMENT	A person's degree of participation in a social group or participation in society generally; enactment of social ties
SOCIAL INTEGRATION	Bonds, connections, and interdependence between members of a society; patterns and processes of human relationships within a society
SOCIAL SUPPORT	A comprehensive term referring to multiple categories of support (i.e. emotional, instrumental, informational) that people give to/receive from others
THEORY OF MIND (ToM)	An individual's ability to infer and attribute mental states (beliefs, cognitions, emotions, intentions) to themselves and to others; understanding that others' mental states differ from their own

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LIST OF PUBLICATIONS AND PRESENTATIONS

Peer-reviewed journal articles

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2016). Residents' positive and negative relationship networks in a nursing home. *Journal of Gerontological Nursing*, 42(11), 9–13. doi: 10.3928/00989134-20160901-06. (manuscript attached)

Casey, A-N & Mitchell, J. (2016). Connections in care count: Residential aged care-based networks and people with dementia. *Australian Journal of Dementia Care*, 5(5): 52–54. http://www.dementiaresearch.org.au/images/Celebrate_10_Yrs/52-54AJDCON_Connections-in-Care.pdf. (manuscript attached)

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2016). Residents perceptions of friendship and positive social networks within a nursing home. *The Gerontologist*. 56 (5): 855–867. doi:10.1093/geront/gnv146 (manuscript attached)

Conference presentations (in reverse chronological order)

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2015) “I had friends when we were young” Social interactions of residents with moderate to severe dementia in a nursing home. Oral presentation, 18th International Psychogeriatric Association (IPA) Congress, Berlin, Germany. <http://dx.doi.org/10.1017/S104161021500215X>

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2014). Two degrees to social integration: focusing on resident social networks in care. Oral presentation. 2nd Annual Arts Health Institute Play-Up Convention 2014, Luna Park, Sydney, Australia. <http://www.ahisplayupconvention.com.au/abstracts/>

Casey, A-N, Low, L-F, Brodaty, H, Jeon, Y-H. (2013). Friendship views of residents with and without dementia living in RACF: qualitative results from the FRIEND study. Oral presentation, National Dementia Research Forum 2013, Brisbane, Australia.

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2012). The Friendships and Relationship Interactions in the Elderly Networks Description study: a literature review. Oral presentation, National Dementia Research Forum 2012, Canberra, Australia.

Poster presentations (in reverse chronological order)

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2015). Association between attachment style and size of peer social networks of nursing home residents with

dementia. Poster presentation, 18th International Psychogeriatric Association (IPA) Congress, Berlin, Germany. <http://dx.doi.org/10.1017/S1041610215002161>

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2015). Two degrees to social integration: the roles of strong, moderate-strength, and weak ties in resident friendship networks within a high-care nursing home. Poster presentation. 30th International Conference of Alzheimer's Disease International, 2015, Perth, Australia. <http://www.alzint.org/docs/default-source/Abstract-Ts-and-Cs/adi-2015-conference-abstract-book.pdf?sfvrsn=2>

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2015). No link between social isolation and activity participation for nursing home residents with dementia. Poster presentation. National Dementia Research and Knowledge Translation Forum 2015, Sydney, Australia.

Casey A-N, Low L-F, Jeon Y-H, Brodaty H. (2014). Friendship and social relationship networks of residents in a nursing home environment. Poster presentation. 2014 Alzheimer's Association International Conference (AAIC), Copenhagen, Denmark. <http://www.alz.org/aaic/portal/overview.asp>

Casey, A-N, Low, L-F, Jeon, Y-H, Brodaty, H. (2012). The Friendships and Relationship Interactions in the Elderly Networks Description Study: a literature review. Poster presentation, National Dementia Research Forum 2012, Canberra, Australia.

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ABSTRACT

People living in long-term residential aged care need supportive relationships and positive interactions. However, current evidence suggests that people with cognitive-functional impairment experience few friendships, negative interactions are common and many residents feel completely isolated. This thesis aims to describe the friendships, social relationships, and personal friendship schema of people living in a Sydney residential aged care facility. The research uses multiple social network analysis methods, including semi-structured interviews, standardised survey assessments, and observations. The thesis explores associations between social networks and self-report measures of perceived social support and adult attachment profiles. It describes staff- and observer-perceptions of residents' multi-valenced relationships and explores associations between relationship characteristics and engagement and social isolation. The thesis introduces a novel psychosocial method for analysis of observational field note data. The novel method is applied to describe patterns and quality of coresident interactions involving residents with dementia and to identify possible personal and environmental factors that influence interactions.

Residents experienced few friendships and many residents had no positive relationships. Most residents perceived little support and felt isolated. Residents' perceptions of support or isolation and difficulty with relationships may have been influenced by their position within the larger network and by environmental factors including care unit location and lack of staff facilitation. The size and quality of resident networks were correlated with personal attributes including residents' cognitive and physical capacities and attachment style. Most residents were able to articulate friendship clearly. Their views of friendship had likely changed little upon entering residential care as they applied long-held schema within a dramatically different social context. Despite multiple barriers to relationships, residents with dementia wished to reach-out to coresidents to connect in positive and meaningful ways. Only a few had friendships. Moreover, staff- and observer-report indicated negative relationships were common and interactions that began positively often ended in rejection and disconnection. These results indicate a pressing need for individually tailored interventions and a sharper focus on residents' social health.

1 Introduction

1.1 Thesis context

The Australian Institute of Health and Welfare estimated that in 2015 more than 342,800 Australians were living with dementia (Major Neurocognitive Disorder; American Psychological Association [APA], 2013; Simpson, 2014) and the number of people living with dementia was expected to increase to 400,000 before 2025 (AIHW, 2012). There is currently no cure for dementia. Despite decades of research and billions of dollars spent on the development of medications aimed at reversing or attenuating the neurodegenerative disease processes, pharmacological treatment for dementia has been largely unsuccessful (Cummings, Morstorf, & Zhong, 2014; Olanrewaju, Clare, Barnes, & Brayne, 2015). Use of psychotropic medication to resolve or improve neuropsychiatric symptoms associated with dementia, such as anxiety and disinhibition, has been associated with extrapyramidal symptoms, including worsening cognition and increased risk of falls and stroke (Anguish, Locca, Büla, Zumbach, & Bugnon, 2015; Ballard & Howard, 2006; Rubin, 2015; Sink, Holden, & Yaffe, 2005). Based on the current state of evidence, stakeholders including consumers, clinicians, care providers, and policy makers are increasingly focused on nonpharmacological psychosocial approaches to improve resident health, wellbeing, and quality of life in care (Burns, Jayasinha, Tsang, & Brodaty, 2012; Chenoweth et al., 2009; Clare et al., 2010; Lawrence, Fossey, Ballard, Moniz-Cook, & Murray, 2012; Low et al., 2015; Low et al., 2014; Luttenberger, Hofner, & Graessel, 2012).

Recent studies have demonstrated the continued importance of friendship and positive social relationship networks to the health and wellbeing of cognitively capable nursing home residents (Bergland & Kirkevold, 2008), and of residents with mild cognitive impairment (Mild Neurocognitive Disorder; APA, 2013; Regier, Kuhl, & Kupfer, 2013) and dementia (Clare, Rowlands, Bruce, Surr, & Downs, 2008; de Medeiros, Saunders, Doyle, Mosby, & Haitsma, 2012; Leedahl, Chapin, & Little, 2015). Subjective and objective social support (i.e. friendship and social connectedness) are associated with greater psychological wellbeing (Ashida & Heaney, 2008; Carpenter, 2002). Conversely, subjective and objective social isolation are associated with poorer mental health and reduced cognitive performance (Cacioppo, Capitanio, & Cacioppo, 2014; Cornwell & Waite, 2009).

Older adults in residential aged care, particularly those with dementia, are at risk of both subjective (Hawthorne, 2006; Nikmat, Hawthorne, & Al-Mashoor, 2015) and objective social isolation (Phillips, Dobbs, Burholt, & Marston, 2015). Among cognitively capable long-term care residents, positive peer relationships (i.e. positive relationships with other residents) contribute to perceived social support by providing opportunities for conversation to share positive and negative experiences, assist one another, or exchange goods. Negative peer relationships can worsen residents' quality of life by creating emotional tension and conflict, and by promoting avoidance of social activities and avoidance of others through social withdrawal (Bergland & Kirkevold, 2006, 2008; Carpenter, 2002; Pillemer et al., 2012).

The meaning and importance of friendship remains salient for people experiencing mild (Harris, 2011) to moderate (Sabat & Lee, 2011) impairment from neurocognitive disorders. Long-term care residents, including individuals living in Dementia Special Care Units (DSCUs), experience a spectrum of positive and negative social interactions with coresidents (Kemp, Ball, Hollingsworth, & Perkins, 2012; Meeks, Van Haitsma, Kostiwa, & Murrell, 2012; Pillemer et al., 2012). Analyses of resident interactions often focus on individual actions, experiences, and effects, rather than examining dynamic interactions, shared experiences, mutual influences and psychosocial outcomes in a relational context. In his theory of dementia care, Tom Kitwood highlighted the use of a bidirectional psychosocial analytic framework in studying underlying processes inherent in social interactions between caregivers and people with moderate to severe dementia in formal care settings (Curyto, Van Haitsma, & Vriesman, 2008). George Engel's biopsychosocial model of medical care emphasises the fundamental importance of assessing social and psychological as well as biological factors to health care provision (Engel, 1977). Recent adaptations of his theoretical framework suggest that a pragmatic adaptive approach to care for those with dementia takes into account both positive and negative biopsychosocial factors (Rook, 2015; Spector, 1997).

Social network analysis is one approach to study social ties between individuals and the larger social networks formed by the interconnection of these ties. Social network analysis integrates statistical analysis and the graphing of variables to investigate connections between people and the effects people experience due to their position in a network (Carrington, Scott, & Wasserman, 2005; Granovetter, 1973; Wasserman & Faust, 1994). Studies investigating the social relationships of older adults have applied social network analysis to investigate peer relationships between independent living residents in retirement communities (Schafer, 2011, 2013, 2015)

and between residents in assisted living (Abbott, Bettger, Hampton, & Kohler, 2012). Researchers have only recently adopted social network analysis to investigate relationships of residents living in traditional nursing homes or DSCUs (Abbott, Bettger, Hampton, & Kohler, 2013; Abbott & Pachucki, 2016; Abbott, Sefcik, & Van Haitsma, 2015; Casey et al., 2015).

1.2 Justification and significance of this thesis

Assessing and improving the wellbeing and quality of life of individuals with dementia is a priority for residential aged care staff, care providers, and policy makers internationally (Australian Health Ministers Advisory Council, 2015; Beattie et al., 2015; Birbeck, Hanna, & Griggs, 2014; Chenoweth et al., 2009; Knapp et al., 2014; Lawrence et al., 2012; Nakanishi & Nakashima, 2014; NSW Dementia Policy Team, 2010; Umberson & Montez, 2010; Vernooij-Dassen & Jeon, 2016). Having a larger network of friendships and positive relationships is associated with better wellbeing and a higher quality of life in older adults (Cho, Martin, & Poon, 2015; Golden, Conroy, Bruce, et al., 2009; Lubben & Gironde, 2003; Rafnsson, Shankar, & Steptoe, 2015; Street, Burge, Quadagno, & Barrett, 2007; Thomas, 2010; van der Horst & Coffé, 2012). It is well accepted that social relationships in general and friendships in particular have an important effect on health and behaviour (Berkman, Glass, Brissette, & Seeman, 2000; Cohen, 2004; Cornwell & Waite, 2009; Haslam, Cruwys, & Haslam, 2014; Haslam, Cruwys, Milne, Kan, & Haslam, 2016; Hershfield, Scheibe, Sims, & Carstensen, 2013; Lee et al., 2014; Norman, Hawkey, Cole, Berntson, & Cacioppo, 2012; Rook, 2015; Seeman, 1996; Stephens, Alpass, Towers, & Stevenson; Uchino, 2009; Yang, Slavin, & Sachdev, 2013). The creation of social networks within residential aged care is inherent in the structure of communal living and provision of care (Bergland & Kirkevold, 2008; Carpenter, 2002; Hubbard, 2003; Kutner, Brown, Stavisky, Clark, & Green, 2000; McKee, 1999; Powers, 1988; Sherer, 2001), and attributes of residents' pre-existing social networks bear upon residents' social networks in care (Bear, 1990; Brown-Wilson, 2009; Parmenter, Cruickshank, & Hussain, 2012). Nonetheless, residents' social relationships remain incidental considerations that are rarely documented (Scocco, Rapattoni, & Fantoni, 2006) or formally tracked by clinicians and residential aged care staff (Powers, 1992; Snow, 1980; Theurer et al., 2015).

Person-centred care models emphasise the centrality of the lived experiences of the person with dementia, including their socio-emotional needs, and the primacy of including their perspective in care to the maintenance of their 'personhood' (Edelman,

Fulton, Kuhn, & Chang, 2005; Smebye & Kirkevold, 2013; Woods, 2001; Zwijsen, van der Ploeg, & Hertogh, 2016). This theoretical foundation emphasises that personhood does not exist in isolation nor is it a unidirectional property conferred upon people with dementia by others, but rather personhood is the concurrence of internal and external relationships, reciprocity, and mutual influence (Kitwood, 1993; Kontos, 2012). However, the social functioning and interactions of residents are often viewed clinically from the perspective of individual attributes, such as their abilities in expressive and receptive communication (Kovach & Robinson, 1996), their level of independence and abilities in activities of daily living (Bitzan & Kruzich, 1990), or the effects of their neuropsychiatric symptoms (Feyereisen, 1994; Schulz, 1976). Research into possible contributory factors for resident cognitive-emotional wellbeing also typically focus upon individual resident attributes, such as personality (Cohen-Mansfield, 2009), attachment style (Browne & Shlosberg, 2006), or mood (Nash, 2007), and individual behaviours such as engagement (Cohen-Mansfield, 2009), or agitation (Cohen-Mansfield & Libin, 2004; Cohen-Mansfield, 1989).

While assessment of the personal attributes of individual residents is fundamental to investigation of personal wellbeing, the residents in question live and function within social groups. Therefore, to truly understand the perspective of residents and the variables influencing their health and wellbeing it is crucial to understand their social context and the role that social relationships play in their daily experience in care (McEvoy & Plant, 2014; Perkins, Ball, Kemp, & Hollingsworth, 2013; Sandhu, Kemp, Ball, Burgess, & Perkins, 2013; Schafer, 2015). Moreover, understanding the residents' experiences requires an understanding of the full range of social relationships that they encounter within their living environment (Kemp et al., 2012; Leedahl et al., 2015; Rook, 2015).

The principles listed above apply to all residents in care, including those with high care requirements who may have more difficulty in directly communicating their own unmet needs. Quantitative studies measuring resident social networks in aged care and qualitative exploration of the meaning of peer relationships for residents have commonly excluded individuals with neurocognitive disorders (Bergland & Kirkevold, 2008; Carpenter, 2002; Perkins et al., 2013; Roberts & Bowers, 2015; Schafer, 2011, 2015; Sefcik & Abbott, 2014; Sherer, 2001). Qualitative studies exploring the meaning of friendship for people with dementia have primarily focused on those with mild to moderate dementia (Harris, 2011, 2013; Sabat & Lee, 2011; Ward, Howorth, Wilkinson, Campbell, & Keady, 2012).

Research exploring the social experience of older adults in residential care has only recently expanded to include individuals with moderate to advanced stages of dementia. Among these studies, few researchers have used multiple-method approaches in their investigation of residents' friendship and social relationships networks (Abbott et al., 2013; Abbott & Pachucki, 2016; Abbott et al., 2015; de Medeiros et al., 2012; Doyle, de Medeiros, & Saunders, 2011). Qualitative enquiry with nursing home residents highlights the concurrent influence of co-occurring affiliative (positive) and antagonistic (negative) social relationships on resident accounts of their life in care (Roberts & Bowers, 2015). However, positive and negative coresident relationships typically have been investigated in isolation from one another (Abbott & Pachucki, 2016; de Medeiros et al., 2012; Pillemer et al., 2012; Rosen, Lachs, et al., 2008). Prominent theories from developmental psychology such as socio-emotional selectivity theory (Carstensen & Mikels, 2005; English & Carstensen, 2014; Lang & Carstensen, 2002; Scheibe & Carstensen, 2010), the convoy model (Akiyama, Antonucci, Takahashi, & Langfahl, 2003; Antonucci, Ajrouch, & Birditt, 2014; Antonucci & Akiyama, 1987b; Antonucci et al., 2002), and adult attachment theory (Bartholomew & Horowitz, 1991), suggest that social choices, behaviour, and the perceptions of social support or isolation of older adults with intact cognition are influenced by the quality of their social relationships. Few studies have explored how the social choices, behaviour, and perceptions of people with dementia living together in residential aged care may be influenced by their onsite interactions with other residents.

In summary, the research on friendships and social relationships between residents living in formal aged care has:

- largely excluded individuals with moderate to severe stages of neurocognitive disorders;
- only recently begun to use social network analysis methods to investigate social networks of people with dementia and those living in specialised care units;
- focused on the influence of individual resident attributes as opposed to the confluence of relationship attributes and context on resident social functioning;
- investigated positive and negative peer social interactions separately;
- presented either qualitative or quantitative report of social relationships between residents with little triangulation of data.

Therefore, the motivation behind this thesis was to explore ways to assess and improve the wellbeing and quality of life of aged care residents through a better understanding of their social relationships in care, including:

- addressing the social experiences of residents with moderate to severe stages of dementia;
- extending the use of social network analyses with residents with dementia and those living in special care units;
- assessing the influence of relationship attributes and the immediate context on resident perceptions and behaviour;
- conducting concurrent investigation of multi-valenced social relationships; and
- using multiple methods and data triangulation to interpret the meaning and potential significance of interactions for the residents involved.

A priori, the research was expected to include a higher proportion of residents without a dementia diagnosis. However, after the consent process it became apparent that most residents participating in interviews had a dementia diagnosis noted in their medical charts. Therefore, the thesis focuses primarily on the experience of residents with dementia and includes residents without dementia to present a more complete picture of residents' social networks and the larger facility social environment.

1.3 Aged care residents with high-care needs

The World Health Organization (WHO) has defined long-term care as:

“...the system of activities undertaken by informal caregivers (family, friends, and/or neighbours) and/or professionals (health, social, and others) to ensure that a person who is not fully capable of self-care can maintain the highest possible quality of life, according to his or her individual preferences, with the greatest possible degree of independence, autonomy, participation, personal fulfillment, and human dignity.”

(WHO, 2000, p. 6)

Additionally, the important elements of long-term care are specifically outlined to include:

- “...maintenance of involvement in community, social, and family life;”
- “...assessment and evaluation of social and health care status, resulting in explicit care plans and follow-up by appropriate professionals and paraprofessionals;”

- “...provision for recognizing and meeting spiritual, emotional, and psychological needs;” (WHO, 2000, p. 6)

In Australia, formal long-term care facilities are referred to as residential aged care facilities (RACFs). The number of people entering permanent residential aged care in Australia is growing steadily, consistent with a general increase in the number of people aged 65 and older and the number of places available in the residential care system (AIHW, 2015). Roughly 60% of Australian RACFs are ‘high care’ facilities and 38% provide a combination of low and high care (AIHW, 2015).

All persons entering permanent residential aged care in Australia have their care needs assessed to determine the level of subsidy allocated to service providers for their care (Australian Department of Health and Ageing [ADHA], 2009). The Australian Institute of Health and Welfare’s (AIHW) report on Residential Aged Care and Home Care indicates that in June 2014 over 83% of people living in permanent residential aged care (144,438) were assessed as ‘high care’ residents, requiring skilled nursing care including high levels of assistance with activities of daily living (ADLs).

Multiple factors may influence the quality of social relationships of aged care residents with high-care needs. Changes in the quality of social relationships affect residents’ social health and may limit residents’ ability to meet their own psychosocial needs in care. The following sections address factors that can affect residents’ abilities to form and maintain friendships and social relationships.

1.3.1 Dementia

The number of people with dementia entering permanent residential aged care is growing. It is estimated that over four out of five older people living in high-care residential care world-wide are people with dementia (Prince, Prina, & Guerchet, 2013). In Australia, 52% of people in permanent residential aged care had a dementia diagnosis in their assessment record, and over 92% of these people had high-care needs. People with dementia stayed in permanent residential care for an average of 3.25 years (39.5 months) before their last separation from aged care, usually due to their death (AIHW, 2015).

The International Classification of Diseases (ICD) 10 defines dementia as a syndrome typically featuring chronic and progressive deterioration in cognition affecting memory and executive function, commonly accompanied or preceded by reduced emotional control, deterioration in social behaviour, and ability in activities of daily living

(WHO, 2016). The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM5) refers to dementia as ‘Major Neurocognitive Disorder’, causing significant cognitive decline that interferes with independence and that is not due to delirium or other mental disorders (APA, 2013). Affected cognitive domains include complex attention, executive function, learning and memory, language, perceptual-motor skills, and social cognition. Diagnostic criteria encompass Alzheimer’s disease, cerebrovascular disease, Parkinson’s disease, Prion disease, Frontotemporal lobar degeneration, Lewy Body disease, Huntington’s disease, traumatic brain injury and HIV-associated dementia (Simpson, 2014).

1.3.2 Neurological function and social function

Changes in brain structure related to age-related decrements, neuro-degenerative disease, and other types of neurological insults such as stroke or traumatic brain injury, may interfere with social cognition—the ability to properly perceive, interpret, respond to, and remember social information (Cabinio et al., 2015; Davidson, 2008; Henry, von Hippel, Molenberghs, Lee, & Sachdev, 2016; Phillips et al.; Zwijsen et al., 2016). These changes in neurological function may interfere with an individual’s ability to form and maintain friendships and other close relationships. Decrements in emotional prosody (identifying emotion by tone of voice) and the processing of non-verbal social cues such as gaze, body movement, and emotional facial expression, produce social dysfunction with deficits differentiated by disease process and affected brain structures (Choong & Doody, 2013; Fliss et al., 2015; Le Bouc et al., 2012; Sandoz, Démonet, & Fossard, 2014; Shany-Ur & Rankin, 2011). Given that some people with dementia have impaired abilities in social cognition and in expressive communication, the social relationships that they develop may be different from those of cognitively capable adults.

1.3.3 Neuropsychiatric symptoms of dementia

Most people with dementia experience one or more neuropsychiatric symptoms through the duration of their illness. Many of these neuropsychiatric symptoms, also referred to as Behavioural and Psychological Symptoms of Dementia (BPSD), are profoundly distressing to the person and their caregivers. BPSD limit independence in ADLs, interfere with normal functioning of social relationships, and impede quality of life (Brodaty, Connors, Xu, Woodward, & Ames, 2015; Brodaty & Donkin, 2009; Judge, Menne, & Whitlatch, 2010). Apathy and depression are neuropsychiatric symptoms of dementia that interfere with social functioning. Apathy inhibits motivation to initiate

interactions and depression prompts social withdrawal (AIHW, 2013; Berman, Brodaty, Withall, & Seeher, 2012; Brodaty & Burns, 2012; Ellis, Doyle, & Selvarajah, 2014). Apathy prevalence levels as high as 92% have been reported for people with severe cognitive impairment (Mortby, Maercker, & Forstmeier, 2013). Though overall patterns suggest a decline in risk of depression in people aged 75 and older living in the community (Trollor, Anderson, Sachdev, Brodaty, & Andrews, 2007), depression levels of up to 40.5% have been reported among RACF residents highly dependent in ADLs and 25.4% among residents who are more independent in ADLs (Snowdon & Fleming, 2008). While levels of depression may decrease over time for people with dementia, levels of apathy increase significantly with disease progression (Brodaty et al., 2015).

1.3.4 Impaired Theory of mind

One of the key functional components of social cognition is Theory of mind (ToM). ToM is our capacity to imagine what others may think, feel, and expect and to incorporate that knowledge into our own cognitions and perceptions. It allows us to better understand and predict other people's behaviour and is created through the complex interaction of social environmental factors such as parenting, social relationships, education and training, and neurophysiological development (Korkmaz, 2011). ToM is a two-part process involving 1) inhibition of one's own belief and 2) inference of another person's belief. Deficits in ToM may vary between individuals with different diagnoses. For example, people with frontotemporal deficits or with Alzheimer's disease exhibit distinct difficulties with ToM (Gregory et al., 2002; Le Bouc et al., 2012). People with behavioural variant frontotemporal dementia have greater problems inhibiting their own perspective, while people with Alzheimer's dementia have greater problems inferring another person's perspective (Le Bouc et al., 2012). Recent research has identified this form of impairment in people with Alzheimer's dementia during real-time *in situ* social interactions (Moreau, Rauzy, Viallet, & Champagne-Lavau, 2015). ToM is related to relationship formation (Dunn & Cutting, 1999; Fink, Begeer, Peterson, Slaughter, & de Rosnay, 2015a, 2015b) and is associated with social cognitive impairment in developmental disorders such as Autism Spectrum Disorder (Baron-Cohen, Leslie, & Frith, 1985) and Turner Syndrome (Molko et al., 2004), in psychiatric disorders including affective disorders (Epa & Dudek, 2015; Olley et al., 2005) and schizophrenia (Rowland et al., 2012), and in most major neurocognitive disorders such as variants of frontotemporal dementia (Mendez et al., 2014; Seeley, Zhou, & Kim, 2012) and Alzheimer's disease (Sandoz et al., 2014). Table 1 provides a list of disorders associated with social cognitive impairment.

Table 1

Disorders associated with social cognitive impairment

Acute brain damage	Neurodegenerative disorders	Psychiatric disorders	Developmental disorders
Stroke	Alzheimer's disease	Anorexia nervosa	Angelman syndrome
Traumatic brain injury	Amyotrophic lateral sclerosis	Antisocial personality disorder	Attention deficit hyperactivity disorder
	Corticobasal degeneration	Bipolar disorder	Autism spectrum disorder
	Frontotemporal dementia	Major depressive disorder	Foetal alcohol syndrome
	Huntington's disease	Personality disorders (i.e. antisocial, avoidant, borderline, narcissistic, schizoid)	Fragile X syndrome
	Multiple sclerosis	Post-traumatic stress disorder	Prader-Willi syndrome
	Parkinson's disease	Schizophrenia	Rett syndrome
	Progressive supranuclear palsy	Social phobia	Severe conduct disorder
			Turner syndrome
			Severe conduct disorder

In practical terms, impairment in social cognition and function create barriers to the formation and maintenance of relationships for residents. Short-term/working memory impairments make it difficult for residents to remember names and conversations. Forgetting important personal details of other people inhibits formation of intimacy. Expressive language impairment makes self-expression and conversation difficult and impaired language comprehension can create misunderstanding. Impaired judgement and disinhibition mean that residents may say things impulsively and without reflection, which may be hurtful to others. Impaired emotion recognition may inhibit emotional connection and perception of mutuality.

1.3.5 Physical impairment and comorbidities

Highly dependent residents with multiple comorbidities may be unable to approach or avoid others at will and have little choice of who their interaction partners

will be within the residential aged care environment (Bitzan & Kruzich, 1990). Many residents with neurological impairment experience reduced physical capacity, including reduced or assistance-dependent mobility, and reduced ability in receptive and expressive communication through impaired vision, hearing, or speech (Davidson, 2008; Dodge et al., 2005). Additionally, most aged care residents with cognitive impairment experience incapacity due to comorbid disorders with secondary symptoms such as chronic pain (Achterberg et al., 2013; Cohen-Mansfield, Dakheel-Ali, Marx, Thein, & Regier, 2015), fatigue (Khachiyants, Trinkle, Son, & Kim, 2011), breathing difficulties (Cheng, Leung, & Chan, 2014; Zarowitz & O'Shea, 2012), sleep disturbance (Deschenes & McCurry, 2009), poor skin integrity (Mitchell, Kiely, & Hamel, 2004), and frailty (Matusik et al., 2012), affecting their ability to engage in social interactions with others. Residents with high-care needs by definition require high levels of assistance with most ADLs. Lack of independence in basic functions such as eating, going to the toilet, and maintaining personal hygiene can influence social interactions and relationships in a communal living environment. Even facets of personal presentation largely beyond residents' control such as oral health (Slade & Spencer, 1994), incontinence, personal hygiene (Dobbs et al., 2008), and dressing and grooming (Cohen-Mansfield & Jensen, 2007; Curyto, Van Haitsma, & Towsley, 2016; Freysteinson, 2010) create practical scenarios that contribute to social perceptions and positive or negative interactions with coresidents (Oosterveld-Vlug et al., 2014).

1.3.6 Activation of attachment behaviour

Neuropsychiatric symptoms, psychological distress, chronic illness, and increased dependency can activate attachment behaviour in residents with dementia, further influencing social cognition and social interaction with coresidents (Nelis, Clare, & Whitaker, 2014). Early in life, affectional bonds with primary caregivers are associated with personality development, emotional regulation, and mental health (Bowlby, 1969, 1970). These formative social experiences create internal working models of 'self' and significant 'others', promote patterns of behaviour in close relationships (Ainsworth, Blehar, Waters, & Wall, 2015), and influence general approaches to social relationships or attachment 'styles' that may change to accommodate life circumstances as people age (Bartholomew & Horowitz, 1991; Fiori, Consedine, & Merz, 2011; Griffin & Bartholomew, 1994). Positive attachment relationships promote 'secure' attachment: the perception of close relationships as sources of support and comfort in times of need and a willingness to engage with and rely on others. Unreliable, ambivalent, and harmful relationships promote 'insecure'

attachment associated with fear, anxiety, and avoidance. Theorists describe three (secure, anxious/ambivalent, avoidant; Hazan & Shaver, 1987) or four (secure, dismissive, preoccupied, fearful; Bartholomew & Horowitz, 1991) unique attachment styles. Studies investigating attachment style in older age have reported no difference (Segal, Needham, & Coolidge, 2009) or an increase in the proportion of dismissive/avoidant attachment among older adults (Magai, 2008), and a greater increase in dismissive/avoidant attachment among widowed individuals in particular (Cicirelli, 2010). Secure and dismissive/avoidant attachment styles, but not anxious or fearful styles, have been related to greater wellbeing in older adults (Merz & Consedine, 2012). People with dementia recruited from memory clinics and a geropsychiatric outpatient clinic have indicated more self-reported dismissive/avoidant attachment (Nelis, Clare, & Whitaker, 2012) and fearful attachment, respectively (Molinari, Cully, Kendjelic, & Kunik, 2001).

Neuroimaging studies indicate that attachment style may influence the perception of social support. Dismissive/avoidant attachment is related to a reduced activation of striatum and ventral tegmental areas in response to pleasant facial expressions, altering their perception as socially rewarding (Vrtička, Andersson, Grandjean, Sander, & Vuilleumier, 2008). Studies using *in vivo* PET scans report a negative correlation of dismissive/avoidant attachment and availability of μ -opioid receptors in regions associated with social distress (thalamus and anterior cingulate cortex), medial frontocortical regions important for emotions and ToM (mPFC, OFC), and reward and pain circuits of the amygdala and insula—all of which are critical in the formation and maintenance of social relationships (Nummenmaa et al., 2015).

High-care residents with cognitive impairment may experience multiple challenges to their social functioning. Neuropsychiatric symptoms interfere with initiation and motivation to engage in social relationships. Disease processes and neurological insults interfere with social cognition and ToM. Physical impairment, comorbidities, and dependence in ADLs limit choice and create difficulty in a communal living environment. Adult attachment style and activation of attachment behaviour may promote withdrawal and interfere with perception of support. However, despite multiple challenges to the ability of residents to independently form and maintain relationships, it does not follow that these individuals no longer need, seek, nor derive benefit from the types of support that friendships and other positive social relationships can provide (Casey et al., 2015; Cohen-Mansfield et al., 2015; Curyto et al., 2008; Harris, 2011, 2013; Kontos; Kontos, Miller, Mitchell, & Stirling-Twist, 2015; Mabire, Gay, Vrignaud,

Garitte, & Vernooij-Dassen, 2016; McEvoy & Plant, 2014; Sabat & Lee, 2011; Saunders, Medeiros, Doyle, & Mosby, 2011).

1.3.7 Unmet psychosocial needs

Some aspects of complex awareness such as self-reflection and evaluative judgment may be accessible to people in the later stages of dementia, prompting the need to reexamine the effects of social interactions on residents with moderate to severe dementia (Cahill & Diaz-Ponce; Clare, 2010). A recent systematic review looking at best evidence of unmet care needs identified 19 care needs of people with dementia living in long-term residential care. Three of the top four unmet needs of people with dementia were psychosocial needs: the need for daily individualised activities/care, general ‘social’ needs, and emotional needs/personhood (Cadieux, Garcia, & Patrick, 2013). These are the very needs that direct care staff may feel most ill-equipped to address due to a lack of experience or lack of time and resources (Baltes, Kindermann, Reizenzein, & Schmid, 1987; Boyden, 2015; Brodaty, Draper, & Low, 2003; Bruce, Surr, Tibbs, & Downs, 2002). Frail residents with reduced independence in ADLs may feel as if they are “in a bubble” (Taube, Jakobsson, Midlöv, & Kristensson, 2015), vulnerable and physically and emotionally isolated from others. Some residents experiencing illness and reduced mobility receive an associated strengthening of close relationships with members of their social network rallying to provide support, while others similar acute or long-term impairment are disadvantaged and socially isolated (Kemp et al., 2012; Nikmat, Hawthorne, et al., 2015; Perkins et al., 2013; Scocco et al., 2006).

1.3.8 Transitioning into care and out of networks

For the majority of individuals who move to assisted living or residential aged care, relocation to communal accommodation means a dramatic change in every facet of their lives. Of all the many changes they will encounter, the sudden shift in their immediate social environment may be the most dramatic aspect of the relocation (Bonifas, Simons, Biel, & Kramer, 2014; Kemp et al., 2012; Lee, 1999; Reed & Payton, 1996). Individuals living in residential aged-care may experience an abrupt decrease in the frequency of visits from close family and friends, and the frequency of visits often declines over time (Gaugler, 2005; Parmenter et al., 2012). Residents find themselves one step removed from extended family, neighbours, friends from work, sporting clubs, community, and place of worship—the people who previously formed their immediate support network (Parmenter et al., 2012). Moreover, they no longer see acquaintances

from their larger social network—their pharmacist, their grocer, the wait staff at their favourite coffee shop, or even the usual suspects at their local pub. Familiar people and objects from their previous home and surroundings are no longer available as references or cues for comfort and memory, and residents must find new ways to navigate their world (Reed & Payton, 1996). They are in many ways suddenly strangers in a strange land.

This feeling of disconnectedness may be attenuated if the resident was involved in the choice or planning of their move (Barredo & Dudley, 2008; Lee, 1999; Reed, Payton, & Bond, 1998; Thomeer, Mudrazija, & Angel, 2015). Even in such circumstances, whether living in self-contained apartments (Potts, 1997), in a single room (Namazi, 1989), or possibly occupying one of 2 to 4 beds in a shared room (Kovach & Robinson, 1996), privacy becomes a privilege and frequent social encounters with staff, visitors, and other residents become the norm (Reed & Payton, 1997). Some residents see their surroundings as ‘home-like’ or ‘homely’ (Chou, Boldy, & Lee, 2003; Rijnaard et al., 2016), but most acknowledge that living in an institution will never replicate the feeling of being ‘at home’ (Barredo & Dudley, 2008; Cahill & Diaz-Ponce; Clare et al., 2008). Nursing home residents express feelings of ambivalence and ambiguity, and trying to ‘make the best’ of their situation (Clare et al., 2008; Haynes, 1991; Kahn, 1999; Lee, 1999; Miller, Donoghue, & Holland-Batt, 2015). A key aspect of the process of acceptance and adaption to their new living environment is the formation of connections with others (Bergland & Kirkevold, 2006; Minney, Hons, & Ranzijn, 2015). Residents necessarily form new and adapted social networks, either consciously or by default (Bradshaw, Playford, & Riazi, 2012; Doyle et al., 2011; Roberts & Bowers, 2015; Schafer, 2015).

In the context of residents living in long-term aged care for an average of three or more years on average, the importance of understanding the psychosocial needs of residents and of identifying better ways to address these needs is apparent. From the perspective of an ‘outsider’ not principally involved in resident interactions, fellow residents appear to represent an abundant potential resource through which residents could meet their unmet ‘social’ needs in care (Roberts & Bowers, 2015). Recent qualitative research highlights the pivotal role that friendships and close relationships with peers play in helping individuals with dementia find continuity in their ever changing external and internal environment (Harris, 2011; Ward et al., 2012). Friendships between individuals with dementia have a supportive effect, leading to reduced anxiety, agitation, and feelings of loneliness, and improved self-esteem, hope, and sense of control (Hubbard, 2003; Kutner et al., 2000; Ward et al., 2012). Literature

addressing the concept of selfhood in dementia suggest that residents find reassurance and reinforcement of self-concept embodied in socio-cultural habits and relational constructs such as friendship (Kontos; Reed & Payton, 1996; Small, Geldart, Gutman, & Clarke Scott, 1998). However, as is the case in other types of communal living environments (Emond, 2014; Jason, Light, Stevens, & Beers, 2014), relationships created through forced cohabitation are not always mutually positive (Bitzan & Kruzich, 1990; Kovach & Robinson, 1996). Social relationships among long-term care residents are frequently problematic and little is known about how people with dementia form relationships with their coresidents (Kemp et al., 2012; Roberts & Bowers, 2015). Addressing residents' unmet social needs in care requires a deeper understanding of the factors influencing residents' needs and perceptions, and of the contributions and consequences of relationships with peers (Rook, 2015).

1.4 Aims and scope of this thesis

This thesis aims to elucidate the consequences of residents' friendships and social relationships in long-term aged care, by:

- Describing residents' friendship schema and perceptions of their own positive social network ties, and investigating associations between these network ties and self-report measures of perceived social support and adult attachment style;
- Describing staff- and observer-perceptions of residents' multi-valenced relationship networks and exploring possible associations between the structure and quality of these networks and resident engagement and social isolation;
- Introducing a novel method, the application of a psychosocial perspective in the analysis of observational field note data; and
- using this novel method to describe patterns and quality of coresident interactions involving residents with dementia, and to identify possible internal and external factors that influence resident interactions.

In summary, this thesis will describe residents' thoughts about friendship and what being in a friendship relationship means to them; their personal approaches to close relationships with peers; their internal representations of their own friendships and social relationships with the people with whom they live; and how socially supported or isolated they feel living in their residential aged care environment. It will establish care staff perceptions of the quality of residents' relationships and of the

residents' level of social withdrawal or engagement with others. The thesis will also quantify what residents' social networks may look like from their own perspective, from staff members' perspective, and from an outside observer's perspective, by using social network analyses and graphical representations. The thesis will describe observations of how residents with dementia interact with one another; the individual and contextual factors that influence their interactions; the possible meaning of these interactions for the residents involved; and what facets of observed resident interactions are associated with social network characteristics and perceived social support/isolation and engagement as captured in standardised measures. Finally, the thesis will analyse and interpret findings to address clinical and theoretical implications including possible approaches to improve social relationships and thereby quality of life.

1.5 Overview and structure of this thesis

Following this general introduction, Chapter 2 will provide the literature review and conceptual background of the thesis. Chapter 3 provides an introduction to social network analysis and details the design, methods and assessments used in this study. In order to address the multiple facets covered in this research, Chapters 4 and 5 will each include results and their discussion in light of the literature. Chapter 4 presents resident self-report, staff-report, and observer-report of resident networks and a qualitative analysis of residents' views of their own friendships. Chapter 5 introduces a novel method in which a psychosocial perspective is applied to the coding and analysis of observational field note data. This chapter also presents the findings on resident interactions and the associations between interaction variables, and network variables and resident attributes. Finally, Chapter 6 is the synthesis of the results and discussion and addresses implications, strengths and limitations of the thesis, future recommendations, and conclusions.

2 Literature review

The following sections consider the literature on factors influencing residents' psychosocial needs, beginning with a brief overview of the evolutionary basis of friendship and close social relationships, and why social connection with others through relationships such as friendship is fundamentally important to health and wellbeing. This is followed by a review of the literature on social-developmental changes affecting social cognition and behaviour, and the structure of social networks across the lifespan. The review will then introduce insights from research into how people without dementia living with social constraints in other settings perceive and approach their own friendships and relationships with peers. Finally, the literature on friendships and social relationships between long-term care residents will be reviewed, with a particular focus on residents with dementia.

2.1 Comparative cognition and behaviour in friendship

Friendship plays an important role in human development and biopsychosocial functioning. While the origins of this understanding are found in non-human animal models and evolutionary models of friendship, recent advances in neuroimaging technologies have provided a greater scope for comparative research. Studies using animal models (Cacioppo, Cacioppo, Capitanio, & Cole, 2015; Cacioppo & Decety, 2011; Cacioppo & Cacioppo, 2015; Micheletta & Waller; Seyfarth & Cheney, 2012), comparative evolutionary models (Dunbar & Shultz, 2007; Hill & Dunbar, 2003; Kudo & Dunbar, 2001), and neuroimaging studies with humans (Davey, Allen, Harrison, Dwyer, & Yücel, 2009; Dunbar, 2012; Krienen, Tu, & Buckner, 2010; Lewis, Rezaie, Brown, Roberts, & Dunbar, 2011; Sakata & Yamamori, 2007) all support the premise that we are fundamentally social beings who shape and are shaped by our social networks as we change and mature (van Leeuwen, Call, & Haun, 2014). A vast weight of evidence from multi-disciplinary research suggests that our brains have evolved to seek out forms of friendship (Dunbar, 2014).

2.1.1 Neurophysiology and social behaviour

2.1.1.1 Oxytocin, arginine vasopressin, and social bonding

Oxytocin (OXT) and arginine vasopressin (AVP), are two key neuropeptides involved in human attraction and social bonding. OXT and AVP are synthesised in similar brain

regions in human and non-human primates (paraventricular and supraoptic nuclei of the hypothalamus) and are associated with primarily visual social recognition cues in both humans and other primates such as orangutans (*Pongo pygmaeus*), gorillas (*Gorilla gorilla*), and chimpanzees (*Pan troglodytes*) (Meyer-Lindenberg, Domes, Kirsch, & Heinrichs, 2011; Mitani, 2009).

2.1.1.2 Brain lateralisation of social behaviour

Social-evolutionary pressures from interactions with others may have promoted lateralisation of social cognitive tasks between the hemispheres of the brain. This is suggested by observations of brain lateralisation of socially related behaviour documented across multiple non-human species (Daisley, Mascalzoni, Rosa-Salva, Rugani, & Regolin, 2009; Fernández-Carriba, Loeches, Morcillo, & Hopkins, 2002; Giljov, Karenina, Hawkins, & Malashichev, 2015; Rogers, Rigosi, Frasnelli, & Vallortigara, 2013). Evolutionary pressures arising from the requirements of human social integration, for example the need to quickly identify 'friend' and 'foe' and to communicate shared concepts, may have promoted efficient 'dual processing' of social information through division of tasks to different hemispheres and neural networks (Chance, 2014; Sung et al., 2011).

For social cognition in particular, there is evidence for four large-scale interconnected brain networks that consistently involve specific brain regions (Henry et al., 2016). Brain regions associated with social perception (posterior superior temporal sulcus, fusiform face area, and amygdala) are located in the right hemisphere. Regions associated with ToM are located in both hemispheres (e.g. Left, dorsomedial prefrontal cortex; Right, temporoparietal junction), as are structures associated with empathy (e.g. Left, dorsal anterior cingulate cortex; Right, anterior insula), and those associated with social behaviour (Right, orbitofrontal cortex; ventromedial prefrontal cortex) (Henry et al., 2016; Yang, Rosenblau, Keifer, & Pelphrey, 2015).

2.1.1.3 Social behaviour and encephalisation

The 'social brain hypothesis' suggests that the need to store and process ever-larger amounts of social information related to pair-bonding and affiliative social relationships was a key driver in the evolution of larger brains relative to body size in primates (encephalisation). Evidence indicates a linear correlation between relative neocortex volume and real-world social network size (Adolphs, 2009; Dunbar, 2012; Dunbar & Shultz, 2007; Hill & Dunbar, 2003). In humans, recent neuroimaging studies support the link between the size of specific brain structures such as the amygdala,

and the size of both real-world (Bickart, Wright, Dautoff, Dickerson, & Barrett, 2011) and declared online social networks (Kanai, Bahrami, Roylance, & Rees, 2012; Lewis et al., 2011).

2.1.2 Social behaviour in primates

Neuropeptide regulation remains an important component in the formation of pair-bonds and social relationships in human and non-human primates. Reward mechanisms such as the analgesic effects of β -endorphin (released during social grooming) in non-humans and affiliative social contact such as hugging, hand-holding, and dancing in humans (Tarr, Launay, & Dunbar, 2016), act to reinforce social bonds between individuals in kin and non-kin relationships (Taylor, 2006). The dependence on primarily visual and cognitively-driven social recognition cues in more complex mammals such as primates has had specific implications for social behaviour. Primates require repeated social interactions across time, and some way of identifying the quality of those interactions (i.e. recall, recognition, behavioural signals), in order to forge and maintain social relationships and to promote group cohesion (Baumeister & Leary, 1995; Campbell & de Waal, 2014; de Waal & Suchak, 2010; Seyfarth & Cheney, 2012).

2.1.2.1 Behaviour in close relationships and ‘friendship’

In psychology, constructs are labels used to represent hypothetical concepts based on patterns of observed behaviours. Constructs summarise complex clusters of behaviours, cognitions, and emotions; allow extrapolation of unobserved behaviours from observed behaviour; and allow comparisons to determine which constructs are associated with one another (Duck & Spencer, 1972; Leichthy, 1989). ‘Friendship’ in non-human primate research is typically operationalised through observation of affiliative behaviour, including frequency and duration of ‘proximity’ (measured by arm- or body-lengths), play (behaviour, facial expression, posture, and gait), positive (non-antagonistic) physical contact, and grooming (Seyfarth & Cheney, 2012; Silk, Cheney, & Seyfarth, 2013; Weinstein & Capitanio, 2008). Friends are also defined as ‘peers with whom subjects spend more time affiliating than expected by chance’ (Mitani, 2009; Weinstein & Capitanio, 2012). Primates tend to choose friends of the same gender, similar age, and dominance rank (Seyfarth & Cheney, 2012). Behavioural research with adult chimpanzees *in situ* suggests that partner similarity (homophily) and the quality of social ties (strength, equity) affect the stability of relationships between non-kin individuals in naturally occurring communities (Mitani, 2009).

2.1.2.2 Identifying human relationships through observed behaviour

People acquire information about their social environment and choose to avoid, approach, and form relationships with others based in part on observation of their behaviour and social interactions (Altman & Taylor, 1973; Curry & Dunbar, 2013; Levinger & Snoek, 1972; Sung et al., 2011). Eye-tracking studies report that young adults attend more to head and facial areas when observing positive social interactions, and more to other body areas when attending to negative interactions. Young adults also attend significantly more to the 'giver' (initiator) during positive interactions and attend in nearly equal amounts to the 'giver' and the 'receiver' during negative interactions (McFarland et al., 2013).

2.1.2.3 Interpreting subjective states

The subjective states of others, including emotion and 'familiarity' between two people in a dyadic interaction, are inferred through interpreting or 'decoding' verbal and nonverbal behaviours. Familiarity denotes knowledge, intimacy, and informality in relationships. As in 'friendships' and other social relationships in non-human primates, humans also use a combination of non-verbal cues, including interpersonal distance and spacing behaviour (i.e. physical distance between people, modulating distance), approach or avoidance (i.e. whole body movement or averted gaze), orientation reactions (i.e. looking toward, turning toward), visual attention (i.e. gaze, eye tracking; McFarland et al., 2013), facial expression, manual movements (i.e. 'talking with your hands', waving 'goodbye'), and 'social touch' (i.e. hugging, holding hands).

Multiple studies have reported that naïve observers are able to identify levels of familiarity in dyadic relationships (strangers, family, lovers, friends) at better than chance levels from watching silent videos and static frames of the individuals involved in interactions (Ambady & Gray, 2002; Benjamin & Creider, 1975; Feyereisen, 1994; Saville & Balas, 2014; Slepian, Bogart, & Ambady, 2014). This process of decoding nonverbal behaviour and relational roles occurs in seconds. Adults are able to decode level of familiarity between other adults by watching 6-second video clips (Saville & Balas, 2014) and can identify social awkwardness in children in video clips as short as 1 second (Grossman, 2015). Both behavioural familiarity in close relationships and the ability to read or 'decode' this nonverbal behaviour are influenced by variables including age (Balas, Kanwisher, & Saxe, 2012; Krendl & Ambady, 2010), sex (Briton & Hall, 1995; Hertenstein & Keltner, 2011; Schmidt, Morr, Fitzpatrick, & Richardson, 2012), culture (Hess, Blaison, & Kafetsios, 2015), cognitive and functional capacity

(Baron-Cohen et al., 2015; Feyereisen, 1994; Feyereisen, Berrewaerts, & Hupet, 2007; Grossman, 2015), and the environmental context (Leleu et al., 2015; Puccinelli, Tickle-Degnen, & Rosenthal, 2004; Travers et al., 2013).

Decoding nonverbal behaviour involves both innate and acquired skills. Adults and older children perform better at decoding familiarity behaviour than younger children, with adults and older children performing better when interactions are presented in temporal sequence (playing a video forward rather than backward) and younger children showing no bias for sequence (Balas et al., 2012). Older adults also perform more poorly at decoding emotional anger from static but not dynamic images (Krendl & Ambady, 2010). Females tend to have greater decoding accuracy than men (Ambady & Gray, 2002; Schmidt et al., 2012) and also express sympathy and happiness in interactions with other females using social touch at a greater than chance rate (Hertenstein & Keltner, 2011).

2.1.2.4 Observed behaviour in adult friendship

Studies investigating nonverbal behaviour in adult friendship dyads present conflicting result (Feyereisen, 1994). Conversing female friends show higher frequencies and durations of gaze, but not body, orientation toward one another than conversing female strangers (Coultts & Schneider, 1976). On the other hand, duration of mutual gaze between friends has also been reported to decrease with increased proximity, and gaze duration to be longer between strangers (Swain, Stephenson, & Dewey, 1982). During listening parts of conversations, friends may look at their partners less, whereas strangers look at their discussion partner more (Rutter & Stephenson, 1979). The role of the person (speaker or listener) and their need for information may be a factor in gaze duration. A small-scale comparative study of social interactions between people with Alzheimer's disease ($n = 7$) in residential care and non-impaired age-matched controls ($n = 5$) reported that both groups spoke longer with an unfamiliar student than with a familiar staff member, and both groups used more simultaneous speech with familiar others than with unfamiliar others (Feyereisen, 1994). People with Alzheimer's disease oriented their head toward conversational partners both while speaking and while listening, while controls oriented their head toward the person more often while speaking than while listening (Feyereisen, 1994).

As with observation of 'friendship' in non-human primates, there has been a convention for identifying friendship based primarily on static proximity, and on proximity-seeking and maintenance behaviours between individuals who have freedom of movement, expression, and choice, such as in studies of university students and

young children (Bauminger-Zviely & Agam-Ben-Artzi, 2014; Dewitte, De Houwer, Buysse, & Koster, 2008; Feyereisen, 1994). These same assumptions may be misleading or inapplicable when the individuals involved cannot move independently, have a limited range of facial or expressive movement, and may have limited or fluctuating communicative and cognitive capacity to engage with others at will.

2.1.3 Summary

Comparative research and evolutionary models suggest that brain structure has evolved to support the complex cognitive processes required to manage interpersonal relationships in large social groups. The size of social networks may have a reflexive association with the size and functional capacity of brain networks. Social relationships involve concurrent activation of multiple interconnected brain areas and stimulate release of neuropeptides that signal areas of emotional reward and reinforcement, in turn effecting behaviour. In this context, seeking positive connection with others through social interactions is an expression of natural human behaviour. These behaviours in turn allow others to identify patterns of interactions that indicate specific social relationships between individuals and groups and to make decisions as to whom they would avoid, approach, or form relationships with. Humans are able to rapidly decode nonverbal behaviour and to identify level of familiarity between others. However, few studies have considered social relationships in settings such as residential aged care. Observational studies have provided conflicting reports on behaviours that define friendship and suggest that multiple variables, including age, gender, culture, context, and functional capacity, influence behaviour observed in dyadic interactions.

2.2 The quality of social relationships

Human social relationships influence cognition, perceptions, emotions, and behaviour (Dunbar & Shultz, 2007; Glymour, Weuve, Fay, Glass, & Berkman, 2008), affecting biopsychosocial function across the lifespan including advanced old age (Adams & Blieszner, 1989; Hartup & Stevens, 1997; Spector & Orrell, 2010; Takahashi, 2005). The quality of social relationships is associated with self-perceived social support or loneliness (Binder, Roberts, & Sutcliffe, 2012). Feeling socially supported through friendship and social connections is associated with greater psychological health (Ashida & Heaney, 2008; Carpenter, 2002). Conversely, perceived and actual

social isolation are associated with reduced cognitive performance and poorer mental health (Cacioppo et al., 2014; Cornwell & Waite, 2009).

2.2.1 Positive, negative, and ambivalent relationships

Different types of peer interactions shape and define relationship networks early in human development. In broad terms, affiliative interaction promotes 'connection', attracts people to one another, is generally constructive, and promotes cohesive relationships that serve 'positive' functions for those involved. Nurturance, guidance, companionship, and cooperation are all considered forms of affiliative interaction. Empathic models suggest that these types of altruistic, supportive behaviours are motivated by an evolved tendency to respond with empathy or sympathy to others who are in need, sad, or distressed (Burkett et al., 2016). However, social affiliative models suggest that people prefer to help and affiliate with socially desirable others who do not appear needy, but successful and happy. Studies comparing the empathic and social affiliative models in contexts of daily interactions (i.e. people entering a university building) and salient need (i.e. people entering a hospital) report that empathic altruism predominates only in contexts of salient need when there is little or no direct interaction between the person giving and the person receiving support (i.e. donating money to hospital patients). Social affiliative motives predominated in daily contexts and in contexts of salient need that involved direct interaction between individuals (i.e. holding the door open for a healthy person or for an injured person). People preferred to directly support and assist happy people more than those who appeared sad even in situations of obvious need, suggesting that social affiliative motives have more influence in daily direct interactions (Hauser, Preston, & Stansfield, 2014).

'Ambivalence' in relationships indicates the presence of complex and possibly contradictory interactions that are not wholly 'positive' or 'negative' (Fingerman, Hay, & Birditt, 2004). Studies of ambivalence in spousal relationships report associations between age and ambivalence, with more midlife adults assessing their relationships as ambivalent and more older adults assessing their relationships as supportive (Windsor & Butterworth, 2010). It is widely accepted that most forms of close social relationships are complex in nature, involving both 'positive' and 'negative' exchanges, and that constructive conflict resolution is a marker of strength and cohesion in relationships (Fung, Yeung, Li, & Lang, 2009; Hiatt, Laursen, Mooney, & Rubin, 2015). Negative interactions in supportive relationships may indicate greater trust and intimacy in the relationship and may be cognitively stimulating or stressful (Seeman, Lusignolo, Albert, & Berkman, 2001; Seeman et al., 2011). However, ambivalence that is not

resolved in a constructive manner can devolve into aggression in close relationships. In the social networks of older adults, individuals referred to as ‘friends’ may actually be abusive (Schafer & Koltai, 2014).

Antagonistic or hostile interaction discourages ‘connection’, may repel other people, divides, and serves generally ‘negative’ functions. Social exclusion, victimisation, and bullying are examples of antagonistic interactions. Social exclusion is involved in ‘ambivalent’ and ‘negative’ social interactions (Kawamoto, Ura, & Nittono, 2015; Zadro & Gonsalkorale, 2014). Victimisation is intentional aggression from one person to another with intent to harm (Arriaga & Schkeryantz, 2015). Bullying is a similar form of aggression that continues or repeats over time within a perceived power imbalance between the aggressor(s) and victim(s), restricting the victims from defending themselves (Meter & Card, 2015). Victimisation and bullying are both present in resident-to-resident aggression between people with dementia (Ellis, Teresi, et al., 2014; Pillemer et al., 2012) and can take many forms such as boundary transgression (MacAndrew, Beattie, O’Reilly, Kolanowski, & Windsor, 2015), arguments and belligerence between roommates, inappropriate sexual behaviour (Ellis, Teresi, et al., 2014; Pillemer et al., 2012), and aggression resulting in physical injury (Ferrah et al., 2015).

2.2.2 Social relationships and health

2.2.2.1 Differential effects of positive and problematic relationships and isolation

Differential effects have been identified for these differing ‘types’ of relationships on biopsychosocial function (Uchino, 2009; Uchino et al., 2012; Uchino, Holt-Lunstad, Smith, & Bloor, 2004). Exploration of the latent constructs of ‘positive’ and ‘negative’ social relationships suggests that these categories have similar factor structures across groups of community-dwelling older adults (aged 60–80 years), including those experiencing recent physical disability or loss of a partner. Positive social ties have been associated with greater psychological wellbeing for these adults and negative social ties associated with both psychological distress and wellbeing. ‘Positive’ and ‘negative’ relationships uniquely contribute to predictions of psychological distress or wellbeing over and above personality characteristics of neuroticism and extroversion (Finch, Okun, Barrera, Zautra, & Reich, 1989).

2.2.2.2 Negative and ambivalent interactions

Negative social interactions are associated with detrimental effects on biological markers such as activation of the hypothalamic-pituitary-adrenal (HPA) axis (Cacioppo et al., 2015; Goldman-Mellor, Hamer, & Steptoe, 2012), sympathetic and parasympathetic nervous system function (Cheng et al., 2014; Crittenden et al., 2014), and production of inflammatory cytokines (Chiang, Eisenberger, Seeman, & Taylor, 2012; Hackett, Hamer, Endrighi, Brydon, & Steptoe, 2012; Loucks, Berkman, Gruenewald, & Seeman, 2006). Low levels of social support predict increased systolic blood pressure and low levels of social integration are linked to increased risk of hypertension (Yang, Boen, & Harris, 2015). Negativity and ambivalence in close social relationships has been associated with epigenetic effects and cellular ageing as indicated by shortened leukocyte telomere length (Barger & Cribbet, 2016; Carroll, Diez Roux, Fitzpatrick, & Seeman, 2013). Women who reported more perceived ambivalence in close relationships had shorter telomeres than women experiencing more positivity or negativity in relationships or than men in any quality of relationship (Uchino et al., 2012). Associations between reduced social support and shorter leukocyte telomeres have been reported in a multi-ethnic study, and shorter leukocyte telomeres and higher telomerase activity have been linked to reduced social support in otherwise healthy older men but not older women (Zalli et al., 2014).

Negative social interactions have a disproportionately large effect on physical and psychological health (Fuhrer & Stansfeld, 2002; Newsom, Rook, Nishishiba, Sorkin, & Mahan, 2005; Schuster, Kessler, & Aseltine, 1990). An increase in the total average number of self-reported negative social interactions has been associated with an increased probability of developing hypertension in older adults (Sneed & Cohen, 2014). In a sample of healthy young adults, participants who recorded more competitive and negative interactions in diarised accounts of daily social encounters had higher levels of proinflammatory cytokines (Chiang et al., 2012). In people with schizophrenia, negative stigmatising social interactions, including interactions with friends, family, and mental health workers, were associated with lower general life satisfaction and lower satisfaction with leisure activities (Yanos, Rosenfield, & Horwitz, 2001). Conversely, poorer physical health exacerbates the detrimental emotional effects of negative interactions. Older adults with reduced functional capacity experience more emotional distress from negative social exchanges than their more physically capable counterparts (August, Rook, & Newsom, 2007).

2.2.2.3 Differentiated effects: context, type of support, and relationship

The social context, type of social support, and the relationship between the people providing and receiving the support may further differentiate effects, as illustrated in the following examples (Burholt & Scharf, 2014; Cohen, Hsueh, Russell, & Ray, 2006; Fiori, Antonucci, & Akiyama, 2008; Newsom et al., 2005; Thorsteinsson & James, 1999). Low levels of negativity in an impoverished or 'structurally restricted' social network (small network, few members, low levels of engagement) may have greater negative effect on mortality than higher levels of negativity in a larger, less impoverished network (Fiori et al., 2008). Passive support during a stress-inducing situation may induce a greater decrease in blood pressure than active support (Thorsteinsson & James, 1999). Laboratory studies suggest that support received from a friend may not be more effective than support from a stranger (Gallagher, Howard, & Heffernan, 2015). Negative interactions between friends are more detrimental to women, with a greater association between hypertension and total mean number of negative friendship interactions among women than among men (Sneed & Cohen, 2014). This sex-effect may be further influenced by culture, with a greater association between negative interactions and depression for French women than for French men, and a greater association between negative interactions and depression for Japanese women experiencing resource deficits such as poor health and financial strain than for Japanese men experiencing similar circumstances (Antonucci et al., 2002).

2.2.2.4 Cognitive discrepancy theory

Cognitive discrepancy theory suggests that people feel isolated and unsupported when they identify a negative discrepancy between the amount of social contact they perceive and the amount that they wish for (Kelley & Thibaut, 1978; Perlman & Fehr, 1986; Russell, Cutrona, McRae, & Gomez, 2012; Thibaut & Kelly, 1959). It is theorised that individuals set internal expectations and standards for the quality and quantity of all the relationships in their social networks and compare their perceptions of their relationships against these internal standards. If these perceptions meet the expectations then people feel supported, but if perceptions fall short of expectations they feel lonely. However, the association between expectations and perceptions may not be linear. Research with adolescents indicates that incremental increases or decreases in the quality or quantity of relationships may have a disproportionate effect on their perceptions of support or loneliness, depending upon the salience and meaning of those relationships to the individuals involved (Russell et

al., 2012). Studies with older adults suggest that personal attributes (age, gender, education, health, depressive symptoms) and environmental context contribute to an individual's perceptions and expectations for their social relationships and that simply increasing social interactions for older people with poor physical and mental health may not decrease their feelings of low social support and loneliness (Burholt & Scharf, 2014; Cacioppo et al., 2014).

2.2.2.5 Proportion of positive to negative interactions

Some researchers suggest that it is the ratio of positive and negative social interactions that is associated with positive or negative outcomes such as 'flourishing' or 'languishing' mental health (Diehl, Hay, & Berg, 2011; Faulk, Gloria, & Steinhardt, 2012; Feeney & Collins, 2015; Fredrickson, 2013; Meeks et al., 2012), success or dissolution in spousal relationships (Gottman, 2014), enhanced or diminished learning in classrooms (Voerman, Meijer, Korthagen, & Simons, 2012), and depression and remission in major depressive disorder (Schwartz et al., 2002). Evidence from these studies indicates that ratios may vary according to personal attributes such as age, gender, and mental health status, as well as relational attributes such as the 'type' of relationship (i.e. spousal, peer, teacher) (Brown, Sokal, & Friedman, 2014). Positive psychosocial outcomes (i.e. enhanced relationships, learning, mental health) have been associated with ratios of 2:1 positive to negative social experiences or higher, while poorer outcomes (i.e. more dysfunction in relationships, learning, mental health) are associated with ratios of 1:1 and lower (Gottman, 2014; Meeks et al., 2012; Schwartz et al., 2002; Voerman et al., 2012).

2.2.2.6 Benefits of friendship and positive social relationships

It is widely accepted that positive social relationships act as 'supportive networks' (Cornwell, 2009; Cornwell, Laumann, & Schumm, 2008) that contribute to longevity (Giles, Glonek, Luszcz, & Andrews, 2005), psychological wellbeing (Carpenter, 2002; Helgeson, 2013; Litwin & Shiovitz-Ezra), and healthy ageing (Crooks, Lubben, Petitti, Little, & Chiu, 2008; Glymour & Manly, 2008; Uchino, 2009) of older adults living in the community (Adams, Blieszner, & de Vries, 2000; Fiori et al., 2008; Fiori et al., 2011). Positive relationships, and friendships in particular (Giles, Anstey, Walker, & Luszcz, 2012), may promote cognitive reserves that protect against neurodegenerative processes such as Alzheimer's disease (Amieva et al., 2010; Bennett, Schneider, Tang, Arnold, & Wilson, 2006), while social isolation and lack of social ties are associated with chronic disease, neuropathology, and cognitive decline

in old age (Alpass & Neville, 2003; Cacioppo & Hawkley, 2009; Cohen, 2004; Friedler, Crapser, & McCullough, 2015). However, studies reporting weak or absent associations between social relationships, cognitive function, and risk for dementia highlight the possibility of reverse causality, i.e. that incipient or prodromal dementia affects social relationships (Bennett, Arnold, Valenzuela, Brayne, & Schneider, 2014; Sörman, Rönnlund, Sundström, Adolfsson, & Nilsson, 2015).

2.2.2.7 Benefits of social engagement

Social engagement is the enactment of social relationship ties through participatory activity. Social networks provide opportunities for engagement, reinforcement of social roles, a sense of belonging, and a coherent sense of identity within the network context (Berkman et al., 2000). Being socially engaged is associated with better cognition (Krueger et al., 2009), health, happiness, and higher quality of life in older people (Golden, Conroy, Bruce, et al., 2009; Golden, Conroy, & Lawlor, 2009). More complex social networks involving multiple social groups that provide a wider breadth of enrichment and variety in social roles may produce greater cognitive benefits (Ellwardt, Van Tilburg, & Aartsen, 2015; Haslam et al., 2014; Haslam et al., 2016). Internet use and social engagement in cultural activities (i.e. going to the cinema, museums, theatre) have been associated with greater health literacy in older adults (Kobayashi, Wardle, & von Wagner, 2015). Aged care residents with dementia who engaged in multi-modal social group therapy experienced longitudinal stabilisation of cognitive-functional ability in performing ADLs (Luttenberger, Hofner, et al., 2012). Internationally, researchers (Abbott et al., 2015; Adams & Blieszner, 1995; Berkman & Kawachi, 2000), medical professionals (Spector & Orrell, 2010), care staff (Anderson, Taha, & Hosier, 2009), and health care policy makers (Australian Health Ministers Advisory Council, 2015) recognise the importance of friendships and social relationships to the health and wellbeing of elders throughout the later stages of their lives in both informal and formal care (Cho et al., 2015; Johnson, 1999; Litwin & Landau, 2000; National Seniors Productive Ageing Centre, 2013).

In their seminal article, Berkman and colleagues (2000) argue that social engagement provides opportunities for companionship and sociability and that the associated behaviours and attitudes:

“...are not the result of the provision of support per se, but are the consequence of participation in a meaningful social context in and of itself. We hypothesise that part of the reason that measures of social integration or ‘connectedness’ have been such

powerful predictors of mortality for long periods of follow-up is that these ties give meaning to an individual's life by virtue of enabling him or her to participate in it fully, to be obligated (in fact often to be the provider of support) and to feel attached to one's community." (Berkman et al., 2000, p. 849).

2.2.2.8 Social engagement among older Australians

In Australia, recognition of the far-reaching health benefits of friendship and positive social networks for older men has led to Federal funding of the Men's Shed movement providing venues and opportunities for focused social engagement, support, and mentoring among older men in the community and in formal aged care (Shaw, Gullifer, & Shaw, 2014). The Men's Shed movement occurred in response to the success of the Older Women's Network and the lack of similar organisations for men (Hall, Brown, Gleeson, & Zinn, 2007; Jackson, 2012). Research from the government-funded national longitudinal study Social Activity and Wellbeing of Older Australians (wave 1: $n = 2123$) reports that 96% of respondents from the community aged 59–89 years engaged in face-to-face social activities with family and friends, and 79% of those aged 70 and over reported feeling that they experienced as much socialising as they wished to (National Seniors Productive Ageing Centre, 2013, p. 9). Respondents endorsed engaging in a wide breadth of activities with family and friends, with the highest percentages endorsing socialising at their own (60%) or another person's home (58%), going out to eat or drink (58%), or attending a family party/get-together (42%) (National Seniors Productive Ageing Centre, 2013, p.10). Fifty-four percent of respondents endorsed that they had as many friends as they wanted or needed. However, 92% of people aged 70 and over reported that they really liked the people that they interacted with and the same percentage endorsed that they considered the people that they interacted with to be friends (National Seniors Productive Ageing Centre, 2013, p. 12).

2.2.2.9 Facilitated engagement

Interventions appear to be necessary to encourage meaningful contact between frail and cognitively impaired older people living in residential aged care (Bergland & Kirkevold, 2008; Lee, Lee, & Woo, 2005; Mok & Müller, 2014; Roberts & Bowers, 2015). Studies report that ongoing meaningful peer relationships result in less agitation in residents with dementia (Kutner et al., 2000) and that residents' perceptions of support from staff contribute to less social loneliness and higher perceived wellbeing (Carpenter, 2002). The few studies examining the relationship between group and

individual behaviour in residential aged care have shown that simply placing residents together, for example in common rooms, is not enough to encourage social integration (Abbott et al., 2015; Hauge & Kristin, 2008).

Observational studies suggest that positive social engagement most often occurs during staff-facilitated structured social activities (Casey, Low, Goodenough, Fletcher, & Brodaty, 2014), however, residents tend to focus on staff during these activities and are reported to initiate interactions with coresidents more frequently outside of structured activities (Roberts & Bowers, 2015). Previous observational research indicated that rates of resident interactions increased when refreshments were served in common rooms and without further staff facilitation; ineffective verbal communication accounted for the largest proportion of interactions (Carstensen & Erickson, 1986). Residents with dementia who participated in an intervention using personalised memory books (i.e. personal information and photos) with staff trained in communication skills increased their use of positive language and interactions with other residents (Allen-Burge, Burgio, Bourgeois, Sims, & Nunnikhoven, 2001; Burgio et al., 2001). Observations of facilitated meetings for conversation among groups of unfamiliar residents (i.e. from different care units) with moderate to moderately-severe dementia who did not have impaired communication capacity or BPSD highlighted frequent interaction between residents and exclusively positive behaviour (Mabire et al., 2016).

2.2.2.10 Social support and cognition

Despite the wealth of evidence suggesting that social engagement promotes mental and physical health and wellbeing, recent cognitive-pathologic studies of the possible longitudinal effects of cognitive and social activities on neuropathology and cognition in late life have provided equivocal results. Studies employing batteries of cognitive testing report differential associations between different types of social support and general cognitive ability, and that these associations are not moderated by age or sex (Cacioppo & Hawkley, 2009; La Fleur & Salthouse, 2016). However, an overview of current research investigating experiential factors on brain reserve and pathology reported only weak associations between multiple variables related to social engagement (i.e. network size, loneliness, purpose in life, and composite measures) and weak relationships between neuropathology and cognition (Bennett et al., 2014).

2.2.2.11 Personal resources, relationship strength, and modality

The interaction between the quality of positive relationships and the benefits that people experience is complex. The strength of relationships contributes to the resources available in relationships and the amount of resources required to maintain those relationships (Altman & Taylor, 1973). Researchers investigating personal resources involved in maintaining differing levels of 'friendship' strength (best, close, and casual) reported that among university students, more developed relationships such as 'best' friends were self-sustaining. They required less investment of time and resources to maintain closeness due to the high level of affection, trust, and commitment. 'Close' friendships, which involved emotional bonds, but with lower levels of trust and commitment, required more frequent contact to maintain or increase relationship strength. Casual friendships were highly dependent upon proximity and face-to-face contact in order to maintain ties and reap benefits from the relationship (Rose & Serafica, 1986). Conversely, similar research among university students reported that 'best' friends engaged in more maintenance behaviours than 'close' or 'casual' friends (Oswald, Clark, & Kelly, 2004).

A large network study using data from the General Social Survey of Canada ($n = 24,347$) investigated associations between friendship networks and indicators of subjective wellbeing, including self-reported social trust, stress, health, and practical support. Study researchers reported differential effects associated with relationship qualities such that having a larger friendship network of similar friends and more face-to-face or internet contact (but not phone contact) was related to higher levels of social trust (van der Horst & Coffé, 2012). Having a higher number of close friends and having more face-to-face contact were both associated with lower stress, while more internet contact was associated with higher stress. Having a higher number of close friends was only beneficial for health when all of the friends were similar, otherwise more friends were detrimental. Though having a larger friendship network, higher frequency of contact (multiple forms), and better overall health were associated with higher levels of subjective wellbeing, the only variable to have a direct positive effect on subjective wellbeing among community-dwelling adults was frequency of face-to-face contact. Having a larger, more diverse friendship network with multiple contact forms was associated with receiving more help from friends, but was not associated with higher subjective wellbeing (van der Horst & Coffé, 2012).

2.2.3 Summary

Positive and negative relationships and interactions have differential effects on physical and mental health and wellbeing. However, the balance or ratio of positive to negative may influence the experience of better or poorer outcomes for health and wellbeing. Negative relationships have a disproportionately negative effect on health and the detrimental effects of negative interactions are greater for people who have small, structurally impoverished social networks compared to people who have larger, more supportive networks. Women may experience poorer socio-emotional outcomes than men when they encounter negative interactions in close personal relationships. Cognitive Dissonance Theory predicts that the subjective experience of support or loneliness is associated with individual relationship expectations. If relationships meet personal expectations people feel supported; when they fail to meet these expectations, people feel isolated or lonely.

Studies on the benefits of friendships in particular, and of positive relationships in general, report equivocal findings regarding associations between these relationships and the promotion of cognitive reserves that protect against neurodegenerative processes and decline in old age. However, it is widely accepted that supportive social networks and active social engagement have far-reaching physical and cognitive health benefits into old age. Older Australians in the community frequently engage in face-to-face interactions with friends and family and enjoy socialising at their own or others' homes and going out to share meals. Having more face-to-face contact may be more beneficial than having multiple forms of contact including communication by phone and internet. Contradictory findings suggest that formation and maintenance of emotionally close relationships may either require more personal resources than weaker relationships or may be self-sustaining and require less effort. Research of social engagement in residential care indicates that facilitation is necessary to foster positive meaningful interaction between residents with reduced cognitive-functional capacities.

2.3 Defining friendship

2.3.1 Friendship as a construct

Friendship is a broad construct used to label a complex spectrum of observed behaviours, cognitions, and emotions (Allan, 2010). The 'amount', 'level', and 'intensity'

of these attributes, i.e. a greater 'amount' of reciprocity, a higher 'level' of trust, or greater 'intensity' of emotion, help to differentiate friendships from other relationships (Adams et al., 2000). In social network research, friendship relationships are often grouped within relationship categories such as 'confidantes', close 'non-kin' relationships, and those with whom people 'discuss important matters' (Cornwell, 2009; Perry & Pescosolido, 2010). These categories are characterised hierarchically by perceived level of intimacy such as 'casual friend', 'close friend', and 'best friend' (Rose & Serafica, 1986; van Hoogdalem, Singer, Eek, & Heesbeen, 2013), and differentiated from other 'friend-like' relationships such as 'comradeship' (Levy, 2005), 'mateship', and 'neo-mateship' (Butera, 2008).

2.3.1.1 Working definition

Friendship is generally defined as a unique dyadic relationship that is different from other social relationships such as kinship, work colleagues, or neighbours, in that it is voluntary, bi-directional, and based upon mutual dependence. Friendship involves fewer societal constraints than any other social relationship and therefore varies widely in its structure and content (Adams & Blieszner, 1989, 1995). Friendship develops over time and shares the constructs of respect, trust, responsiveness, capitalization, and social support seen in other close positive relationships such as romantic relationships and kinship (Miller, Perlman, & Brehm, 2007). Whether face-to-face or in online social media environments (Amichai-Hamburger, Kingsbury, & Schneider, 2013), friendship is recognised as a phenomenon defined by the individuals involved and characterised by closeness and reciprocity.

2.3.1.2 Comparison with other close relationships

Friendship involves greater trust, commitment, emotional support and depth of knowledge about relationship partners than does 'acquaintanceship' (Hall, 2012). It is a type of close relationship that shares relational elements with romantic love and kinship while differing from these relationships in important ways. It is considered an 'intimate relationship' or 'intimate partnership' characterised by 'liking' more than 'love' and differentiated from romantic relationships which are characterised by passion, sexual desire, and greater exclusivity (Miller, Perlman, & Brehm, 2007). Friends may 'love' one another but are not 'in love' with each other. Kinship and friendship involve high levels of trust and support. Kinship typically entails implicit obligation and greater instrumental support whereas friendship involves greater choice and affirmative emotional support (Messerli, Silverstein, & Litwak, 1993; Wright, 1984). In the absence of neglect and

abuse, kinship relationships involve dispositional trust (Frederiksen, 2012) and are assumed to exist rather than being seen as 'optional'. This differentiation has important consequences for the resources required for relationship maintenance, including explicit behaviour, and for evolving relationship qualities. Though strong long-lasting friendship can evolve and take on characteristics of 'surrogate' kinship including dispositional trust (Ackerman, Kenrick, & Schaller, 2007), friendship requires investment of personal resources such as time, attention, and action to maintain or grow the relationship (Roberts & Dunbar, 2011a; Roberts & Dunbar, 2011b).

2.3.1.3 Self-referent model of friendship

Social psychologist Paul Wright's Self-referent model of friendship (Wright, 1984) suggests that friendship involves voluntary interdependence and meets self-referent needs through each partner's affirmation of the other's self-identity as a unique, genuine, and irreplaceable person ('person qua person' factor). Wright's model positions friendship as a 'communal relationship' as compared to an 'exchange' relationship (Clark & Mills, 2012; Mills & Clark, 1982). Communal relationships involve equity of affect instead of equity in exchange of benefits. Though this produces rewards for the partners, it is not an 'exchange' of emotion but rather an expression of reciprocity through mirrored emotion regulation. Friends in such relationships share understanding and acceptance and can simply 'be' together in the moment. They are more 'we' than 'you and I'. Strong friendships can become self-sustaining and intrinsically valuable, a reward in themselves (Wright, 1984).

2.3.2 Expectations and behaviour in friendship

Universal standards of friendship represent dimensions of ideal expectations (Hall, 2012). These standards incorporate generalised beliefs about 'perfect' friendship and are not necessarily based upon actual observed behaviour in individual relationships (Pahl & Spencer, 2010). Expectations are the mediating links between people's friendship schema and their perceptions and attributions in the relationship (Fitness, 2006). A multi-study investigation of expectations associated with friendship reported six universal standards (Hall, 2012): symmetrical reciprocity (mutual loyalty, trust) (Hartup & Stevens, 1997), agency (selfish benefit), enjoyment, instrumental aid (practical assistance), similarity, and communion (self-disclosure). 'Symmetrical reciprocity' and 'communion' represent affective aspects of mutuality, trust, emotional intimacy, and support. 'Instrumental aid' and 'similarity' represent communal aspects of friendship such as provision of practical assistance, comparable personal attributes,

and shared experiences. 'Enjoyment' encompasses the sociable aspects of friendship, the experience of fun, occupation, diversion, or relaxation in each other's company. 'Agency' in this context means expectation of personal benefit and contribution to agentic rather than communal goals (Trapnell & Paulhus, 2012).

Expectations and 'rules' of behaviour in friendship are typically learnt in childhood (Furman & Bierman, 1983; Pataki, Shapiro, & Clark, 1994), developed and consolidated in adolescence (Furman & Bierman, 1984; La Gaipa, 1979), then practised and refined into adulthood (Hartup & Stevens, 1999). The expectations that individuals hold of their relationship partners are thought to affect almost every aspect of social interaction. Children's friendship expectations influence how they treat their friends, and the success of their friendships (MacEvoy, Papadakis, Fedigan, & Ash, 2016). Cross-sectional qualitative analysis of children's and young adolescents' essays on friendship suggest both continuity and developmental change in thematic dimensions of friendship, including reciprocal liking, providing help to a friend (sharing), receiving help from a friend (sharing), and organised play, with only the two latter themes diminishing with older age (Bigelow & La Gaipa, 1975; La Gaipa, 1979). Reports of consistently high salience of behavioural characteristics (i.e. helping, sharing secrets) across grade levels 2, 4, and 6 suggest that the fundamental importance of explicit behaviour in friendship is established early in development, while increased salience of more complex dispositional characteristics (i.e. consideration, loyalty) at higher grade levels suggests developmental changes in implicit attributes. From early adolescence (ages 12–14 years) to later adolescence (ages 16–19 years), descriptions of ideal friends such as "nice" and "good" decline and expectations of greater intimacy and self-disclosure increase (Azmitia, Ittel, & Radmacher, 2005; Hartup, 1993; La Gaipa, 1979). Loyalty (commitment), emotional support, and trust and trustworthiness (authenticity) become the most salient themes in descriptions of 'best' friendships by early and late adolescents (Azmitia et al., 2005; La Gaipa, 1979).

These primary themes of friendship expectations are carried into adulthood, as evidenced from investigation of behavioural 'rules' of adult friendship. A large cross-cultural study of adult friendship in the United Kingdom (UK), Italy, Hong Kong, and Japan reported six universal 'rules' of friendship behaviour, including 1) standing-up for the other person in their absence, 2) sharing good news, 3) showing emotional support, 4) showing intimacy through trust and sharing confidences, 5) offering to help when needed, and 6) trying to make the other person happy when you are together (Argyle & Henderson, 1984). Cross-cultural studies on how older adults defined friendship reported familiar behavioural themes of self-disclosure, sociability, day-to-day

assistance, shared activities, and cognitive themes of loyalty, trustworthiness, and shared interests. Salient aspects of friendship indicated gender differences, with women focusing on more emotional characteristics and men focusing on interaction frequency and relationship duration (Adams et al., 2000). Friendship expectations of people with dementia appear to be similar to those of other older adults and include the expectation of trust, emotional intimacy, shared activities and interests, and enjoyment (Casey et al., 2015; de Medeiros et al., 2012).

2.3.3 Summary

Friendship is a broad and complex construct, difficult to define and influenced by individual variables and context. However, cross-cultural studies suggest that most adults hold 'universal' ideal expectations and rules of behaviour in friendship. Friendship rules of behaviour are typically learnt in childhood and refined through adolescence and into adulthood, with developmental and environmental variables influencing the salience of particular relationship characteristics. Play and explicit behaviours indicative of friendship in younger children remain important parts of relationships but are joined by more implicit aspects of relationships such as trust and emotional intimacy that help to define and differentiate 'close' and 'best' friendships from more casual relationships and acquaintances. Older adults define friendship in much the same way as younger adults, and older adults with dementia may continue to hold similar definitions and expectations of friendship.

2.4 Developing friendships

Friendship and other close relationships are formed over time through a process of repeated social interactions. Social psychological theories of relationship development suggest that relationship strength is determined by the progression and digression of interaction through multiple stages across time, with dyadic behaviour influenced by the 'stage' of the relationship (Altman & Taylor, 1973; Levinger & Snoek, 1972). The meaning and importance that individuals attribute to relationships may be influenced by lifespan developmental changes, which in turn influence actions and interactions observed in relationships (Hartup & Stevens, 1997; Selman, 1980). In this way, variations in both relationship and lifespan development may influence the structure, meaning, and quality of dyadic relationships (Antonucci et al., 2014; Finkel et al., 2015). The first part of this section will briefly describe foundational theories of how people form interpersonal relationships and how those relationships do, or do not,

progress into friendship over time. The second half of this section will provide examples of how the meaning and importance of friendships and other social relationships may differ across the lifespan.

2.4.1 Models of relationship development

2.4.1.1 Model of pair relatedness

Levinger and Snoek's (1972) model of pair relatedness emphasises states of awareness and four possible levels of dyadic relatedness. The first level, 'zero contact', recognises the state of being in company or in a group yet remaining unaware of and isolated from one another. The second level, 'unilateral awareness', progresses to perceiving and evaluating one another based upon external factors such as physical appearance prior to commencing direct interactions. Casual relationship ties begin to form in the third level of relatedness, 'surface contact', with increased yet superficial engagement, exchanges of information, and testing of interactions. A continuum of true bonding through to increasingly deeper involvement progresses throughout the fourth level of relatedness, 'mutuality' (Finkel et al., 2015; Levinger & Snoek, 1972; Perlman & Fehr, 1986). In this model, familiarity built through frequency of interactions promotes attraction by reducing fear and uncertainty and lays the groundwork for long-term close relationships.

Recently, researchers have proposed a relationship-stage model of the link between familiarity and attraction (the ability of familiarity to promote or undermine interpersonal attraction) building upon Levinger and Snoek's model (Finkel et al., 2015). They suggest that informational coherence (capacity to integrate information acquired about a person) is key in the 'awareness' stage, experiential saturation (exposure to the point that a person is no longer novel) is key in the surface contact stage, and structural interdependence (frequent, diverse, strong influence over time) is key in the mutuality stage (Finkel et al., 2015). Their proposed model predicts that familiarity with a person can promote attraction but inability to integrate information about a person undermines attraction. Overexposure to a person may produce boredom or disgust, and too much structural interdependence can promote interpersonal conflict (Finkel et al., 2015).

Roommates or partners sharing spaces where they carry out their activities of daily living have high structural interdependence. Research suggests that in university roommate relationships the familiarity inherent in high structural interdependence can lead to dissatisfaction increasing over time: the longer randomly selected roommates

live together, the less they like one another. This effect may be increased if the roommates identify as belonging to different 'groups' (West, Pearson, Dovidio, Shelton, & Trail, 2009). It is possible that similar relationship mechanisms may influence satisfaction or dissatisfaction among aged care residents in their 'random' roommate assignments (Kovach & Robinson, 1996).

2.4.1.2 Social penetration theory

Altman and Taylor's (1973) Social penetration theory divides the stages of relationship development in four ways beginning with 'orientation'. 'Orientation' is a period of awareness and interactions characterised by superficial, highly structured behaviour that takes place in 'public' areas, as might be observed during structured activities at a RACF (Knight & Mellor, 2007). After establishing initial contact in the first stage, partners feeling more familiar and at ease begin to experience 'friendly' superficial interactions in the second stage, 'exploratory affective exchange' (Thomas, O'Connell, & Gaskin, 2013). Greater familiarity and positive encounters engender trust, allowing the development of greater intimacy and mutual understanding in the third stage, 'affective exchange'. In the fourth and final stage of 'stable exchange', the relationship involves high self-disclosure, mutual understanding, predictability, and trust. In this theory, relational closeness develops through trust and self-disclosure, and progression of relationships from one stage to the next is determined by an implicit ratio of the costs and benefits experienced by the interaction partners (Altman & Taylor, 1973).

Researchers investigating the development and maintenance of friendship between new undergraduate psychology students reported that, as predicted by social penetration theory, students interacted in behaviours at superficial and casual levels more often than at intimate levels at all stages of relationship development (Hays, 1984). Sixty percent of student relationships progressed to close relationships. Breadth of interactional content (including companionship, utility, self-disclosure, and affection), and the intimacy of exchange (superficial, casual, intimate) differentiated pairs of students who did and did not become close friends (Hays, 1984).

2.4.2 Variables affecting social engagement

2.4.2.1 Propinquity

Propinquity (physical proximity) can lead to repeated exposure and quantitative 'familiarity' (Finkel et al., 2015). Though 'familiarity' may be used colloquially to describe passing 'knowledge' of a target person or experience, relationship theorists

primarily use concrete quantitative definitions to explain 'dosage' of exposure, as in the number of interactions people have across time or the number of personal attributes that one person knows about another (Finkel et al., 2015). Research has provided conflicting accounts of whether familiarity increases or decreases attraction. In the classic Festinger, Schachter, and Back (1950) study of associations between propinquity and the friendship networks of married US military veterans living in a Massachusetts Institute of Technology university housing complex, residents were over four times more likely to name their randomly assigned next-door neighbours as friends than their neighbours who lived four doors away (Festinger, Schacter, & Back, 1963). In a similar study of relationships between tenants in residential complexes, Ebbesen, Kjos, and Konečni (1976) found that propinquity differentially increased both affiliation and dislike. The likelihood and strength of friendships increased with proximity and face-to-face encounters and personal dislike increased with proximity and the perception that the target individual had negative effects on their living environment (noise, odours, infringement on shared resources; Ebbesen, Kjos, & Konečni, 1976). Additional empirical evidence suggests that differential relationship outcomes associated with familiarity may depend on both internal and external variables.

2.4.2.2 Chance

The effects of environment and situational factors on formation of friendships has led to the argument that chance may have just as much to do with friendship formation as personal attributes. First year university students studying psychology who were randomly assigned to seating in the first session of an introductory course gave higher attractiveness ratings to the students that they were seated next to or with whom they were seated in the same row. One year later these same relationships were associated with higher friendship intensity ratings, leading researchers to conclude that coincidental proximity and group membership led to friendship formation (Back, Schmukle, & Egloff, 2008). Though this research is primarily an example of random selection creating opportunity for contact and awareness, environmental and situational variables in the form of propinquity (proximity) and familiarity (repeated exposure) were implicit in the design and both are widely-acknowledged as factors influencing friendship formation.

2.4.2.3 Homophily

The literature on social relationships suggest that people tend to choose to interact with similar others, this is known as homophily (Fu, Nowak, Christakis, &

Fowler, 2012). Homophily initially enables individuals to reduce uncertainty by differentiating 'in-group' members from 'strangers'. Studies investigating this principal using computer-simulated interactions report that cooperative relationships may be established between individuals without a history of reciprocity, based on recognition of minimal salient perceptual cues (Riolo, Cohen, & Axelrod, 2001). Studies on the effect of homophily on social relationships report that homophily structures close relationship networks through controlling the flow of information that people receive, the attitudes they form, and the interactions they experience with homophily of ethnicity, age, religion, education, occupation, and gender all exerting influence (McPherson, Smith-Lovin, & Cook, 2001). Homophily significantly predicts altruism and emotional closeness, though inter-individual similarity declines with frequency of contact (Curry & Dunbar, 2013).

Research of relational interdependent self-construal (RISC) supports the theory of homophily in friendship, with university students reporting higher affective quality of relationships with people with whom they perceived to share greater similarity (high RISC). However, participants low in RISC also reported higher quality of relationship with people high in RISC, suggesting dissimilarity-attraction (Morry, Kito, Mann, & Hill, 2013). Similar findings have been reported for people with developmental disabilities who shared a house, apartment, or room (collectively termed 'roommates') in long-term residential care (Wiltz, 2003).

2.4.3 Developmental changes in friendship

Research suggests that friendship has differential purposes and effects at different stages of human development (Adams & Blieszner, 1989; Antonucci & Akiyama, 1987b; Takahashi, 2005). People begin to organise their close relationships with peers very early in life. Between the ages of three (early preschool) and four (late preschool), children's behavioural patterns transition from using more antagonistic exchanges to using more positive exchanges to organise their social groups (Fujisawa, Kutsukake, & Hasegawa, 2009). Children as young as three appear to rank relationships with peers and have 'best' friends (Feldman, Gordon, Influss, Gutbir, & Ebstein, 2013).

2.4.3.1 Infancy and childhood

Educational psychologist Robert L. Selman theorised that children develop ToM through gradual progression from a single ego-centred perspective of social relationships to a level of cognitive perspective taking that allows them to maintain their

personal perspective while concurrently differentiating and incorporating the perspectives of multiple others (Selman, 1980, 1981). As children are able to integrate multiple other perspectives into their own understanding, they gain a greater awareness of others' thoughts, feelings, beliefs, and motivations and improve their ability to manage social situations and coordinate their own behaviour.

Longitudinal observational studies of peer interactions among pre-schoolers indicate that even at this young age children have dynamic networks of playmates with high levels of 'turnover' in the early stages of peer network development (i.e. the beginning of a schoolyear) (Barbu, 2003; Daniel, Santos, Peceguina, & Vaughn, 2013). Peer networks decrease in size as low-interaction relationships fall away and high-interaction relationships remain (Barbu, 2003; Daniel et al., 2013). In the process, children lose more interaction partners than they gain, with as few as 10% of relationships remaining stable across a typical school year. Children's long-lasting relationships are predominantly high-frequency dyadic or triadic same-sex associations and fluctuations in peer whole networks (i.e. an entire class) are driven by a small number of children with high fluctuation in their social patterns (Barbu, 2003).

2.4.3.2 Adolescence and young adulthood

The perceived quality of adolescent friendships affect feelings of self-worth (Hiatt et al., 2015), behaviour (conduct and problems), and academic performance (Burk & Laursen, 2005). In a study of early-adolescents (ages 11 to 13 years) and mid-adolescents (ages 14 to 16 years), adverse outcomes were found for students with discrepant views of their dyadic friendship quality and for those reporting high conflict and negativity in their relationships. Both individual and dyadic perceptions of low quality friendships with high levels of negativity were associated with internalising and externalising behaviour problems and lower marks in school (Burk & Laursen, 2005).

2.4.3.3 Midlife

Friendship behaviours established in adolescence carry-over into adulthood, however, the amount of time that friends spend together slowly begins to decrease as people approach midlife and private 'free' time is at a premium (Lachman, 2004; Walen & Lachman, 2000). Midlife adults spend approximately 7% of waking hours with friends with this percentage creeping up to 9% by age 65 (Larsen 1985). Research suggests that midlife adults have frequent social interactions and diverse social networks (home, social, work) but the size of these social networks begins to decrease (English & Carstensen, 2014). Some studies report that among midlife and older adults, women

have larger, more heterogeneous, and more interconnected close social networks than men (Antonucci & Akiyama, 1987a; Fuhrer & Stansfeld, 2002; Phongsavan et al., 2013). Other studies report more exclusivity and less interconnectedness among close relationship networks of women than in those of men (Cornwell, 2011).

2.4.3.4 Old age and the oldest old

Older adults report greater subjective wellbeing from having contact with friends than from having contact with adult children (Pinquart & Sörensen, 2000). Mathews' (1986) model of friendship style identified three distinct styles of friendship among older adults in the US (aged 60–80 years) based on a qualitative study of the oral histories of 63 individuals. Individuals with a discerning friendship style invested in a select few relationships with strong commitment and exclusivity, retaining these core friendships throughout life. Those with an independent friendship style saw relationships as a result of life circumstances more than selectivity in choice. They did not see friendships as deep or long-lasting commitments and were happy with a few relationships for friendly exchanges. Individuals with an acquisitive friendship style actively sought-out friendships throughout their lives and had several friendships that varied in strength and endurance (Mathews, 1986).

A study based upon data from the German Ageing Study (Deutscher Alterssurvey: DEAS) used five key indicators to operationalise Mathews' relationship styles, including number of friendships, mean emotional closeness, variance in emotional closeness across relationships, mean friendship duration, and variance in friendship duration across relationships. Their sample of adults aged 40–85 years named an overall average of 3.1 'friends', including neighbours, colleagues, acquaintances, and club members. Study results supported Mathews' three friendship styles and advanced the model by identifying two subtypes of the acquisitive style, an unconditionally acquisitive style in slightly younger individuals and a selectively acquisitive style in slightly older individuals (Miche, Huxhold, & Stevens, 2013).

2.4.3.5 Friendship network size across the lifespan

Friendship networks develop spontaneously among any group of people initially unknown to one another (strangers) who interact across time within a specific context (Zeggelink, 1995) such as young school children (Daniel et al., 2013; Fujisawa et al., 2009), first-year university students (Back et al., 2008; Perl & Trickett, 1988), employee cohorts (Morrison, 2002), or older-aged community volunteers (Rook & Sorkin, 2003).

Friendship networks are smaller, less interconnected (less dense), and less diverse than other types of relationship networks (Hanneman & Riddle, 2005).

Hartup et al. (1988) studied conflict and friendship relationships among pre-schoolers (ages 3 to 5 years) using observational and sociometric methods. These children identified with very small personal friendship networks, including an average of less than one or two unreciprocated (asymmetrical) friendships (girls, 0.86; boys, 1.68), less than one reciprocal friendship (girls, 0.63; boys, 0.88), and a small number of children (10%) did not appear to establish reciprocal friendships (Hartup, 1993; Hartup, Laursen, Stewart, & Eastenson, 1988). Subsequent studies also mention pre-schoolers who have no positive peer relationships, however, percentages of socially isolated peers are rarely reported in results (Daniel et al., 2013; Schaefer, Light, Fabes, Hanish, & Martin, 2010).

In a study of the mutual effects of friendships and antipathies on the development of adolescents' peer networks, Rambaran et al. (2015) report that adolescents 11 to 14 years of age ($n = 480$) who were asked to name their 'best friends' in their year (grade) nominated between 7 and 10 friends on average and approximately 30 to 41 percent of those friendship nominations were reciprocated. Between 8 and 22 percent of interviewed adolescents did not nominate a friend and between 10 and 26 percent did not have any reciprocal friendships (Rambaran, Dijkstra, Munniksma, & Cillessen, 2015). In research of the effects of same-sex friendship reciprocity on school outcomes among adolescents in grades 7 to 12, Vaquera and Kao (2008) used friendship network data mined from the National Longitudinal Study of Adolescent Health dataset (US; $n = 90,000$). Adolescents given the opportunity to name up to five 'best friends' nominated an average of four friends, with a higher percentage of reciprocal friendships reported for female (60%) than for male students (40%). Best friends spent more time together outside of school and engaged in shared activities and socialising. No effect was found for age on either number of 'best friends' or reciprocity of friendship (Vaquera & Kao, 2008).

UK studies investigating the personal relationship networks of noninstitutionalised community-dwelling adults aged approximately 18 to 65 years (Binder et al., 2012; Roberts, Dunbar, Pollet, & Kuppens, 2009; Stiller & Dunbar, 2007) report that adult networks typically consisted of five (Binder et al., 2012) core members and 20 (Stiller & Dunbar, 2007) to 24 (Binder et al., 2012) less intimate close others, 44 to 60 percent of whom were not family (Roberts et al., 2009). Research on links between familial and best-friend relationships for people in Japan and in the US found cultural differences for the positive association between 'quality of family relationships'

and 'quality of friendship relationships'. Participants ranged from 13 to 93 years of age (Lansford, 2004). Social network size was differentially related to attachment dimensions in older adults. Those with secure attachment had larger networks and those with dismissive attachment had smaller networks (Fiori et al., 2011).

Older adult participants in the National Social Life Health and Aging Project (O'Muircheartaigh, Eckman, & Smith, 2009) aged 57 to 85 years ($n = 2779$) reported an average of 4 to 9 friends (Cornwell & Waite, 2009) and those aged 75 to 85 reported an average of just over 3 close confidantes, less than a third of whom were not family (Cornwell, Schumm, Laumann, & Graber, 2009). These confidant networks had average densities of 0.78 (Ashida & Heaney, 2008) and 0.85 (Cornwell et al., 2009), meaning on average 78 to 85% of members had ties with one another. Both the size and density of close relationship networks reduce when people relocate to retirement communities. Independent living residents in a Midwestern US Continuing Care Retirement Community (CCRC) reported a median of 2 confidantes and 17 less-intimate ties with coresidents (Schafer, 2011), with confidant network densities varying between residence halls (.16 to .31) due to resident health status and proximity (Schafer, 2015).

2.4.4 Culture- and sex-differences in friendship and network composition

2.4.4.1 Culture influences the construct of inclusiveness

Culture influences the types of friendships that develop, the importance placed upon those relationships, and the meaning attributed to the term 'friend' (Lee et al., 2005; Miche et al., 2013). Data from the German Ageing Study mentioned earlier provides an example of the influence of cultural norms in studying friendship relationships. This particular study allowed participants to name up to eight 'important relationships'. Relationships named as "friend, colleague, neighbour, club member, and acquaintance" were all included in calculating an individual's number of friends based on the culture-specific premise that Western Europeans, and Germans in particular, used the term 'friend' conservatively and that any non-kin relationship named as 'important' would qualify as friendship (Miche et al., 2013).

2.4.4.2 Culture influences perceived quality of relationships

Australian data from the Men, Women, and Ageing project ($n = 5741$) report that among participants aged 72–78 years, those who were not Australian-born had fewer social relationships and were less satisfied with the social support they received than Australian-born peers (McLaughlin, Vagenas, Pachana, Begum, & Dobson, 2010).

Studies of social relationships between participants from traditional Confucian-based Chinese cultural backgrounds note the emphasis on harmony and the concept of 'modesty' in relationships, or refraining from saying improper things that might cause offense or misunderstanding (Lee, 1999). People sharing this cultural norm may be more cautious in forming relationships and less likely to actively approach others unknown to them to form new relationships (Lee et al., 2005). People from heterogeneous European (i.e. 'individualistic') cultural backgrounds report preference for more overt emotional expression in friendships and people from heterogeneous Asian ('collectivistic') cultural backgrounds report preference for more emotional restraint in friendships (Chen, Kim, Sherman, & Hashimoto, 2015). Studies investigating provision of emotional support to others in times of distress found great similarities between American-born and Chinese-born participants' preference for 'person-centred' approaches to alleviating the distress of close others, but marked differences in their evaluation of actual supportive behaviour. While Americans preferred communication that focused attention on the person and their distress, Chinese preferred communication that restored composure and avoided undue attention (Burleson, 2003). These differences demonstrate how each might find the others' provision of support unsatisfying.

2.4.4.3 Sex differences

The way that people access support through their social networks and judge the quality of their relationships may also be influenced by sex/gender differences. Cross-sectionally, women tend to have larger, more heterogeneous social networks of interconnected relationships and to seek emotional support from friends and children, while men tend to have smaller social networks and to rely more on spousal relationships to fulfil all of their support needs (Antonucci & Akiyama, 1987a; Cicirelli, 2010; McLaughlin et al., 2010). Women form more new friendship than men in the years leading up to retirement (Fischer & Olicker, 1983). However, results from recent large-scale research using data collected in face-to-face interviews (Antonucci et al., 2002) and through online surveys (Gillespie, Lever, Frederick, & Royce, 2015) show few sex-differences in the number and perceived quality of friendship relationships. Each of these studies reports differences in friendship network size (number of relationships) based on age, health (ill, well), marital status (single, partnered, widowed), parenthood (parent, childless), and financial status (well off, hardship) (Antonucci et al., 2002; Fuhrer & Stansfeld, 2002; Gillespie et al., 2015; McLaughlin et al., 2010).

Both men and women experience greater effects on wellbeing from the quality of supportive relationships rather than from the quantity of support (Antonucci & Akiyama, 1987a; Antonucci et al., 2002; Gillespie et al., 2015). There are no significant sex-differences in the positive or negative quality of relationship networks, and negative social relationships have been associated with depressive symptoms for both men and women (Birditt, Antonucci, & Tighe, 2012). Studies have reported conflicting results regarding similarities and differences in the types of support experienced, either reporting more emotional support enacted by women than men (Antonucci & Akiyama, 1987a; Antonucci et al., 2002; Birditt et al., 2012), or that both sexes relied on both male and female friends to enact a variety of different types of support (Gillespie et al., 2015). These and other studies of sex-differences concur that older participants generally have smaller friendship networks (Fischer & Oliner, 1983), provide less emotional support, and enact less support than younger participants (Birditt et al., 2012; Gillespie et al., 2015).

Australian studies had mixed results. In a national sample ($n = 2000$), older women were more likely to report involvement in community groups than men. Men were more likely to report keeping to themselves and having fewer social contacts (National Seniors Productive Ageing Centre, 2013). Results from the 45-and-Up Study based on responses from a large postal survey ($n = 236,490$) across the state of New South Wales reported that contact with social groups increased as people aged for both men and women up to age 85, at which point contact frequency declined but still outpaced much younger groups (Phongsavan et al., 2013). The size of close relationship networks declined for people aged 75 years and older. The proportion of people reporting 1 to 5 'people they could depend on' increased with age while the proportion reporting 6 to 15+ declined. The number of social telephone calls also declined in this age group. For both men and women 85 years and older, having someone to depend on and social phone contacts were not significantly associated with risk of psychological distress. However, engaging in social group interaction was protective against psychological distress for women aged 85 and older but not for men of similar age (Phongsavan et al., 2013).

2.5 Variations on friendship

Although friendship is a fundamental relationship intricately related to health and wellbeing, variations in individual brain structure and life experiences (i.e. 'nature' and 'nurture') lead certain groups of people to experience friendship differently than the

general population. Some people experience reduced social cognition and difficulty forming reciprocal friendships from the beginning of their lifespan. Other people have difficulty forming and maintaining friendships due to poor mental health. Individuals who live in residential institutions encounter adversarial relationships and barriers to friendship in the form of stigmatisation, misunderstanding, and lack of autonomy. Reduced social cognition and poor mental health are internal factors that affect friendships, and living in a residential institution is an external factor that affects friendship. Understanding how patterns of friendship vary for people without dementia in these circumstances may aid in interpreting and understanding patterns of friendship for people with and without dementia living in long-term residential aged care.

2.5.1 Chronic friendlessness

In some instances, otherwise clinically ‘typical’ children fail to develop ToM and experience chronic ‘friendlessness’, a lack of reciprocal friendships (Fink et al., 2015a, 2015b; Wellman, 2015). Unlike ostracism, where the individuals are ignored and rejected by others (Williams & Nida, 2011) children experiencing friendlessness may appear popular in sociometric measures, yet are unable to understand the beliefs of others or establish mutuality and intimacy. Fink et al. (2015) interviewed 96 Australian children at two time points, first when they were between 5–6 years old in their 3rd term of kindergarten and again 24 months later in the 3rd term of their school year. Just over nine percent of surveyed children remained friendless at both time points. A lower ability in ToM and False Beliefs were the only significant differences between these children and their peers (Fink et al., 2015a). Chronic friendlessness in adolescence is a predictor of children’s difficulties in school and adverse psychiatric outcomes across their lifespan (Lerner & Lillard, 2015).

2.5.2 ‘Neurotypical’ friendship and Autism Spectrum Disorder

Some individuals have difficulty developing and maintaining friendships due to genetically based syndromes and developmental disorders such as Autism Spectrum Disorder (ASD), which create social experiences different to those commonly experienced by ‘neurotypical’ children and adults (APA, 2013; Baron-Cohen et al., 1985; Bauminger-Zviely & Agam-Ben-Artzi, 2014; Catani et al., 2016). Results of recent neuroimaging research with adults indicates that ASD is a condition associated with regional differences in neuroanatomy that correlate to specific symptoms, and atypical developmental trajectories of connectivity of the frontal lobes that persist across the lifespan (Catani et al., 2016). Persons diagnosed with Asperger’s Syndrome

(AS)/High-functioning Autism Spectrum Disorder (HFASD) retain high cognitive function but experience deficits in social communication and social interactions, repetitious behaviour, lack of imagination, and restricted interests or activities (APA, 2013). Deficits of social-communication and ToM (Baron-Cohen et al., 1985) interfere with social behaviour such as sharing, reciprocity, collaboration, and play, making it more difficult for children to develop age-appropriate friendships and leading many to choose social interactions with family and trusted adults rather than with age-matched peers (Bauminger-Zviely & Agam-Ben-Artzi, 2014). Despite these deficits, young children with HFASD have shown differential behaviour in friendship and acquaintanceship relationships similar to their 'neurotypical' age-matched peers. Bauminger-Zviely and Agam-Ben-Artzi (2014) report that children's interactions with 'best' friends showed higher levels of closeness and behavioural synchrony, and more socially coordinated and collaborative parallel play. Children appeared to have more 'fun' in interactions with friends than in interactions with acquaintances. In contrast to 'neurotypical' peers, friendship interactions of children with HFASD did not include higher levels of cooperation, sharing, or prosocial behaviour than interactions with non-friends. Children with HFASD playing with neurotypical partners showed more mutual engagement behaviours and synchrony than children in non-mixed dyads. Social-behavioural deficits become more problematic, and relationships more complex, as children with HFASD mature. Children and adolescents with higher cognitive-functioning who have friendships that lack reciprocity or responsiveness report higher levels of anxiety than HFASD peers who have either very good, very poor, or no friendships. Lower quality friendships lacking true reciprocity appear to contribute to anxiety for these young people rather than provide them with stress-buffering reserves (Mazurek & Kanne, 2010).

2.5.3 Friendships in residential institutions

Enforced separation from existing social networks creates a need to form new support networks. There may be novel and unspoken rules within communal living situations that influence the structure and process of relationship formation. In certain institutional situations, social integration may not have the same forms, functions, or outcomes as in more general populations.

2.5.3.1 Children in residential care homes

Children who lived in residential care homes describe facing unique challenges in navigating social relationships with 'mainstream' schoolmates and 'in-care' peers,

while comparing their personal experiences against perceived social 'normality'. Qualitative researchers report children's concepts of identity and group membership in themes of "sameness and difference" and "belonging and exclusion" (Emond, 2014). Children's perception of connection to 'normal' school peers appeared to increase through their self-comparison with others perceived to be more disconnected and 'different' to themselves. Children's feelings of connectedness or disconnectedness to peers were also mediated by carers and other adults whose behaviour promoted perceptions of 'normality' or stigmatisation. Children who had relocated geographically and/or came from culturally and linguistically diverse backgrounds felt doubly disconnected, both from previous norms and practices and from their current social environment, contributing to compensatory changes in behaviour and "adversarial relationships" with peers. In addition, children felt that otherwise supportive teachers and carers did not understand the difficulties they experienced in friendships and peer relationships and that without adult assistance they were left to seek support on their own from trustworthy inside or outside peers (Emond, 2014).

2.5.3.2 Adolescents in youth services facilities

Friendship networks of institutionalised "delinquent" boys are similar in size and quality to those reported by "non-delinquent samples". Young men aged 12 to 18 years legally committed to a residential Youth Services Facility were provided a dorm roster of coresidents, asked to nominate three peers they liked "best", three peers they liked "least", and to rate their peers' social behaviour using an assessment tool. They were also asked to circle the names of friends, mark who was their "best" friend, and to rate the quality of their friendships using a standardised assessment tool. Young men reported an average of 8 friends and on average three of these nominations were reciprocated. Contrary to researcher hypotheses, participants rated as showing more prosocial behaviour were more popular among peers and those showing more aggression and victimisation were socially rejected. However, the size of boys' reciprocal friendship networks remained the same regardless of their peer-rated social 'status' (popular, average, or rejected), with boys in the rejected-status group rating the quality of their friendships more highly than boys in the 'average' or 'popular' groups (Preveaux, Ray, LoBello, & Mehta, 2004).

2.5.3.3 Adult correctional facilities

Research among incarcerated adults in prison populations suggest variations in the structure and process of social networks among male and female prisoners and

possible life course developmental differences. Larson's (1984) research with female prisoners in the US suggests that inmates' perceived level of control in the face of "coercive power" within the institutional setting motivates them to choose different adaptive strategies with some inmates choosing social isolation, some choosing to form friendships, and some forming oppositional groups defying staff and administration (Larson & Nelson, 1984). Among female prisoners, perceptions of 'infantilisation' influenced some to oppose staff and the institution (Moyer, 1980). Women who had substantial time left to serve in their sentence reported higher perceived sense of powerlessness, while those with more co-inmate 'peer' friendships had lower perceived powerlessness. Women with little time left to serve on their sentence placed less importance on their inmate friendships. Those with high self-esteem who identified more with their prior community roles and outside contacts were more likely to isolate themselves from other inmates (Larson & Nelson, 1984). More recent interview research suggests that social environments for women in US correctional facilities may have evolved, or devolved, into networks clearly based upon mistrust and manipulation. Many inmates identified themselves as "loners", preferring not to interact with 'peers' whom they perceived as hostile and dishonest and yet they were unable to avoid these peers in a closed residential environment (Greer, 2000). Women made clear distinctions between people with whom they interacted as 'associates' and others whom they considered 'friends'. Most women spoke only of reluctantly interacting with 'associates'. Women consciously avoided investing in relationships with others whose behaviour and motives they perceived to be fundamentally unpredictable, despite sharing similar attributes with these peers such as shared religious beliefs (Greer, 2000). Female inmates valued the type of 'real' friendship that they believed could still be developed on the outside and commented on the temporary nature of prison relationships and the investment of time and emotion that true friendships required. Close relationships formed in prison rarely continued once one or both partners served their time and returned to the community. For those willing to consider friendship, the seemingly inevitable eventual loss of relationships motivated affective distancing in order to avoid future negative emotions (Greer, 2000).

Kreager et al.'s (2016) recent research with male inmates from 32 Dutch short-term pre-trial detainment facilities ($n = 467$) suggests that in this environment, personal trust and social integration with other inmates contributes to negative outcomes for psychological health. In this relatively homogenous population and temporary setting, establishing a trusting relationship with at least one other inmate was associated with higher levels of depression (Kreager, Palmen, Dirkzwager, & Nieuwbeerta, 2016). Peer

friendships were operationalised as fellow inmates with whom participating inmates could 'get along best'. Inmates asked to name up to three peer 'friends' identified an average of just over 2 fellow detainees, regardless of whether or not the participants endorsed 'trusting' these identified peers (Kreager et al., 2016). Authors acknowledged that associations between higher depression and naming a fellow detainee as a trusted friend may have reflected reverse causality, with inmates already experiencing psychological distress prior to detainment more likely to seek close relationships with available others as a stress-buffering mechanism (Kreager et al., 2016).

Research involving inmates recruited from three men's and three women's long-term correctional facilities within the US system ($n = 256$) reported beneficial outcomes associated with friendships among inmates, with developmental patterns in network size and closeness resembling those of similar age-matched non-inmate groups in the general population (Bond, Thompson, & Malloy, 2005). Younger adult inmate and non-inmate groups (aged 18 to 43 years) nominated approximately 20 members on average in their personal social networks. Older adult inmates (aged 55 to 84 years) nominated an average of between 10 to 11 social network members and older non-inmates nominated an average of 15 network members. Male inmates had a greater number of network members than female inmates, and female non-inmates had more network members on average than female inmates. Across contexts (incarceration, community) and gender (male, female), the size of social networks declined with age. The number of peripheral partners decreased and the closeness of very close relationships increased with age, in line with Carstensen's theory of Socioemotional Selectivity (Bond et al., 2005; Charles & Carstensen, 2010). However, differentiation between kin and non-kin relationships including friendship were not presented in this study.

2.5.4 Neuropsychiatric illness and friendship

2.5.4.1 Consumer-survivors, prior life, and illness-identity

The meaning and expectations of friendship may alter for individuals experiencing disability due to neuropsychiatric illness such as major depression, bipolar disorder, and schizophrenia-spectrum disorders (Boydell, Gladstone, & Crawford, 2002; Coatsworth-Puspoky, Forchuk, & Ward-Griffin, 2006; Ogden, 2014). As evidenced from interviews with community-dwelling adult Consumer-survivors (past and present consumers of mental health services), individuals living with neuropsychiatric illness depict friendship in much the same way as non-consumers: as

a dynamic, complex, challenging, and potentially contradictory relationship (Boydell et al., 2002). Friendship remains a highly valued intimate relationship, essential to wellbeing, with some friends resembling ‘surrogate family’ in the provision of emotional and practical support. Friendships between Consumer-survivor ‘peers’ and friendships with non-consumers both fulfilled important functions. The first type of friendships provided deep understanding based on similar knowledge and first-person experience of illness, engendering a sense of belonging and alleviating loneliness. The importance of this type of peer relationship has similarly been reported for people recovering from substance use disorders (Jason et al., 2014). The second type of friendships provided a sense of ‘normalcy’ and increased feelings of self-worth. It allowed Consumer-survivors to identify with their “prior life” instead of their “illness-identity”. However, experiential variables related to their disorder, such as confusion, low tolerance for others, attentional and concentration deficits, and the “tremendous energy” required to engage in conversation, let alone to maintain relationships, all diminished motivation and prompted withdrawal from opportunities for interaction.

Friendships with Consumer-survivors and non-consumer friends each created their own unique difficulties. Non-consumers might not ‘understand’ the lived experience and unmet needs of their Consumer-survivor friend, bringing an underlying sense of frustration, vulnerability and fear of rejection in the relationship. Alternatively, friendships between Consumer-survivors could be “depressing”, centring on discussion of illness and treatment, reinforcing feelings of stigmatization, “confinement”, being “ghettoized”, and leading some to distance themselves from others who they perceived as being more ill than themselves. Consumer-survivors saw friendship connections as essential for their wellbeing and found value in a heterogeneous friendship network of ‘peers’ and non-consumers. Importantly, they also expressed a need for solitude and opportunity to withdraw from social interaction and conserve their functional resources (Boydell et al., 2002; Ogden, 2014).

In interviews with older adult Consumer-survivors, themes of relational loss, loneliness, adaptation, and adjustment pervade, yet strong close relationships were associated with feelings of safety and satisfaction (Ogden, 2014). Australian data indicate that men and women aged 72–78 living with poor mental health and physical impairment (including sensory impairment) in the community have smaller close relationship networks and are less satisfied with the social support they receive than their more able counterparts (McLaughlin et al., 2010).

2.6 Friendship and social relationships in residential aged care

People living in residential aged care retain clear concepts of friendship and the quality of their relationships with other residents (Roberts & Bowers, 2015; Sefcik & Abbott, 2014). Cognitive constructs similar to the universal expectations outlined by Jeffrey Hall (Hall, 2012) appear to persist for individuals with dementia, with emergent themes of intimacy, reciprocity, reliability, and common interests (de Medeiros et al., 2012). Relationships with coresidents contribute to positive affect (Carpenter, 2002) and perceptions of social support for long-term care residents, yet residents find forming relationships with coresidents difficult (Bradshaw et al., 2012; Kemp et al., 2012; Wiersma & Pedlar, 2008).

2.6.1 Social relationships in dementia and RACFs

The quality of relationships and interactions between coresidents with dementia residing together in long-term care has become the focus of recent applied dementia care research (Abbott et al., 2015; Doyle et al., 2011; Ferrah et al., 2015). As with other social relationships, the social encounters between residents potentially affect their cognitions, perceptions, emotions, behaviour, and biopsychosocial functioning (Bergland & Kirkevold, 2008; Bitzan & Kruzich, 1990). Unlike close familial relationships where 'connection' is inherent, connection through other close relationships such as friendship is contingent upon resident choice, action, and interaction (Bergland & Kirkevold, 2008; Hauge & Kristin, 2008; McEvoy & Plant, 2014). Although some residents enter long-term care with pre-existing connections to others within their facility (Sefcik & Abbott, 2014), many individuals entering communal residences and long-term care begin from a state of social 'disconnection' from those around them (Burge & Street, 2010; Dupuis-Blanchard, Neufeld, & Strang, 2009; Street, Burge, Quadagno, & Barrett, 2007).

Studies exploring the social experiences of older adults in long-term care suggest that positive relationships with coresidents contribute to perceptions of social support and inclusion, but many residents report that relationships with coresidents are problematic (Kemp et al., 2012; Knight & Mellor, 2007; Wolff, 2013). Residents in independent living and assisted living name few close relationships with coresidents (Perkins et al., 2013; Schafer, 2011). Preliminary results from a recent comparative study indicated that residents with mild dementia living in institutional care in nursing homes ($n = 30$) reported significantly lower quality of life, lower functional ability, and

lower social connectedness than people with mild dementia receiving home care ($n = 19$), but experienced similar levels of depression (Nikmat, Hawthorne, et al., 2015). Findings from the same study using the complete participant sample ($n = 219$, 109 home care/110 nursing home), including nursing home residents with mild to severe cognitive impairment, demonstrated significantly more depression and lower perceived quality of life and social connectedness in people living in nursing homes than in those who received home care (Nikmat, Al-Mashoor, & Hashim, 2015; Nikmat, Hawthorne, & Al-Mashoor, 2011).

Research investigating factors influencing coresident social relationships in low-level-care aged care suggests residents' social perceptions and interactions are influenced by multiple external factors in combination with residents' personal attributes (Kemp et al., 2012; Knight & Mellor, 2007). External contextual factors at the community level, including governmental regulatory policy, community resources, and geographic setting, contribute to intersecting facility-level factors (such as policies and practices, social resources, the physical setting) and to resident-level factors (such as demographic characteristics, functional capacity, family involvement, social schema) (Kemp et al., 2012).

2.6.2 Attachment in dementia

The experience of dementia can trigger attachment behaviour, for people living in the community and for those in residential aged care, who are feeling confused, stressed and threatened by their 'unfamiliar' and often confronting environment (Browne & Shlosberg, 2006; de Vries & McChrystal, 2010). Research with non-impaired individuals living in the community indicates that older adults maintain a range of tangible and intangible attachment figures, including (in order of most- to least-frequently reported) adult children and other living family members, friends, God, deceased family members, pet dogs, ministers/priests, nurses, and doctors (Cicirelli, 2010). Better emotion regulation, more sociability, and less anger, fear, and shyness have been associated with secure rather than insecure pre-morbid attachment styles for people with dementia who live with family caregivers in the community (Magai & Cohen, 1998). Researchers reported similar findings for people with mid- to late-stage dementia in a long-term care setting, indicating more positive affect, joy, and interest in those with pre-morbid secure attachment than those with avoidant pre-morbid attachment (Magai, Cohen, Culver, Gomberg, & Malatesta, 1997). Studies of observed attachment style in long-term care residents with dementia report that some residents meet attachment needs and emotional regulation through a re-emergent fixation on

primary parental figures. This is more evident among people with greater cognitive impairment (Browne & Shlosberg, 2005) and pre-morbid conscientiousness (Osborne, Stokes, & Simpson, 2010). Very few studies have used standardised measures to investigate self-reported attachment styles of people with dementia (Molinari et al., 2001; Nelis et al., 2012, 2014; Perren, Schmid, Herrmann, & Wettstein, 2007).

2.6.3 Socio-emotional selectivity theory

Socio-emotional selectivity theory suggest that older adults may actively seek to maintain emotional equilibrium by selecting emotionally rewarding relationships over problematic ones (Scheibe & Carstensen, 2010). Thus, through choosing to retain their closest, most supportive relationships and to let go of less supportive relationships, older adults selectively narrow their social networks (English & Carstensen, 2014).

Maintaining a 'balanced' ratio of positive over negative emotions (roughly three to one) has been associated with higher wellbeing and 'flourishing' in cognitively capable nursing home residents and those with mild cognitive impairment (Meeks et al., 2012). However, long-term care residents who live in high-care long-term care facilities often have little control over when and with whom they interact. Negative interactions between residents are more likely to occur with frequent contact within restricted spaces. Positive interactions are more likely when residents have opportunity for both closeness and privacy/distance. Yet, even private rooms provide limited sanctuary from uninvited sounds, aromas, and people (Firestone, Lichtman, & Evans, 1980; Jones, 1975; Schafer, 2015). Studies report that the emotional valence of networks contributes to an individual's daily emotional experience (English & Carstensen, 2014). This effect increases for individuals dealing with multiple negative/stressful life events, so that they experience higher negative affect associated with negative interactions (Ingersoll-Dayton, Morgan, & Antonucci, 1997).

Socio-emotional selectivity theory predicts that the proportion of friends should increase in older adults' social networks as people weed-out negative relationships and retain emotionally supportive relationships (Charles & Carstensen, 2010). However, a longitudinal study of the effects of age and declining physical and cognitive-functional capacity on the size and composition of older adults' social networks indicates that the proportion of friends in social networks decreases as physical and cognitive functional incapacity increases (Aartsen, van Tilburg, Smits, & Knipscheer, 2004). Among older-old adults aged 71 to 85 years, those with cognitive decline experienced greater shrinkage than those with just physical impairment, with their proportion of kin relationships decreasing along with friendships. Interestingly, older adults who

experienced cognitive decline and had large social networks were disproportionately affected by shrinkage when compared to those with smaller networks (Aartsen et al., 2004).

2.6.4 Social convoy theory

Social psychologists Kahn and Antonucci (1980) introduced the convoy model of social relationships as an approach to study the supportive personal networks of individuals across time (Kahn & Antonucci, 1980). The social convoy theory incorporates both a life course sociological perspective, considering the temporal ordering of social activities and states or events, and lifespan psychology considering the developmental changes in functional capacities from birth to death (Mayer, 2003). Using the concept of networks as 'convoys' illustrates that individuals move together and continue to support and influence one another throughout the course of life (Kahn & Antonucci, 1980). The convoy model approach was among the first to recognise social relationships as multi-dimensional constructs involving network structure, relationship type (i.e. family, friend), and quality (i.e. high/low, weak/strong). It was also among the first to integrate the significance of cumulative experiences and changes in relationship dimensions throughout a person's life, the role of attachment in adult relationships, the multiple objective and subjective perspectives of networks, and the importance of context to social relationships (Antonucci, Ajrouch, & Birditt, 2013). Kahn and Antonucci operationalised the 'closeness' or strength of relationships in a person's network using a series of nested concentric circles with the focal person at the centre and their relational partners positioned within circles at a distance from the centre proportional to their perceived emotional closeness or importance. The person's closest, strongest, and most important relationships are within the tightest 'inner circle' and less close, weaker relationships are positioned at a greater distance (Antonucci & Akiyama, 1987b; Kahn & Antonucci, 1980).

Researchers applying the convoy model as a theoretical framework to investigate close relationships of people residing in assisted living report that less than a third of interviewed residents (29%) nominated coresidents as members of their personal networks. Most residents who included coresidents in their network placed them in intermediate or 'outer' circles indicating less emotional closeness or 'weak' relationship ties and only 7% placed coresidents in their 'inner circle' indicating that they were close 'strong' ties (Perkins et al., 2013). Residents who included coresidents in their social networks were not significantly different to residents who did not include coresidents in their networks regarding age, sex, race, level of education, time in

residence, or functional health. Findings indicated that having a few weak 'peripheral friendships' with coresidents was associated with higher overall wellbeing. Thematic analysis of resident interviews indicated that residents were selective in choosing coresident friends, purposefully drew emotional boundaries between themselves and others, formed relationships based largely on homophily, and described not having enough time to establish true friendships with coresidents (Perkins et al., 2013).

2.6.5 Social network theory

Social network theory describes close important relationships as 'strong' ties and more distant, less important relationships as 'weak' ties (Granovetter, 1973). In his seminal article 'The strength of weak ties', economic sociologist and social network analysis theorist Mark Granovetter (1973) explained the synergy of sociological theory and mathematical graph theory represented by social network analysis. In social network analysis, 'tie strength' represents the aggregate of behaviours, cognitions, and emotions that contribute to the closeness and importance of relationships. Concurring with predominant theories of relationship development, Granovetter (1973) theorised that tie strength would increase as people spent more time together, engaged in more reciprocal actions, and experienced greater emotional intensity in their relationship. Homophily would increase the probability that people would spend time together, which would in turn engender greater homophily and stronger ties. Conversely, less time spent together and greater diversity between network members would be associated with weaker ties.

Granovetter's theory on the effects of tie strength on network structure inspired research into the unique real-world implications of strong (Granovetter, 1973, 1983; Krackhardt, 1992), weak (Fingerman, 2009), and intermediate-strength ties (Huszti, Dávid, & Vajda, 2013). Citing empirical evidence and Heider's Cognitive Balance theory (1958), Granovetter suggested that people who are aware of one another and aware of sharing strong dyadic ties with the same partner, such as two people who have the same close friend, would feel more compelled to form a mutual tie between themselves than similarly aware people who shared weak ties with the same partner, for instance people having the same hairdresser (Fingerman, 2009; Granovetter, 1973; Heider, 1958). Strong dyadic ties are more likely to provide assistance when needed and involve more trust and affection (Granovetter, 1973; Krackhardt, 1992). Weak ties are theorised to serve as bridges between otherwise unconnected people or groups (Cornwell, 2009, 2011; Kalish & Robins, 2006). They would provide access to a greater variety of resources, and provide a sense of support and community with limited

obligation and less emotional risk than that involved in strong ties (Fingerman, 2009; Wright, Rains, & Banas, 2010).

However, propinquity, familiarity, and homophily may not exert similar influence over the structure and quality of relationships between people with cognitive impairment living in long-term aged care. Children (Emond, 2014) and adults (Greer, 2000; Kreager et al., 2016; Kreager et al., 2015; Larson & Nelson, 1984) living in enforced residential settings adapt unique social strategies to navigate their communal living environments. In the same way, aged care residents with dementia may develop specific strategies and interaction patterns that are influenced by their social encounters with coresidents.

2.6.6 Summary

Social encounters between residents potentially affect their cognition, perceptions, emotions, behaviour, and biopsychosocial functioning. Positive relationships with coresidents contribute to perceptions of social support and inclusion, however, many residents report that relationships with coresidents are problematic. Research suggests that social perceptions and interactions of residents are influenced by multiple environmental factors in combination with residents' personal attributes. The experience of dementia can trigger attachment behaviour for people in residential aged care who are feeling stressed and threatened by their 'unfamiliar' environment. Socio-emotional selectivity theory suggests that older adults may seek emotional equilibrium by selecting emotionally rewarding relationships over problematic ones. However, longitudinal research indicates that the proportion of friends in social networks decreases as physical and cognitive functional capacity decreases. The Convoy model approach recognises social relationships as multi-dimensional constructs involving network structure, relationship type, and quality. Social network theory and Cognitive balance theory suggest that people who are aware of one another and aware of sharing strong dyadic ties with the same person would feel more compelled to form a mutual tie between themselves than similarly aware people who shared weak ties with the same person.

2.7 Summary and gaps in the current literature

The greatest proportion of long-term aged care residents with high care needs are people with dementia. Investigation of variables that influence quality of life in care indicate that psychosocial needs are among the most salient unmet needs affecting

people with dementia. Assessing and improving the social relationships of residents with dementia is becoming a priority for consumers, care staff, service providers, and policy makers.

People with dementia commonly experience impaired social cognition that interferes with relationship formation and maintenance. Residents with reduced capacities may experience relationships differently than cognitively capable peers. These difficulties do not mean that residents no longer seek or need enriching positive relationships such as friendship. It is well accepted that the quality of social relationships is associated with mental and physical health or illness. Evidence from comparative, evolutionary, and neuroimaging studies all suggest that our brains are organised to seek and manage social relationships. Social cognition and behaviour involves multiple brain areas and stimulates the release of oxytocin and arginine vasopressin, as well as the release of neuropeptides involved in pain management. Reduced social networks may lead to reduced stimulation of neural pathways and less expression of rewarding neuropeptides.

Residents interact with others and form new relationship networks. Aged care residents spend more time with coresidents than with individual care staff or family. However social relationships between coresidents remain a low priority in care practice. Evidence indicates that residents with dementia experience a spectrum of positive, ambivalent, and negative relationships. When investigating associations between these variables and key psychosocial health outcomes, the identification and assessment of the quality of resident relationships is essential.

Research on friendships and social relationships among people living in long-term residential aged care has largely excluded individuals with more advanced stages of neurocognitive disorders. Researchers have only recently applied social network analysis to better understand social networks of people with dementia and those residing in special care units. Positive and negative relationships have typically been quantified separately with minimal triangulation of quantitative and qualitative data sources.

This PhD thesis aims to address gaps in the literature through including the views and experiences of heterogeneous groups of residents with high-care needs, including residents with moderate to advanced stages of dementia. The thesis will extend current findings via the use of social network analysis methods with residents with dementia and will explore the influence of relationship attributes and the immediate context on resident perceptions, actions, and interactions. Staff and observer perceptions of positive, negative, and ambivalent relationships will illustrate

the complexity of resident networks and explore the potential influence of these relationships on resident engagement, withdrawal, and isolation. Interpretation of the meaning and potential significance of interactions between residents will be informed by multiple methods including a novel psychosocial approach to coding observational field note data.

3 Design and Methods

3.1 Exploring residents' friendship and social relationship networks

Friendship literature reflects three main methods for defining 'friendship' in older adult populations: asking individuals directly to provide their own definition (de Medeiros et al., 2012); presenting people with a priori limitations on the definition of friendship; or using an inductive approach, through observation and guided narrative, to arrive at a definition (Adams & Blieszner, 1989). The literature also reflects three related approaches to studying friendship in older adults: a qualitative case-study approach emphasising social psychological definitions (Ward et al., 2012), a behaviour-based ethological approach focusing on type and number of interactions (Retsinas & Garrity, 1985), and a mixed-methods approach combining quantitative and qualitative techniques to enable data triangulation (de Medeiros et al., 2012). The current study uses a mixed-methods approach including social network analysis.

3.2 Introduction to social network analysis

Identifying groups such as resident friendship networks may seem intuitive, but knowledge of resident relationships is frequently anecdotal, fragmented, and rarely documented (Carpenter, 2002). Social network analysis (SNA) methodology emphasises the importance of the connections ('ties') between people ('nodes') and the possible benefits and/or detriments that people experience from their position within a network (Carrington et al., 2005). The relational perspective in SNA can offer unique insights into social strengths (Bergland & Kirkevold, 2008) and vulnerabilities (Trompetter, Scholte, & Westerhof, 2011) that influence residents' engagement (Cadieux et al., 2013) and perceived support or isolation (Abbott et al., 2013). SNA describes structural characteristics of networks such as network size, density, and distance (Cacioppo, Fowler, & Christakis, 2009; Cornwell et al., 2008; Cornwell, Marcum, & Silverstein, 2015; Hirdes & Scott, 1998; Schafer & Koltai, 2014), as well as relational variables such as tie strength and direction (Anderson et al., 2009; Fu, Ho, & Chen, 2013; Kim et al., 2015). These variables are described in detail below and influence the flow and accessibility of tangible and intangible resources such as social support to network members (Wasserman &

Faust, 1994). SNA may also be used to explore associations between network variables and resident attributes such as health status (Schafer, 2011, 2013, 2015) and level of cognition (Abbott & Pachucki, 2016).

3.2.1 Network size

In SNA, the number of ties that an individual has with others represents the size of their personal network and indicates how connected or isolated that person is. Personal network size is used as a proxy indicator of objective and perceived social support (Crooks et al., 2008; Lubben et al., 2006) and of social engagement (Krueger et al., 2009). However, in its strictest definition, the presence of a tie indicates potential or opportunity for engagement and experienced and perceived support (Song, Son, & Lin, 2011; Zunzunegui, Alvarado, Del Ser, & Otero, 2003), not actual engagement or support. In survey measurements, the number of ties that people report may be influenced by numeric parameters within the question (i.e. 'name five friends') or by qualifiers within the question (i.e. 'who can you count on in times of need?'). Different indicators of network size can be calculated in research, including the total number of ties within a network, the number of ties participants report, and the number of ties that others have reported (number of tie nominations received). The indicator chosen to represent network size in each study is based on theory, the perspective of interest, and the key variables under investigation.

In this study, the main perspective of interest was that of the resident. Key variables included the number of friendships and positive relationships that residents perceived to have with coresidents. As not all residents within a care unit were interviewed, and interviewed residents were only asked to comment on the relationships that they saw themselves as having, the relationships that residents endorsed for themselves became the primary indicators of their enacted network ties (i.e. the most salient people in their network). The nominations that residents report represent their perspective and implicitly acknowledge residents' agency in deciding their own relationships standards, and in choosing with whom they interact in their immediate environment. Therefore, the number of ties that residents nominated having with others, or 'out-degree', was chosen to represent network size. This perspective was maintained for staff-report data and observational data in order to enable comparison of perspectives on residents' positive social networks and to focus interpretation of network data from all sources on the meaning of relationships from the residents' perspective.

3.2.2 Degree centrality

At the network level, a person with many ties is described as more 'central' to the network than a person with fewer ties. The number of relationship ties that a person reports to have with others is described as 'out-degree', whereas the number of relationship tie nominations that a person receives from others is described as 'in-degree'. Thus, the numbers of out-degree and in-degree ties are measures of network 'degree centrality'. Centrality is related to the sociological concepts of 'power' and influence. A person described as having higher in-degree centrality has received more ties and may be 'popular' or more 'powerful' in the network. A person described as having higher out-degree centrality has initiated more ties and has had more opportunity or ability to exchange with many different people and be influential.

3.2.3 Reciprocity, asymmetry, and isolation

Categorising and counting dyads in a network according to their mutual, asymmetric, and null status produces a 'dyad census', an overview of all the dyads within that network. The direction of ties indicates whether relationships are reciprocated (mutual) or one-sided (asymmetrical). If a potential relationship between two people is not enacted, their lack of a relationship represents a 'null' dyad. In SNA theory, mutual ties are thought to indicate relationship stability and are associated with greater trust and emotional closeness than asymmetric ties (Wasserman & Faust, 1994). However, asymmetric ties are commonly found in studies of close relationships such as friendship. Researchers have argued that asymmetry in close relationships is an artefact of cross-sectional design with data capturing the early stage of a developing relationship (Eder & Hallinan, 1978), while more recent empirical evidence suggests that asymmetries may reflect subtleties and complexity inherent to close social relationships (Carley & Krackhardt, 1996; Hallinan & Kubitschek, 1990).

3.2.4 Density and path length

A network with interconnected relationships between many of its members has a high 'density'. 'Density' of ties is a measure of network cohesion and is expressed as a proportion: a network density of 0.81 means that 81% of the people in the network are connected to one another. Different types of relationship networks commonly show

different density patterns. Networks composed of relationships which require more time and resources to develop, such as friendship networks, are typically less dense ('sparse') than networks of relationships such as kinship, where most members have direct ties to one another (Roberts & Dunbar, 2011a). As with centrality, density is theoretically related to the concept of social power and influence. Dense networks afford greater potential for exerting influence than sparse networks (Hanneman & Riddle, 2005).

In a dense network, people have many ties in common and the length of a 'path' linking one person to any other person is short, involving only one or two steps (Hanneman & Riddle, 2005). For example, to reach a friend involves one step and to reach the friend of a friend involves two steps. In most circumstances people are socially engaged with others within a two-step distance or two degrees of separation (Friedkin, 1983). However, their feelings may be influenced by others up to three steps removed in their social networks (Cacioppo et al., 2009).

3.2.5 Visualisation of network graphs

Graphical representations of social networks in SNA literature are referred to as 'socio-grams', 'socio-graphs', or simply as 'graphs'. Graphs typically include shapes or icons representing nodes, and lines ('edges') between nodes representing the observed relationship tie. A graph of directed ties is called a digraph. In a digraph, the lines representing ties between nodes are called 'arcs'. Arcs have arrows at the end, denoting the direction of the tie (from whom, to whom). A mutual tie has an arrow at each end of the arc between two nodes, while an asymmetric tie has one arrow at the end of the arc pointing toward the 'receiving' node. In a null dyad, the two nodes would remain unconnected.

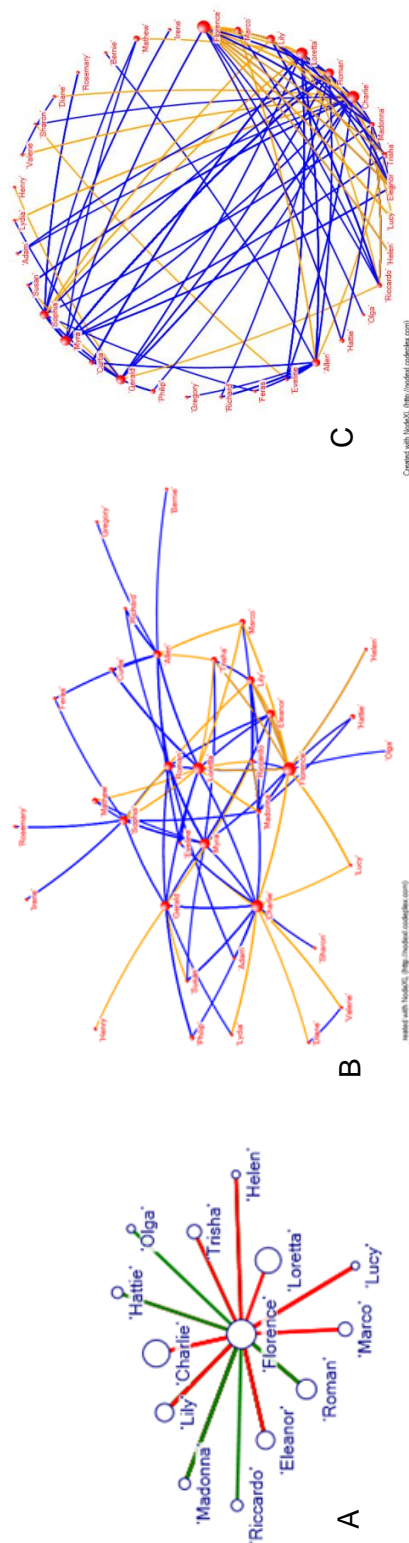


Figure 1. Examples of graphed network data. In these examples circles represent people and lines represent relationships between people. Graph A illustrates 'egocentric' data. This type of graph represents one person ('Florence') and her relationships with people from different groups. In this example larger circles represent frequent interaction partners, green lines represent supportive relationships, and red lines represent antagonistic relationships. Graph B illustrates 'sociocentric' data from a larger 'bounded' network. This type of graph illustrates relationships between people within a defined group, such as people living together in a residential care unit. Graph C illustrates a 'circle' layout of sociocentric data. (Casey & Mitchell, 2016)

There are many software algorithms that can be used to create social network graphs. There are no standardised field-specific guidelines for the presentation of these SNA graphs, hence researchers both align their graphs with convention and innovate as needed in order to clearly and appropriately communicate results (Freeman, 2000). Visual conventions such as placing more 'central' nodes closer to the centre of graphs and clustering of nodes belonging to the same group lead to enhanced interpretability of data (Huang, Hong, & Eades, 2007).

3.2.6 Egocentric and sociocentric designs

Generally speaking, studies incorporating SNA follow one of two designs using different methodological approaches to collect either individual-level (egocentric) network data or group-level whole-network (sociocentric) data. The egocentric approach asks individuals to name people in their personal network, identifying relationships with people from different groups. Group membership may be defined or 'bounded' based on location, position, activity, or events in time. The sociocentric approach asks members of a defined (bounded) group to identify relationships they have with others within that group (Carrington et al., 2005; Marsden, 2005). In an egocentric design, investigators might ask each resident of a retirement facility to name all of their friends (unbounded network) and in a sociocentric study investigators would ask the same residents to name all of their friends that live with them in the same apartment building (bounded network). Though distinct and separable, the two types of network study designs are necessarily interrelated. Individual egocentric networks contribute to and combine to form whole networks, depending on how network boundaries are defined. For example, an aged care resident's egocentric network may include family and friends living in the community who are members of groups such as service clubs, sporting teams, and religious congregations, as well as including other residents from their aged care facility. The boundary of their 'community' could be defined by their village, suburb, shire, or city. The resident and their network members are all part of the community in which they live, so that the resident's egocentric network contributes to and combines with the egocentric networks of other people within the community to form the whole community network. The current study used a sociocentric design with residents, staff, and the observer identifying relationships within bounded networks.

3.2.7 Defining network boundaries

Network studies incorporating egocentric designs do not require pre-set boundaries, and may define boundaries during data collection using 'name generators'. Name generators are measurement tools incorporating free-recall items, used to identify other individuals within the respondent's social network. A name generator may ask a respondent to name 'people that you speak with regularly' to establish a general network, or to name 'people with whom you discuss important matters' to define a closer network. Name generators are often followed by 'name interpreters' that ask for more detailed information about the individuals identified by the name generator (Marsden, 2005).

Sociocentric studies define the inclusion zone of a network, setting its boundaries using a pre-defined strategy (Marsden, 2005). Such studies may begin with the use of archival and survey data to determine what types of relationships are of interest and which individuals to approach as respondents. For example, researchers might choose to access national databases or to survey general practitioners in order to determine which geographic areas and which people within those geographic areas to approach as respondents for their study. Alternatively, researchers may investigate relationships within a clearly defined existing group such as all first-year students taking the same first semester introductory psychology course within one university. Commonly used strategies for setting network boundaries include: a positional approach based upon geographic criteria, for example living in a residential community (Schafer, 2015) or within a particular building (Jones, Moyle, & Stockwell-Smith, 2013); an event-based participation approach such as in-patient ward rounds (Walton & Steinert, 2010); or a relational approach based on pre-existing relationships, for example work colleagues of long-term care staff (van Beek et al., 2011).

The facility care units that participated in this study were clearly defined by pre-existing conceptual and physical boundaries (see section 3.4). Each care unit had its own unique name, creating a sense of place and reinforcing conceptual boundaries. The location of each unit within the facility (ground level or upper level), and the presence of secured entryways and exits (keypad entry doors, gated stairs) reinforced clear physical boundaries. Residents spent the majority of their time at the facility within the same care unit where they were initially placed, with infrequent transfer of residents between units. Most scheduled full- and part-time direct care staff were regularly assigned to one of the three care units. These clear conceptual, structural, and organisational boundaries allowed

investigation of each care unit as a whole network within a larger overall facility network. All facility residents comprised the potential facility whole network. The building and grounds formed the physical boundaries of this larger network including all care units.

For the purpose of collecting data on coresident relationships in this study, conceptual constraints that aligned with pre-existing conceptual and physical boundaries were placed on resident social network boundaries. Resident relationship networks were bounded by the number of residents living within the facility at the time of study. These criteria excluded residents' previous friendships with people living in the community who did not visit or were unknown within the facility context and therefore could not be consented or confirmed. Residents' network boundaries for each unit were defined as the people who lived within that unit.

3.2.8 Network rosters, recall, and recognition

When all group members are known (e.g. in a study of first year university students), they comprise a network 'roster' that can be used in interviews and surveys to investigate in-group relationships. Name and image rosters may be created using any of the strategies mentioned above. These rosters are incorporated into measures that require respondents to recognise individuals or relationships instead of using free-recall to name them (Marsden, 2005). Identifying relationships from a roster reduces recall burden and provides respondents equal opportunity to name and be named by other network members (Marin, 2004). Network research with non-impaired populations using recognition and free-recall surveys suggests that recognition methods generate greater accuracy and less 'forgetting' of network members than do free-recall methods (Hlebec, 1993; Marsden, 2005; Sudman, 1985). Social cognition research and social network studies suggest that free-recall and recognition methods of data collection may elicit more accurate and complete data when used in combination (Brashears & Quintane, 2015; Brewer, 2000; Brewer & Webster, 2000). As most participating residents in this study had some level of cognitive impairment, a combination of free-recall and recognition methods was used in interviews.

Name generating questions that constrain the type and number of names nominated by each participant are known as limited choice sociometric questions (Faust, 2008). SNA studies of positive relationships such as friendship are investigating limited choice social networks because the type of network data collected is limited to a specific type of relationship, in this case friendship. Comparative analysis of SNA methods used to

describe limited choice networks suggests that the most parsimonious explanations of the fundamental properties of limited choice networks may be best described at the level of the dyadic tie (Faust, 2006, 2008, 2010).

3.3 Study Design

The Friendship and Relationship Interactions in the Elderly Networks Description (FRIEND) study used purposive sampling in a cross-sectional multiple method social network analysis (SNA) design. Data collection methods included the use of structured and semi-structured interviews with residents and care staff, a brief survey assessment for residents' family, and direct observation of resident interactions. The FRIEND study design and protocol were approved by the University of New South Wales (UNSW Australia) Human Research Ethics Committee (HREC) 2012, HREC Ref# HC 12208 and the study protocol was approved by both the participating care facility's Operations and Care Manager and their care network's Chief Executive Officer.

3.4 Study Setting

The participating facility was a recently renovated two-story Residential Aged Care Facility (RACF) in suburban Sydney, Australia. It was a for-profit private facility and part of a small intra-state chain. All 94 facility beds were classified as 'high-care' and therefore catered to residents who required a combination of accommodation, personal care, and 24-hour skilled nursing care (Steering Committee for the Review of Government Service Provision, 2013). All beds were occupied by permanently-placed residents at the time of the study.

The study took place within the facility's three care units (Figures 2 and 3). These were a 42-bed ground-floor unit (Unit 1) with keypad access to gated outdoor front and side courtyards (Figure 2), a 34-bed upper level unit (Unit 3) directly above Unit 1 with no direct outdoor access, and an 18-bed keypad entry Dementia-Specific Unit (DSU) on the same level (Figure 3). The upper level was accessible through a gated stairway and lift (elevator). Due to the residents' high level of dependence in ADLs, residents required staff or visitor assistance to move between units to provide for resident safety and security. The original structure was not purpose-built for aged care and had undergone multiple extensions, retrofitting for safety and security, and contemporary renovations.

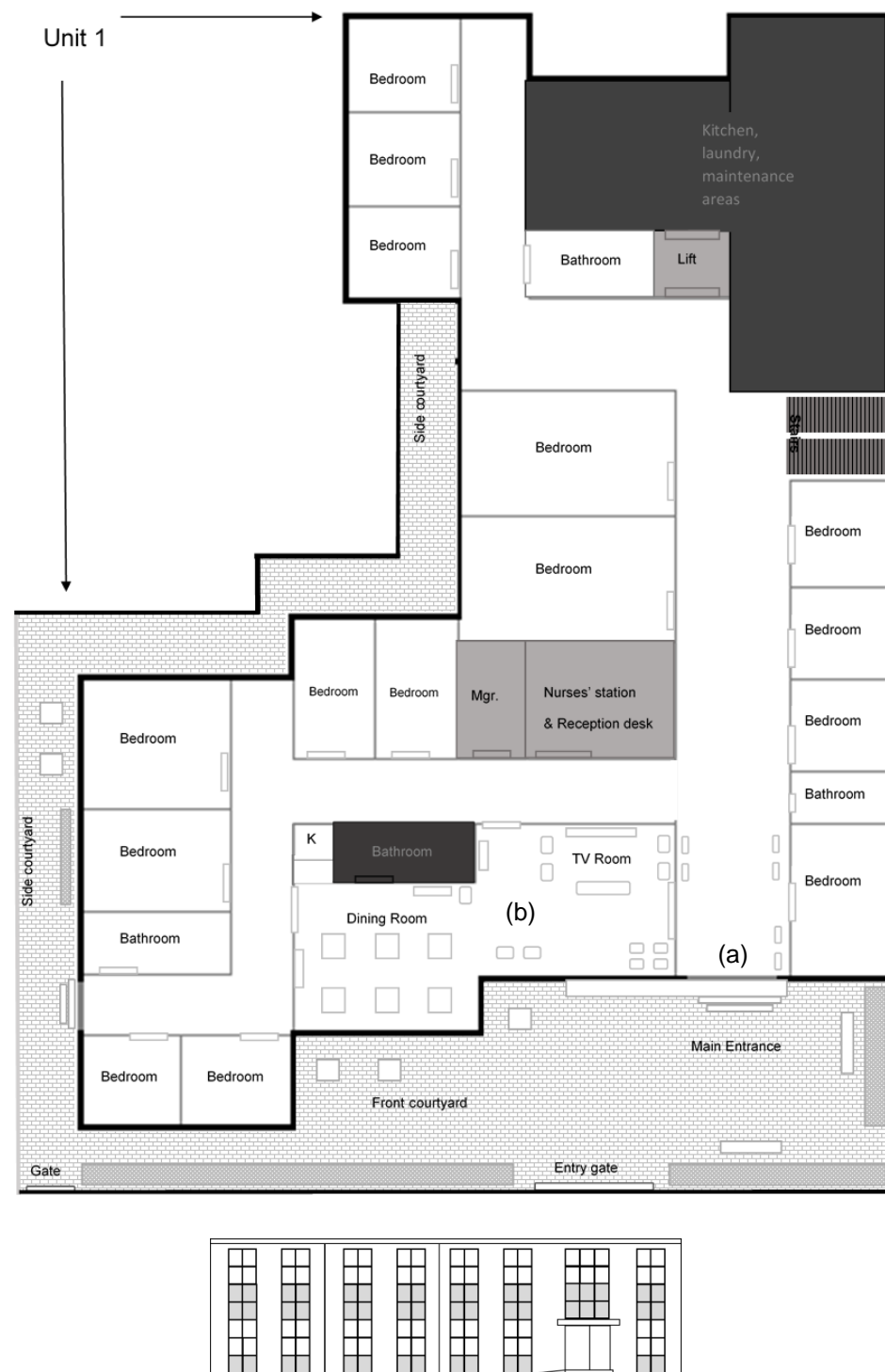


Figure 2. Elevation of the facility and floorplan of Unit 1. Areas in black are closed to residents, areas in grey are open to accompanied residents, and areas in white are open to residents generally. The main entry/exit (a) is a secure keypad-enabled sliding glass door. The multi-purpose common area in Unit 1 (b) has a kitchenette ('K'), square dining tables and chairs, a sideboard, piano, and a TV/sitting area with sofa and chairs. 'Mgr.' = manager's office. 'Lift' = elevator. The drawing is not to scale.

Most main facility operation centres (reception, food preparation, laundry, maintenance, management) were located on the ground floor in and around Unit 1. Unit 1 had a spacious well-lit multi-purpose common activity room, located just inside the facility's front entry. The activity room was arranged into a 24-seat dining area plus kitchenette and a large 12-seat room with flat-screen TV. Resident rooms, shared toilet and shower facilities, the nurses' station, and all other facilities were located in corridors outside of the common room and along the width and length of the building. Upper-level resident rooms, shared toilet and shower facilities, and the nurses' station were located along L-shaped corridors in both the DSU and Unit 3. Each upper level unit had one small multi-purpose common activity room with a picture window, 12 dining seats, a small kitchenette (Unit 3) or built-in cabinet (DSU), and a 4- to 6-seat TV area.

3.5 Participant recruitment and consent

I distributed study information packets containing a letter explaining the facility and care network's approval of the study, an invitation for the resident to participate, information sheets explaining the study in detail, consent forms for the resident and their legal guardian(s), and an invitation to attend an information session that I presented onsite at the facility. All study documentation was printed on research centre letterhead including the research centre and university name and their associated contact details. The participating facility's management then mailed these information packets to residents' legal guardians. The same study recruitment documents were made available to those who attended the information session and further distributed onsite afterwards via facility staff.

All facility residents without acute physical illness were invited to participate ($n = 91$). Written informed consent was obtained for interview participation and collection of background information. An 'opt-out' approach was applied to participation in observational data collection (National Health and Medical Research Council, 2014). Notices were displayed in common areas, at reception, and in nurses' stations explaining the study and notifying residents, family, visitors, and staff of ongoing observational data collection and the right to 'opt-out' at any time. Researcher and UNSW Human Research Ethics Committee contact information were included in the public notice.

In accordance with ethics requirements, the best available evidence of a resident's capacity was consulted to provide informed written self-consent by consulting with the facility's long-serving Care Manager, a trained geriatric nurse who knew the residents well and who had current knowledge of their cognitive status. In this way, informed written consent was obtained from residents with capacity to consent as confirmed by the Care Manager. Otherwise, verbal assent was obtained together with the informed written consent of a legal guardian. Thirty-two residents provided verbal assent with consent from a legal guardian to fully participate. Four residents confirmed by the care manager as cognitively capable provided their own written consent. I met with these residents individually, explained the study purpose in simple language and confirmed with residents that they understood what they were consenting to. I continued to confirm assent through the questions and discussions exchanged with residents throughout the study. No resident opted out of observations and 91 residents were observed, three residents were acutely ill and excluded.

At the time of the study, the facility employed over 90 staff, including full-time, part-time, and casual staff members. The average number of daytime (morning or afternoon shift) care staff including Assistants in Nursing (AINs) and Registered Nurses (RNs) was 17 (see Table 2, Chapter 4 Results and Discussion—Part 1). Observational data were only collected during daytime hours and no daytime staff opted-out of observations. Twenty-three daytime staff provided signed consent to participate in interviews. Seven night-shift staff submitted signed revocation of consent to participate. Of the 23 consenting staff members, I chose six permanently-placed long-serving professional care staff who knew the residents well (2 x 3 units) to serve as informants. Unit 1 staff informants were the facility's full-time Recreational Activities Officer (RAO) who was also a trained nurse, and an AIN who fulfilled RAO duties in the RAO's absence. DSU care staff informants were a full-time RN/unit supervisor and an AIN. Unit 3 care staff informants were both RNs/unit supervisors, one of whom had also previously assisted with RAO duties.

3.6 Data collection

Data were collected over 45 days—15 weekdays in each of the three care units—between August and November 2012. All data were collected onsite at the facility using 'paper and pencil' methods. Review of facility files including clinical case notes took place on the first day of each 3-week segment and observational data collection occurred over

the following 10 weekdays. Staff and resident interviews were conducted during the last four days of each segment and additional brief timed observations of resident behaviour were recorded in field notes.

Data collection methods are explained in detail below, beginning with collection of background data. An account of interview protocols and overview of standardised assessment measures is presented. This is followed by an introduction to SNA methodology including definition of key concepts, data collection methods, and terminology.

3.6.1 Background data

Resident demographic data, current medical status, background social network data, and clinical background data were collected from facility files and through interviews. Demographic data included age, sex, time in care, country of birth, spoken languages, religious affiliation, marital status, education level, and previous occupation (McLennan, 1997). Background social network data included current number of active visitors and facility roommates. Clinical background data included dementia diagnoses, physical and psychological comorbidities, dosage and frequency of psychotropic medications, and general functional ability in sight/hearing/speech (Goodenough et al., 2012). Copies of the facility's resident ID photos were obtained to assist with observational identification and to serve as visual cues during staff and resident interviews.

3.6.2 Observational data collection

As the researcher fulfilling the role of participant observer, I was trained in psychology and experienced in interview, observation, and research assessment of people with and without dementia living in residential aged care facilities (Casey et al., 2014; Chenoweth et al., 2014; Goodenough et al., 2012; Low et al., 2013; Low et al., 2014). I wore an identification badge with my full name and the name of my place of study, remained positioned in common areas with residents from morning through to later afternoon/evening each day, engaged in polite greetings with residents, staff, and visitors, and responded to residents, staff, and visitors when approached. Maintaining a physical presence and polite social exchange with individuals in each care unit allowed the residents and staff to become more familiar with me, allowed me to become more familiar

with them, and for us to establish rapport prior to engaging in interviews (Allan, 2006; Beuscher & Grando, 2009; Hellström, Nolan, Nordenfelt, & Lundh, 2007).

I applied a process of focused participant observation, immediate hand-written data transcription, and post data collection electronic transcription of hand-written field notes and daily diarised supporting information using Microsoft Word 2010 (Mulhall, 2003). Ethics approval for the study did not include any form of direct electronic recording of interviews or interactions. Residents' social interactions were transcribed into unstructured field notes Monday–Friday, typically from 10 am to 5 pm when residents were in common areas (i.e. the facility dining room, lounge room, corridors) for an average of 71 hours per unit, for a total of 213 hours.

Chronological field note data included date and time of initiated interactions (in minutes), situational time-activity context (structured social activity, unstructured time, mealtimes, structured care routines), interaction partners (initiators, recipients, others involved), continuous recording of social exchange (statements, actions), activity participation (intentional presence at structured activities), and interaction-based behaviour such as approach, avoidance, and withdrawal. Observational field notes also contained daily descriptions of the immediate physical environment including general weather conditions (fair, cloud, wind, rain, storm), temperature (hot, warm, cool, cold), sound and lighting levels (low, medium, high), room layout (furnishings, windows, entries and exits), and mapping of residents' locations at the commencement of observations and at mealtimes (seating arrangements, placements). Although social interactions between participating coresidents constituted the interactions of key interest (focal ID sampling), all social interactions involving participating residents were initially transcribed into field notes, including interactions with staff and visitors. These interactions provided environmental and social context for coresident interactions. Events involving individual staff and visitors were recorded when these events changed the environment or influenced resident behaviour, such as the RAO starting a DVD for residents, or visitors bringing their pet dog during a facility visit. Daily diarised field notes recorded additional observations on residents' status and routine ('unwell', 'very sleepy', 'wife didn't come for daily visit'), alterations in staffing ('new AIN training', 'cook called-in sick') and updates from staff on events or changes occurring outside of direct observations (i.e. in another care unit, overnight, or over the weekend) that could potentially affect the residents under observation.

I strove to record events as they happened in the moment without immediate conscious interpretation. Transcription of residents' behaviour during social interactions included description of the appearance and physical form (structure) of the behaviour (i.e. "bangs the table with his open hand"), the effect (consequences) of the behaviour on coresidents (i.e. "bothered by [the] loud outburst"), and the spatial relationship between interaction partners (i.e. "from across the room"). Macro elements of behavioural patterns and sequences were typically noted instead of micro elements. For example, noting that two residents 'smiled at one another in greeting' rather than noting the level of synchrony between their body postures and facial expressions. Residents' movements and statements commonly proceeded at a slow pace due to the high level of cognitive-functional impairment and immobility of residents within the participating facility. Whenever possible, resident statements were transcribed verbatim. In instances when I was unable to transcribe statements verbatim, I noted the reason (i.e. 'resident turned head, unable to hear response') and summarised the event rather than the statement ('looked at [her] and responded to the question').

Field notes were reviewed at the end of each day's data collection. This process served to prompt recall of additional details, allowed cross-checking of participant IDs with maps of resident locations, and allowed notation of errors or omissions. Additional details or corrections noted separately throughout the day and recalled upon review were included in field notes. Hand-written field notes were transcribed into Word 2010 documents and compiled by date, with supplementary information on environmental setting, staffing, scheduled activities, updated resident status, and seating arrangements compiled at the beginning of each transcript followed by resident interactions and further supplementary data listed in order of occurrence across each day.

3.6.3 Interviews

3.6.3.1 Resident interviews

I commenced interviews with residents of each care unit after I had spent ten weekdays within the care unit collecting observational data. I chose to interview residents to 1) gain insight into the feelings, beliefs, and expectations that the residents held about friendship, or what 'friendship' meant to them, including the types of activities they enjoyed sharing with friends; and 2) to document which other residents they thought of as their friends and/or with whom they had some type of positive relationship. I consulted with

consented residents and interviews were conducted with each resident's assent and at their convenience (Slaughter, Cole, Jennings, & Reimer, 2007). In respect of each resident's needs, wishes, and privacy, interviews took place in public areas or private rooms according to their preference. I read aloud all questions, items, and response sets to residents during interviews. Measure items and response sets printed in large font size were made available for residents who preferred to see and/or read the items in tandem with hearing them read aloud. These printed visual aids provided alternate communication pathways for residents with good (or corrected) sight and reading comprehension to choose and point to their responses if they were unable to hear/understand me, or if they were unable to produce verbal responses. Table 2 presents a summary of measures used. Details of each measure are addressed in Section 3.6.4 Standardised assessment.

Table 2

Summary of All Scales and Measures, their Possible and Actual Score Ranges, and Interpretation of Scores

Construct	Measure/ Scale	Possible Range	Actual Range	Scaling	Interpretation	Cronbach's α	Reference
Demographic factors associated with social network size							
Age	all noted in chart	0–110	63–94	continuous	years	N/A	(McLaughlin et al., 2010; Phongsavan et al., 2013)
Sex		0–1	0–1	binary	0 = M, 1 = F	N/A	
Time in care		.25–50+	.25 – 10.75	continuous	years	N/A	
Non-Australian born/CALD ^a		0–1	0–1	binary	0 = Y, 1 = N	N/A	
English first language/ESL ^a		0–1	0–1	binary	0 = N, 1 = Y	N/A	
Level of education ^{a, b}		0–1	0–1	binary	0 = Y12 or > 1 = < Y12	N/A	
Marital status ^a		0–3	0–3	binary	0 = N, 1 = Y	N/A	
Number of active visitors		0–20+	0–6	continuous	N/A	N/A	
Dementia diagnosis	noted in chart	0–1	0–1	binary	0 = Y, 1 = N	N/A	(Abbott & Pachucki, 2016)
Number of psychiatric diagnoses ^{a, c}	noted in chart	0–18	0–4	continuous	N/A	N/A	(Goodenough et al., 2012)
Physical comorbidity ^d	noted in chart	0–104	0–8	continuous	N/A	N/A	(AIHW, 2002)
Medications (last 2 weeks):							
Psychotropic medications	dose/ frequency	0–24	0–5	continuous	N/A	N/A	(Goodenough et al., 2012)
Non- psychotropic medications	noted in chart	0–24	0–16				
Ability in Communication	noted in chart, researcher confirmed	0–45	15–45	continuous	higher = less impairment	N/A	(Goodenough et al., 2012)
Ability in Activities of Daily Living	Barthel Index, completed based on chart notes and observation	1–100	0 to 75	continuous	higher = lower ability/greater dependence	.82	(Mahoney, 1965)
Cognition	PAS cognitive impairment scale: charted or researcher administered	0–21	1–21	continuous	0–3 = no or minimal impairment 4–9 = mild impairment 10–15 = moderate impairment 16–21 = severe impairment	N/A	(Jorm et al., 1997; Jorm et al., 1995)

Cognitive-functional ability/dementia severity stage	Global Deterioration Scale	0–7	1–7	ordinal	1 = subjectively and objectively normal 2 = subjective complaints of mild memory loss 3 = Mild Cognitive Impairment 4 = early dementia 5 = moderate dementia 6 = moderately severe dementia 7 = severe dementia	N/A	(Reisberg, 1982)
Participation in structured social activities	Field note data	0–28	0–9	continuous	N/A	N/A	(Casey et al., 2015)
Resident semi-structured interview							
Meaning of friendship	'Views of Friendship', resident self-report	N/A	N/A	nominal/qualitative	content analysis, thematic analysis	N/A	(de Medeiros et al., 2012)
Friendship and positive relationships with coresidents/positive social network size	'Views of Friendship', resident self-report	Unit 1 = 0–42 DSU = 0–18 Unit 3 = 0–34	Unit 1 = 0–18 DSU = 0–1 Unit 3 = 0–4	continuous	network analyses	N/A	(de Medeiros et al., 2012)
Resident survey assessment							
Perceived and objective social support	adapted Lubben Social Network Scale–6 Friends subscale. Weekly and daily timeframes added in this study	0–45	0–20	continuous	cutpoint of ≤ 6 suggests risk of social isolation	.89, .70, .58	(Lubben et al., 2006)
Subjective social support/isolation	The Friendship Scale	0–24	4–23	continuous	higher = greater social connectedness	.76	(Hawthorne, 2006)
Attachment style in adult relationships/dimensional models of self and others	The Relationship Questionnaire resident self-report	each version: 1–4/ –12 to 12 for both models	self-report: 1–4/ –2 to 6 (self) –10 to 6 (others) family/friend report:	nominal/continuous	1 = secure 2 = fearful 3 = preoccupied 4 = dismissing positive scores = more positive models	N/A ^e	(Bartholomew & Horowitz, 1991; Morse, Shaffer, Williamson, Dooley, &

	version and family/friend-report version adapted for this study		-6 to 6 (self) -7 to 9 (other)		negative scores = more negative models		Schulz, 2012; Schmitt et al., 2004)
Direct care staff semi-structured interview							
Coresident relationships: friendships and antagonistic relationships	'Views of Friendship', direct care staff report	Unit 1 = 0-42 DSU = 0-18 Unit 3 = 0-34	see below	continuous	higher = larger networks	N/A	(de Medeiros et al, 2012)
Coresident social networks: positive, negative, and ambivalent social network size	Direct care staff report	Unit 1 = 0-42 DSU = 0-18 Unit 3 = 0-34	Unit 1=0-25, 0-5, 0-2 DSU=0-3, 0-9, 0-1 Unit 3=0-20, 0-5, 0-2	continuous	higher = larger networks	N/A	(Casey et al., 2016)
Direct care staff survey assessment							
Social engagement	Multi-dimensional Observation Scale for Elderly Subjects Withdrawn Behaviour subscale	0-33	10-31	continuous	higher = greater withdrawal	.80	(Helmes, Csapo, & Short, 1987)
Observational data							
Meaning and content of resident social interactions	observer hand-written field notes	N/A	N/A	qualitative, continuous	thematic analyses, content analyses	N/A	(Casey et al., 2015)
Coresident social networks: positive, negative, and ambivalent social network size	observer-report	Unit 1 = 0-42 DSU = 0-18 Unit 3 = 0-34	Unit 1: 0-19, 0-4, 0-2 DSU: 0-4, 0-11, 0-3 Unit 3: 0-7, 0-6, 0-1	continuous	network analyses	N/A	(Casey et al., 2015)

Note: M = male. F = female. Y = yes. N = no. CALD = Culturally and Linguistically Diverse. Residents born overseas, originating from non-English speaking countries. ESL = residents whose first language was not English. Y12 or > = Year 12 or higher. < Y12 = below Year 12. PAS = Psychogeriatric Assessment Scales. ^a Results of demographic data coded using nominal scaling is provided in Appendix A. ^b Level of education Year 12 or higher = attaining at least a Higher School Certificate (HSC)/High School Diploma or higher degree. ^c Psychiatric diagnoses included: anxiety disorders inclusive of obsessive compulsive disorder, post-traumatic stress disorder, panic disorder, anxiety unspecified, other unspecified; amnesic disorder, delirium or other cognitive disorder unspecified; intellectual disability, developmental disorder, unspecified disorder; affective disorders inclusive of bipolar disorders, depression unspecified, and other unspecified; schizophrenia, schizoaffective disorder, and psychosis unspecified, and other unspecified. Total counts of

psychiatric diagnoses included dementia diagnosis. ^d Physical comorbidities were compared against the Aged Care Assessment Program (ACAP) Code list for Health Condition – long (Australian Department of Health and Ageing, 2009). The possible range of physical comorbidities was based on the code list with the exclusion of codes included in dementia diagnoses (codes 602, 604, 606, 607) and codes listed under “symptoms & signs n.o.s. or n.e.c.” (codes 1701 to 1730, 1799, 1899).

^e The format of the Relationship Questionnaire does not allow for estimates of internal consistency.

Residents first answered three open-ended questions about their views of friendship. The questions were: “What does friendship mean to you?”, “What do you like to do with friends?”, and “Who are your friends here?” (de Medeiros et al., 2012). This created a ‘conversational’ beginning to interviews, offered broad scope for expression of ideas, and primed the constructs of friendship and social relationships for the following interview assessments (Sudman, 1985).

If the resident was willing and able to continue with the interview (Krosnick, 1991), I would introduce standardised measure items assessing objective social support, followed by items assessing subjective social support, and then items assessing adult attachment style. In case current results of cognitive assessment had not been available from the resident’s file (see section 3.6.4.1), I consulted with the resident to gauge their fatigue and willingness to continue and completed a cognitive assessment with residents where possible. If residents were fatigued, unwilling, or unable to complete measure items at any point during interview, I discontinued assessment and attempted the unfinished portion of the interview at a later time where possible.

Residents’ responses from the three open-ended questions were imported into NVivo 10 (QSR International Pty Ltd., 2012) for analysis of key word frequency and descriptive themes (Neergaard, Olesen, Andersen, & Sondergaard, 2009). Due to their restricted cognitive capacity, participants tended to use short and fragmented words in answering questions and were limited in their ability to explain or tell stories. Identifying descriptive patterns of key words was the main focus of initial analysis given the nature of the answers. Descriptive thematic analysis was conducted to elicit the meaning attached to friendship and patterns of their friendship experiences.

3.6.3.2 Care staff interviews

I chose to interview direct care staff who knew the residents well in order to gain insight into their perspective of the occurrence, emotional valence, and strength of friendships and other social relationships between residents and their perceptions of individual residents’ level of social engagement/withdrawal. Direct care staff who work with highly dependent people create opportunities or barriers to resident social interactions through their enactment of activities, care routines, and protocols, and through their individual choices in assessing and meeting resident needs. Their intervention, or lack thereof, can affect immediate and longer-term social outcomes for residents. Knowledge of care staff perceptions of resident social interactions

contributes to an understanding of the broader social-care context in the facility and allows for triangulation of data with resident self-report and researcher observations (Maas, Kelley, Park, & Specht, 2002; Roxburgh, 2006; Veeramah, 1995).

I consulted with care staff who consented and had been chosen to participate in informant interviews and conducted interviews with them at their convenience. Interviews took place in facility areas away from residents, visitors, and non-involved staff in order to maintain the privacy and confidentiality of resident information and staff responses. All six care staff provided information on dyadic social relationships between residents. The facility care manager arranged secured time to conduct extended interviews with one staff member from each unit (Unit 1: RAO; DSU: RN/Unit Supervisor; Unit 3: RN/Unit Supervisor who previously assisted with RAO duties) to enable them to additionally complete a standardised measure of resident social engagement/withdrawal for each resident who had consented from their unit. I read aloud all questions, measure items, and response sets to staff participants during interviews. Staff completing questionnaires were provided with printed questionnaire-item response sets to read in tandem. Staff first answered open-ended questions about dyadic friendships and social relationships between residents and then responded to questionnaire items.

At the conclusion of each resident and staff interview, participants were asked if they had questions for me. Any questions arising were addressed and the participants were thanked for their time and contribution.

3.6.4 *Standardised assessment*

3.6.4.1 *Psychogeriatric Assessment Scales cognitive impairment scale*

The cognitive impairment scale of the Psychogeriatric Assessment Scales (PAS; Jorm et al., 1997; Jorm et al., 1995) served as a ubiquitous standardised measure of cognitive ability. The PAS cognitive impairment scale displays good psychometric properties (Jorm et al., 1997) and was designed for use in research and provision of aged care services (Jorm et al., 1995). PAS cognitive impairment scale scores are recorded in residents' files soon after admission to the facility as part of the assessment battery included in the Aged Care Funding Instrument (ACFI) mandated by the Australian Government's Department of Health and Ageing (DOHA, 2009). In the event that files recorded either no score or a score discrepant with current status, I attempted to complete a PAS with residents ($n = 9$). The 21-item PAS cognitive impairment scale assesses cognitive decline in dementia. Scores range from 0 to 21 with higher scores indicating greater impairment. Score cut-offs establish four

qualitative impairment categories: 0 to 3 'No or minimal impairment', 4 to 9 'Mild impairment', 10 to 15 'Moderate impairment', and 16 to 21 'Severe impairment' (DOHA, 2009).

3.6.4.2 The Barthel Index

I assessed residents' ability in Activities of Daily Living (ADL) and disease severity using the 10-item Barthel Index (Mahoney, 1965) and the Global Deterioration Scale (GDS) respectively (Reisberg, 1982), based on the best available evidence, including a combination of chart, observation, and staff interview data. The Barthel Index assesses functional ability in seven areas of self-care and three areas of mobility. Items are scored in 5-point increments with the maximum total score of 100 indicating fully independent functioning and the minimum total score of 0 indicating a fully dependent bed-bound state. The Barthel Index is a valid and reliable tool used widely in Australia (Kitsos, Harris, Pollack, & Hubbard, 2011) and suitable for use by both clinicians and researchers (Richards et al., 2000). Scale internal consistency was good in this study with Cronbach's alpha 0.82 ($n = 36$).

3.6.4.3 The Global Deterioration Scale

The Global Deterioration Scale (GDS) is a staging instrument designed to rate dementia severity based on an individual's deficits in cognition and function in activities of daily living. Seven stages rate level of impairment from 1 'Subjectively and objectively normal' (no memory deficit evident on clinical interview) to 7 'Severe dementia' (all verbal abilities are lost over the course of this stage, individual requires assistance toileting and feeding; basic psychomotor skills (e.g. ability to walk) are lost with the progression of this stage). Stage 3 corresponds to Mild Cognitive Impairment (MCI) and Stages 4 to 5 indicate the presence of dementia with need for formal care. The GDS has been shown to be a valid and reliable measure of functional and cognitive impairment across multiple dementia subtypes (Paul et al., 2002; Reisberg, 1982) and is a recommended dementia assessment tool in the Australian health care context (Sanson et al., 2008).

3.6.4.4 The Multidimensional Observation Scale for Elderly Subjects (MOSES) Withdrawn Behaviour subscale

Staff provided information in semi-structured interviews using the Multidimensional Observation Scale for Elderly Subjects (MOSES) Withdrawn Behaviour subscale (Helses et al., 1987). The eight-item Guttman-style subscale captured data on resident social engagement. A Guttman scale, also known as a

cumulative scale or ‘scalogram’ (Guttman, 1944), establishes a unidimensional continuum for a concept so that respondents who agree with any one item in the scale will also agree with previous scale items. Individual items of the MOSES Withdrawn Behaviour subscale addressed solitude, initiating and responding to social contacts, friendships with other residents, keeping occupied, interest in daily and outside events, and helping other residents. For example, in item C ‘Responding to social contacts’ the informant was asked “How often during (the) past week did NN [resident’s name] respond to social contacts made by other people?—1. Most of the time and tried to keep the contact going, 2. Most of the time, but only briefly, 3. Only some of the time, 4. Not at all” (Helmes et al., 1987). The MOSES was chosen for this study based on its robust psychometric properties, validity in elderly populations, and its construction of social engagement as a key indicator of healthy functioning. Previously published studies with populations in low-level-care and skilled nursing facilities have reported acceptable ($\alpha = 0.79$, $n = 599$) to good ($\alpha = 0.77$, $n = 970$) internal consistency for the Withdrawn behaviour subscale (Helmes et al., 1987). The subscale’s internal consistency was good in this study with Cronbach’s alpha 0.80 ($n = 36$).

3.6.4.5 Adapted Lubben Social Network Scale-6 Friends subscale

Residents provided quantitative data on their personal friendship networks using an adapted version of the 3-item LSNS-6 Friends subscale. The LSNS-6-Friends subscale was chosen for this study as an internationally validated instrument measuring objective and perceived social support in older adults and providing quantitative data on the size, intimacy, and frequency of contact in a respondent’s friendship network (Lubben et al., 2006; Sansoni, Marosszeky, Sansoni, & Fleming, 2010). This measure acted as a secondary name generator (Brewer, 2000) after the primary SNA name generator (see point 2.7.1) for self-report of friendship ties (de Medeiros et al., 2012).

The original LSNS-6 Friends subscale was designed for use in a community setting. For the purposes of this study, items on the LSNS-6 Friends were adapted for use in a long-term care setting where participants might encounter some residents on a daily basis and others only on a weekly or monthly basis at structured activities. The subscale was adapted by adding the qualifier ‘here’ to each question and including shorter time reference options such as ‘week’ and ‘day’. Subscale items asked “How many of your friends (here) do you see or hear from at least once a (month/week/day)?”, “How many friends (here) do you feel so at ease with that you can talk about private matters (month/week/day)?”, and “How many friends (here) do you

feel close to such that you could call on them for help (month/week/day)?" (Lubben et al., 2006). Responses were coded on a 6-point scale (0 = none, 1 = one, 2 = two, 3 = three or four, 4 = five through eight, 5 = nine or more) with total scores ranging from 0 to 15 within each time reference. The original cutpoints for the Friends subscale denoting scores of <6 as 'marginal friendship ties' (Lubben et al., 2006) were retained for the adapted version of the subscale used in this study. Internal consistency for the adapted LSNS-6 Friends subscale ranged from excellent ($\alpha = 0.89$, $n = 20$) for the monthly time frame, to acceptable ($\alpha = 0.70$, $n = 17$) and poor ($\alpha = 0.58$, $n = 17$) for the weekly and daily time frame, respectively. Internal consistency for the monthly time frame in the adapted LSNS-6 Friends subscale slightly exceeded the internal consistencies previously reported (0.80 to 0.82) for the original LSNS-6 Friends subscale (Lubben et al., 2006).

3.6.4.6 The Friendship Scale

Residents' perceptions of personal social isolation were measured with the Friendship Scale. The Friendship Scale was chosen for this study as a valid measure of social isolation with available Australian reference data for older adults in long-term care (Hawthorne, 2006; Sansoni et al., 2008; Sansoni et al., 2010). The Friendship Scale operationalises social isolation as a multi-faceted construct based on transgression theories of social support. These theories postulate that attachment style predisposes social network behaviour across the lifespan and that social network quality modulates individual response to life stressors, with social isolation affecting health and wellbeing negatively (Hawthorne, 2006).

Residents used a 5-point Guttman-type scale, from 1 = 'Almost always' to 5 = 'Not at all', to rate how often in the past month they were able to relate to others, experienced feelings of isolation, had someone to share their feelings with, found it easy to get in touch with others when needed, felt separate from others, or felt alone and friendless (Hawthorne, 2006). The Guttman-type item response scale locates the most aversive responses—indicating no social interaction—as the lowest scores. Cut-off points divide an individual's Friendship Scale score into five categories with the lowest category reflecting the respondent's strong endorsement of at least one isolating condition (Hawthorne, 2006). Corresponding total scores and level of social isolation are as follows: 0–11 'socially isolated'; 12–15 'isolated or low level social support'; 16–18 'some social support'; 19–21 'socially connected'; and 22–24 'very socially connected' (Hawthorne, 2006). The Friendship Scale showed an acceptable internal

consistency with a Cronbach's α of 0.76 ($n = 21$) in this study, though this was lower than in previous reports by the scale authors ($\alpha = 0.83$, $n = 829$; Hawthorne, 2006).

3.6.4.7 The Relationship Questionnaire

Self-report of the current attachment style of residents was collected using the Relationship Questionnaire (Bartholomew & Horowitz, 1991). This questionnaire was chosen as a valid and reliable brief standardised assessment of adult attachment (Griffin & Bartholomew, 1994) that has been used with older adults in Australia (Feeney & Hohaus, 2001) and with people with dementia in the US and UK (Molinari et al., 2001; Nelis et al., 2012). The Relationship Questionnaire assesses attachment style in adult relationships using two underlying dimensions—'Anxiety' and 'Avoidance'—representing cognitive models of 'self' and 'others', respectively. The two dimensions are conceptualised as orthogonal continuums from 'low' to 'high'. Four attachment patterns or styles fall between the arms of the two dimensions. Low anxiety with low avoidance reflects secure attachment, low avoidance with high anxiety reflects preoccupied style, high anxiety with high avoidance reflects fearful-avoidant attachment and high avoidance with low anxiety reflects a dismissing-avoidant style. Items describe first-person cognitions associated with each style. Respondents were first asked to select the relationship style item that "best describes (them) or is closest to the way (they) are", providing a discreet classification to one style (forced-choice). Respondents then rated each style individually according to how well it corresponded to their own style using a 7-point Likert rating scale anchored by 1 "Disagree strongly", 4 "Neutral/Mixed", and 7 "Agree strongly" (Bartholomew & Horowitz, 1991). This provided the dimensional classification from which a person's position on the models of 'self' and 'others' was determined. Summed ratings for preoccupied and fearful attachment (negative self-models) are subtracted from the summed secure and dismissing (positive self-models) ratings to provide the self-model dimensional rating. Summed ratings of dismissing and fearful patterns (negative other models) are then subtracted from summed secure and preoccupied ratings (positive other models) to derive the others-model dimensional rating.

One family member, friend, or guardian of each resident was asked to complete a version of the Relationship Questionnaire (Bartholomew & Horowitz, 1991) adapted for informant-report in order to assess the resident's pre-facility attachment style in adult relationships. Informants unable to visit the facility received posted packets containing the survey, a self-addressed stamped response envelope and an

explanatory letter requesting completion and return of the survey. Informants visiting the facility obtained the measure directly from me. The survey asked respondents to select the relationship style item that best described their friend or relative prior to their residence at the nursing home. Respondents then rated each style individually according to how well it corresponded to their friend or relative's style using the previously mentioned 7-point scale.

3.6.5 Participation in structured social activities

Data on resident participation in structured social activities were recorded as part of observational data collection. Descriptive data regarding type, duration, frequency, and staff-facilitation of structured social activities, as well as the residents' participation in each type of activity were extracted for correlational analyses. Participation in structured social activities was defined as residents' deliberate (not coincidental) presence at staff-facilitated activities involving at least one other resident, not including personal care or routine daily meals (Casey et al., 2014).

3.7 *Social network analysis*

3.7.1 Resident self-report of positive relationships

Residents provided qualitative self-report data in semi-structured interviews by answering the de Medeiros et al. (2012) Views of Friendship–Resident version (VoF–R), Items 1 and 2: “What does friendship mean to you?” and “What do you like to do with friends?” (de Medeiros et al., 2012). These questions aimed to document the resident's cognitive schema around their concept of ‘Friendship’, including emotions, expectations, and behaviours associated with the construct. Five residents with ethnically diverse backgrounds who were no longer able to communicate in English were assisted by family members who interpreted in their native language during interviews.

During resident interviews, social network boundaries were defined by the roster of residents who lived within each care unit. These boundaries were established to include residents with whom participants had the greatest opportunity for interaction (Carley & Krackhardt, 1996) and to reduce recall burden (Marin, 2004; Marin & Hampton, 2007). Network tie data were collected by showing residents the ‘album’ of their coresidents’ facility ID photos while I explained “I have an album of photos here that I would like to show you—is that alright? (if the resident responded ‘yes’—the interview proceeded) We can look at the photos together. Would you please tell me if

any of the people you see in the photos are friends of yours?” (Abbott et al., 2013; de Medeiros et al., 2012). Residents also provided data for friendship network matrices through their responses to items in the adapted LSNS-6 Friends subscale (Lubben et al., 2006). The items served as name generators that provided opportunity for residents to name friends within the facility with whom they may have interacted across different time scales (day/week/month). Names identified as friends from beyond the facility and names arising from delusional thinking (i.e. famous or well-known public figures) were not included in resident networks.

Verbal responses were hand-transcribed verbatim into response booklets and descriptions written of non-verbal responses. For example, a resident answered the question “Who are your friends here?” verbally and with hand gestures. The response was written “That guy over there (points to bed of ‘resident ID’)”. A resident who could not remember individual names identified someone they liked by pointing at that resident’s photo and saying ‘Oh yes!’ while smiling and nodding. Friendship strength was assessed with follow-up questions asking if the person was a ‘true friend’ (+3) or a ‘casual friend’ (+2). Positive relationships not identified as ‘friendship’ were rated as ‘positive regard’ (+1). The absence of a relationship between two residents was rated ‘0’. Self-report data on personal friendship networks were not recorded for residents who were non-responsive due to cognitive impairment, or whose responses were uninterpretable by family members and by me.

3.7.2 Staff-report of resident relationships

Staff reported relationship ties of residents living on their unit. Staff were prompted with a roster of names and photographs of all residents in their assigned care unit. For each resident’s name in turn, staff were shown the resident’s photograph and asked to identify which other residents in the facility that resident had a friendship or other social relationship with. Staff reported residents’ positive ties by answering “Does (resident) have friendships with other residents and if so with whom?” and rating relationship tie strength as ‘true’ (+3) or ‘casual’ (+2) friendship (de Medeiros et al., 2012). Positive relationships not identified as ‘friendship’ were rated ‘positive regard’ (+1). Negative ties were reported by answering “Which residents are in conflict with each other?” and rating tie strength as ‘mild disregard’ (–1), ‘moderate dislike’ (–2), or ‘strong dislike’ (–3). Together, these ratings formed a tie strength scale from –3 to +3 with ‘0’ representing no relationship (‘neutral’). Relationships defined as both positive and negative were rated ‘weak’ (1), ‘moderate’ (2), or ‘strong’ (3) ambivalence.

3.7.3 Researcher ratings of resident relationships

I formed perceptions of residents' relationships with coresidents through the process of focused participant observation, conducting interviews with residents and staff, transcription of observations into field notes, and reflection on observed interactions and behaviour. I then rated resident relationships at the end of the study data collection period using the same methods and tie strength scale used by staff. Completing ratings at the end of data collection meant that I was aware of all information gathered to date, including observational field notes and discussions during interviews with staff and residents of all three care units. As with staff ratings of resident relationships, researcher ratings at this stage represented professional judgements based on aggregate impressions of multiple sources of information regarding residents' relationships with others. This process identified both explicit information from conversations with residents and implicit meaning based on residents' verbal and non-verbal communication in context. It did not involve formal analysis based on explicit behavioural criteria.

3.7.4 *SNA data management and cleaning*

3.7.4.1 Matrices and dyadic tie lists

Relationship 'tie data' and resident personal attribute 'node data' were organised, managed, and analysed using Microsoft Excel 2013, IBM SPSS Statistics vers. 22.0 (IBM Corp., 2013), and UCINET 6 for Windows vers. 6.523 (Borgatti, Everett, & Freeman, 2002). Resident, staff, and researcher data were entered into separate relationship matrices in Excel. The process was repeated for each of the three care units, creating 9 matrices (3 matrices x 3 units). Using data from the rows and columns of each matrix, I compiled lists of 'tie data' that provided information on the directionality and strength of each possible dyadic relationship within that unit. Data reformatted in this way was imported into UCINET for analysis. 'Tie lists' would consist of three columns: an initiator ('ego') column labelled 'From', a recipient ('alter') column labelled 'To', and a column listing the level or 'strength' of the tie between the two residents labelled 'Tie strength'. Figures 4 and 5 provide an example of an 8 x 8 matrix and resulting tie list, respectively.

Columns to display:
Row partition:
Column partition:
Input dataset:

		1	2	3	4	5	6	7	8
		1	1	1	1	1	1	1	1
		-	-	-	-	-	-	-	-
1	100202	0	0	0	0	0	0	0	0
2	100207	0	0	0	0	0	0	0	0
3	100209	0	0	0	0	0	0	0	0
4	100213	0	0	0	0	1	0	0	0
5	100214	0	0	0	0	0	0	0	0
6	100215	0	0	0	0	0	0	0	1
7	100216	0	0	0	0	0	0	0	0
8	100217	0	0	0	0	0	1	0	0

Figure 4. Example 8 x 8 matrix

*tie data

From	To	Degree	Strength
100101	100102	0	0
100101	100103	0	0
100101	100104	0	0
100101	100105	1	1
100101	100106	0	0
100101	100108	1	1
100101	100109	1	1
100101	100110	0	0
100101	100111	0	0
100101	100112	0	0
100101	100113	0	0
100101	100114	1	1
100101	100115	0	0
100101	100116	0	0
100101	100142	1	2

Figure 5. Example tie list

The matrix in Figure 4 uses eight resident ID numbers with each number serving as the heading (label) of both one row and one column (Figure 4). The first row in the matrix—corresponding to the first resident ID—produces seven ‘initiator’ relationship ties. Each of these dyadic ties is entered as one row in the new tie list, listing the first resident ID each time in the ‘From’ column, one of the seven remaining resident IDs in the ‘To’ column, and the strength of the individual dyadic relationship (–3 thru +3) in the ‘Tie strength’ column. Now the same resident ID as in the first column in the matrix will produce seven ‘recipient’ relationships—listing this resident ID each time in the ‘To’ column, one of the seven remaining resident IDs in the ‘From’ column, and the strength of the relationship in the ‘Tie strength’ column (Figure 5). Each resident ID in this 8 x 8 matrix will therefore contribute a total of fourteen rows of dyadic relationships, seven as the initiator and seven as the recipient, in a tie list.

This data conversion and reformatting process was replicated to produce 9 unique data sets of dyadic relationship ties (3 separate care units x 3 respondent sets) available for analyses in UCINET. Additionally, the sociocentric data I reported for each of the three care units, collected through observation of the residents throughout the facility, were combined to form a list containing all resident ties within the whole facility.

However, the photos used during interviews with residents and staff were photos only of those residents living within each care unit so that Unit 1 residents and staff were shown photos of Unit 1 residents only, DSU residents and staff were shown photos of DSU residents only, and Unit 3 residents and staff saw only photos of Unit 3 residents. Therefore, in these cases it was inappropriate to combine data for analysis

of the whole facility network as photos of residents in other units would not have been available for all residents and staff to nominate during interviews. Resident and staff sociocentric data from the three care units were combined along with spontaneously-reported boundary-crossing ties between residents from different units in order to visually represent the resident network as reported by interviewed residents and staff, respectively.

The tie strength scale (−3 to +3) provided two types of data addressing 1) the emotional valence (positive, negative, ambivalent) of the relationship and 2) the strength of the relationships (true friend, casual friend, positive regard; null; disregard, moderate dislike, strong dislike). I separated these variables—‘valence’ and ‘strength’—into two separate columns by dummy coding each variable into multiple levels. Relationship ties not coded as ‘null’ were coded as either (1) positive, (2) ambivalent, or (3) negative ‘Valence’ and (1) weak, (2) moderate, or (3) strong ‘Strength’. In SNA, particularly for measures of centrality, it is often assumed that tie data is binary with ‘1’ indicating tie presence and ‘0’ indicating tie absence. For these procedures, tie valence and strength data were dichotomised into binary data (1 and 0) and new tie list columns were created and labelled as needed.

Four outcomes were possible for binary dyadic tie data: 1) the relationship was mutual and the ties reciprocal (‘1,1’); 2 & 3) the relationship was one-sided and the ties were asymmetrical (‘1,0’; ‘0,1’); or 4) the ties were null (‘0,0’) and there was no relationship (Hanneman & Riddle, 2005). There were 16 possible outcomes for directed ties using four strength levels (0 = null, 1 = weak, 2 = moderate, 3 = strong), including: a null relationship; ‘balanced’ reciprocal weak (‘1,1’), moderate (‘2,2’), and strong (‘3,3’) ties; and the remaining 12 ‘unbalanced’ asymmetrical ties (i.e. ‘0,1’ or ‘2,3’). The directed ties in this study entailed the four strength levels mentioned above and three qualitative valence levels (1 = positive, 2 = ambivalent, 3 = negative). If positive, negative, and ambivalent ties were treated as mutually exclusive categories and null outcomes in each group were treated as qualitatively different outcomes (i.e. having no positive relationships is qualitatively different to having no negative relationships), then in this study there could have been 46 possible outcomes for the dyadic relationship between any two coresidents.

3.7.4.2 Self-loops

All tie list data were cleaned and sorted in Excel. Any ‘self-loops’, dyads listing the same resident ID in both the ‘From’ and ‘To’ columns, were identified and removed. The remaining dyads were sorted into mirrored pairs, i.e. a tie from ID 312 to ID 315

was matched with the tie from ID 315 to ID 312. The new data structure provided opportunity to check for missing or incorrect tie data. As the data set was relatively small, the process also allowed for a preliminary qualitative examination of the dyads, of each separate unit network, and of the overall combined facility network (Alexander, 2012).

3.7.4.3 Conflicting data and duplicate data

In each case where staff respondents disagreed about the existence or strength of a relationship between two people, I adhered to the following set of decision criteria. Staff ratings were symmetrised—meaning that in cases of binary disagreement over the existence of a relationship the response reporting the presence of a relationship was retained over the response reporting the absence of a relationship (Hanneman & Riddle, 2005). In cases of qualitative disagreement over the strength of a relationship, the more conservative of the two responses was retained. There were no cases of reporting differences in the emotional valence of relationships within staff data. Differences in reported presence or valence of relationships in resident data formed the basis of asymmetrical or ‘unreciprocated’ relationships. All duplicated data were removed.

3.7.4.4 Data file creation and management

Tie data were saved as Visual Network Analysis (VNA) files in Windows Notepad. VNA files were imported into UCINET and saved, creating UCINET network files. This process was repeated for each of the binary data sets. Multi-level data were imported into UCINET’s DL editor Spreadsheet Interface to create separate Edgelist1-mode lists (ego ‘from’, alter ‘to’, relationship1—‘valence’, relationship2—‘strength’) and saved as UCINET network files. UCINET files were used for generation and exploration of network digraphs (directed network graphs) in NetDraw version 2.140 (Borgatti, 2002). Tie data and node attribute data were imported into NodeXL Excel Template 2014 (Smith et al., 2010) for generation and exploration of final digraphs (directed network graphs) and saved as Microsoft Excel workbooks.

3.8 Network analyses

3.8.1 Directed ties, density, and path length

Binary UCINET network files were analysed at resident node level (egocentric data) and at the unit network level (sociocentric data). Network-level density variables

for the whole combined units network based on researcher data were derived by running the UCINET Univariate statistics routine and selecting the 'matrices' dimension. Output from this routine provides whole network indices—the number of possible ties, the number of realised ties, network density, and a measure of variability.

Node-level (actor-level) density information was derived by running the Univariate statistics (old) routine and selecting first the 'rows' and then the 'columns' dimensions. The 'row-wise' output provides a preliminary look at the number of ties the resident has initiated with other residents (out-degree), the proportion of other residents with whom the focal resident has initiated ties (density) and the variability of those relationships. These indices provide insight into how embedded a resident may be, if they are a 'source' initiating several ties within a network or a 'sink' receiving several ties within a network (Hanneman & Riddle, 2005). 'Column-wise' output provides similar information focusing on ties received from other residents. Node-level centrality variables were obtained for binary directed tie data by running the UCINET Multiple measures routine for node-level data. An example of a binary directed tie would be whether or not one resident thought a 'true friendship' tie existed between themselves and another resident.

As mentioned previously, the current dataset used directional ties (i.e. ties that indicate the direction of the relationship) called 'arcs'. Therefore, 'reciprocity' was calculated as the percentage of reciprocal relationships relative to the total number of reported relationships ('arc-based' reciprocity). 'Density' was calculated as the proportion of all possible dyadic relationships that were reported by residents, staff, and observer, respectively (Hanneman & Riddle, 2005). 'Path length' was based on reported ties only and calculated as the number of ties in the shortest path between two residents (geodesic distance). Networks were sparse with several isolates, a low density, and few common relationships. Therefore, the path length 'distance' between residents was calculated within network 'components'—smaller groups of residents connected to people within their group but disconnected from people in other groups (Hanneman & Riddle, 2005).

3.8.2 Network size, reciprocity, asymmetry, and null dyads

UCINET egocentric and sociocentric data output for all residents and units were imported into Excel. Resident centrality data (out-degree and in-degree) were sorted and labelled by directional category as 'reciprocated', 'given non-reciprocated', and 'received non-reciprocated' (Abbott et al., 2013). The residents' point of view was chosen as the primary viewpoint of interest in analysis of self-reported social network

data. Exploring and describing SNA data from the residents' perspective allows researchers to focus on resident perceptions or the 'cognitive structure' of the networks rather than interpreting network structure based on proxy physical cues such as proximity to others or counts of actual interactions. This perspective may more closely approximate the residents' 'lived experience' of their social environment. Out-degree indicates awareness of ties, and choice and intention in nominating ties. Therefore, the number of out-degree relationships that a resident reported was selected for use as the key indicator of their self-reported personal network size.

Residents without any ties to other residents were categorised as social 'isolates' (Wasserman & Faust, 1994). Residents who were not nominated by others and did not provide SNA data were included in descriptive statistics to provide an overall view of networks but were not included in correlational analyses between 'isolate' status and scores on standardised measures.

3.8.3 Network visualisation

Sociocentric data from the three care units were combined with spontaneously reported boundary-crossing ties between residents from different units to visually represent the resident network as reported by interviewed residents and staff. Preliminary graphing and exploration of this data and observer sociocentric data were conducted using NetDraw version 2.140 (Borgatti, 2002). NodeXL Excel Template 2014 (Smith et al., 2010) was used to generate final digraphs (directed network graphs) of each data set, with directed ties represented as 'arcs'. Whole network graphs were generated using the Fruchterman-Reingold force-directed placement algorithm (Fruchterman & Reingold, 1991).

3.9 Statistical tests

The following section outlines the parametric and nonparametric statistical tests applied for descriptive and explorative data analyses. The level of statistical significance was $p < 0.05$ unless stated otherwise. All p -values were two-tailed.

Results of Shapiro-Wilk normality tests (Shapiro & Wilk, 1965) in SPSS indicated normal distributions for overall participation in structured activities, adapted LSNS-6 Friends subscale, The Friendship Scale, and the MOSES Withdrawn Behaviour subscale scores. Barthel Index scores, Global Deterioration Scale ratings, participation in specific activities, Relationship Questionnaire attachment style profiles, and social network data were not normally distributed.

Care unit groups were unequal in size and results of Levene's test of homogeneity of error variances (Levene, 1960) indicated unequal variances between care units on adapted LSNS-6 Friends subscale scores, the Friendship Scale scores, MOSES Withdrawn Behaviour subscale scores and number of social network ties. Due to the nature of the constructs under investigation and the relatively small numbers of participants involved it was determined after initial review of each variable that running descriptive and exploratory group comparisons on data normalised through transformation would benefit neither analyses nor the interpretability of study results. Therefore, group comparisons were run on untransformed data and data reported in tables represent untransformed means and standard deviations, and medians and interquartile ranges according to the test used.

Pairwise differences between care units on activity participation, standardised assessment measures, and social network data were explored using one-way Analysis of Variance (ANOVA; Fisher, 1921) and non-parametric Mann-Whitney U tests (Mann & Whitney, 1947) as appropriate. Differences between staff- and observer-rated social network data were investigated using Wilcoxon Signed Ranks tests (Wilcoxon, 1945). Corresponding test statistics and associated degrees of freedom or medians and interquartile ranges, p-values, and effect size statistics are reported.

Correlational analyses between network variables, demographic variables and participation in structured activity were conducted to allow comparison with results from previous network studies. Further correlational analyses were conducted between resident attributes, including network variables, and observational data in order to explore results that were derived from the application of a novel psychosocial coding method to observational field notes. Nonparametric tests were used to explore associations between resident attributes and social network data. Spearman's Rank Order tests (Spearman, 1987) were used for bivariate correlational analyses between number of social network ties and continuous variables including resident age, communication ability, number of active visitors, activity participation, Barthel Index scores, and ordinal Global Deterioration Scale scores. Pairwise differences between resident groups (i.e. male or female sex, with or without charted dementia diagnosis) on number of social network ties were explored using Mann-Whitney U tests (Mann & Whitney, 1947).

3.10 Observational data analysis

3.10.1 Rationale for observation

Observations were conducted as a supporting method to collect SNA data, to understand residents' behaviour, and to gain knowledge of the context in order to better understand why residents and staff perceived the residents' social relationships as they did (Dahlke, Hall, & Phinney, 2015; Manning & Kunkel, 2014). Secondary qualitative analyses of observational data were conducted to gain insight into aspects of the research story that could not be explained by interview data or statistical analysis and graphing of SNA variables. As a researcher and observer, I had training in psychology, additional training in observational data collection methods in naturalistic settings, and fifteen years of experience collecting observational data of human and non-human animal behaviour. The choice of observational data collection methods was influenced by my training as an ethnographer, consideration of study aims, and method feasibility within the long-term residential aged care setting. The Consolidated criteria for reporting qualitative studies (COREQ) 32-item checklist (Tong, Sainsbury, & Craig, 2007), and the Standards for Reporting Qualitative Research (SRQR); O'Brien, Harris, Beckman, Reed, & Cook, 2014) have been used to guide and structure the reporting of qualitative and observational methods and analyses where appropriate. Observational data collection methods are described in detail in Section 3.6.2 of this chapter.

3.10.2 Theoretical influences

I used aspects of Symbolic Interactionism (Blumer, 1969; Jeon, 2004; Kitwood, 1993; Mead, 1981; Serpe, 1987), Phenomenology (Carel, 2010; Clare et al., 2008; Cotrell & Schulz, 1993; Davidsen, 2013), Embodied Selfhood (Kontos, 2004, 2012; Kontos et al., 2015; Merleau-Ponty, 1962) and Perceptual Control Theory (Mansell, 2005; Marken & Mansell, 2013; McEvoy & Plant, 2014; Powers, 1973), in the secondary qualitative analyses of observational data of resident social interactions. Informed by these theoretical underpinnings, the secondary analyses of observational data shed light on aspects of friendship and social interactions that were not explained by the original study design and methods.

Each of these theoretical perspectives is predicated on the concept of people as adaptive agentic forces influencing and influenced by their interactions with other

people and other internal and external variables (individual, environmental, and cultural). Symbolic interactionism holds that individuals are continually adapting and developing meaning through interactions with others in a constantly changing social environment. Behaviour, from this perspective, is best understood by interpreting what meaning the participants derive from their action and interaction with others in a specific context, which is the institutional care context for older people with dementia in this study (Jeon, 2004; Kitwood, 1993). Phenomenological approaches emphasise the primacy of the lived experience of the person, and interpret behaviour from the participants' point of view and through their perception of meaning. The contexts in which experiences take place are integral to understanding their meaning and the appearance, perception, and significance of experiences take precedent over their factual details (Carel, 2010; Clare et al., 2008; Davidsen, 2013). Embodied Selfhood suggests that purposeful physical engagement with the environment and interaction with others, including contextually coherent and meaningful non-verbal communication, are indicative of agency and selfhood (Kontos, 2004; Seth, 2013; Wilson, 2002). Spontaneous contextually relevant non-verbal behaviour, such as is often seen in people with advanced dementia, may be interpreted as the external manifestations of a person's pre-reflective perception and experience, whether the behaviour is socio-cultural (i.e. 'dance' movements) or unique to the individual (i.e. their 'cheeky smile') (Kontos, 2012). In psychology, Perceptual Control Theory interprets an individual's behaviour as a means of controlling or modulating their perceptions of stimuli with the goal of achieving a personal internal equilibrium. People control neither their behaviour nor external variables, but their behaviour varies in order to alter their perceptions (Mansell, 2005; Mansell & Marken, 2015; Marken, 2013; Marken & Mansell, 2013). All of these theories place the person and their perceptions at the centre of behavioural interpretation while acknowledging the influential role of their environmental context.

3.10.3 Exploration and coding of field note data

Exploration of observational field note data began with thematic analysis, followed by constant comparative analysis, and progressed through an iterative process of developing conceptual abstraction. The observer read through all resident interactions line by line throughout the entire data set and collated recurrent behaviours, words and phrases. Key themes and behavioural categories were identified. The observer reduced research bias in thematic analyses through engaging with co-investigators and PhD supervisors Y-H.J. and L-F.L. A sample of de-identified transcripts from each care unit were reviewed for thematic content by PhD supervisor

and co-author Y-H.J. and resultant themes were compared with those identified by the observer. The same process was repeated separately with PhD supervisor L-F.L. and themes were compared and discussed amongst the three investigators. Codes were initially assigned to categories and concepts by the observer and confirmed in collaboration with both Y-H.J. and L-F.L. This process resulted in a novel coding scheme with each code defined, explained, and exemplified.

I revisited the transcripts with coded information and teased out the key relationships between the themes that explained the potential pathways of social interactions. Transcripts were coded by hand, and data were entered and managed in Excel and Word 2010. Text were re-read in their entirety, reviewed to identify situational time-activity contexts and social exchanges within different types of relationship partners (resident – resident, resident – staff, resident – visitor), and to establish the start and end of extended interaction sequences between multiple exchange partners. Interactions between participants and their coresidents were then isolated and extracted from field note text, organised, and content-analysed for manifest (explicit, obvious) and latent (implicit, underlying) themes keeping in mind the perspective of the participating resident with dementia, thus forming daily case summaries for each participating resident. Within summaries, each exchange sequence included the interaction partners (initiators, recipients), a description of the situational context, the time of initiation and approximate length of interchange, the verbal and nonverbal content, the perceived internal motivation of the participants, internal and external facilitators and barriers to the exchange, and the perceived socio-emotional impact of the exchange on the resident participants. At each stage of this process. The coding scheme was refined and updated to reflect both manifest behaviour and latent meaning.

Resident interaction data were compared and contrasted between cases to identify and define emergent descriptive themes of actions and interactions. Descriptive themes were then coordinated with exchange sequences to identify recurring patterns of social interactions within and across cases. These interaction patterns were then reviewed within the text as a whole to further clarify themes and the interplay of internal and external factors on interaction patterns. Through this iterative process of critical reflection and inductive analysis, a novel interaction coding scheme for field notes was created based on these qualitative analyses and reviewed in consultation with co-authors Y-H.J. and L-F.L.

3.10.4 Feedback on findings

Due to the spectrum and advanced nature of neurocognitive disorders involving both short-term and long-term memory loss, and due to the comorbid chronic disease and cognitive-functional disability experienced by the residents involved in the study, I did not approach interviewed study participants for post-interview comment, correction, or feedback on their personal statements or on study findings. I presented preliminary study findings from qualitative interview and SNA data at an onsite information session for interested RACF residents, their family, visitors, and staff. Some interviewed participants had died and several others had experienced markedly diminished capacity since completion of their participation. The facility had experienced a restructuring and staff turnover in the interim since the completion of study data collection and the Director of Nursing (DoN) at the time of the study, the full-time Recreational Activities Officer, and one RN who had participated in the study had ceased employment with the facility. One resident and one family member of another resident attending the presentation recognised me, but did not comment on findings. The facility Operations and Care Manager, one RN, and one AIN who had participated in the study spoke with me informally after presentation of initial study results and these anecdotal comments will be addressed in the Discussion chapter.

3.10.5 Quantitative reduction and description

In order to better understand the structure and quality of residents' social experience in care, the observer used the emergent descriptive themes of action and interaction as coding categories for quantitative analysis of interaction sequences. All resident personal attributes, including chart and standardised assessment data, SNA data, and coded observational field note data were compiled and analysed using IBM SPSS Statistics vers. 22.0 (IBM Corp., 2013). Descriptive analyses were used to better understand the 'dose' and 'prevalence' of each interaction variable among participating residents. Correlational analyses were conducted to investigate possible relationships between resident personal attributes and interaction variables.

Results of Shapiro-Wilk normality tests indicated that observed social interaction variables were not normally distributed. Care unit groups were unequal in size and results of Levene's test of homogeneity of error variances indicated unequal variances between care units on frequency of observed social interaction variables. Pairwise differences between care units on standardised assessments and observed interaction variables were explored using one-way ANOVA and Mann-Whitney U tests

as appropriate. Spearman's rank order tests were used for correlational analyses between standardised assessment scores and observed interaction variables.

4 Results and Discussion—Part 1

4.1 Introduction

This chapter will begin with a description of the characteristics of participating residents (Section 4.2), including demographic information, medical diagnoses, and results of assessment of ability in activities of daily living and cognitive-functional staging. This will be followed by a quantitative description of residents' participation in structured activities. Results of self-report measures of perceived social support and both self- and informant-report of residents' adult attachment style profiles in Section 4.3 add to the description of residents' personal attributes.

In Section 4.4, results from analysis of sociocentric network data of resident self-reported friendship and positive social relationships are detailed and graphed to illustrate the structure of residents' self-perceived social networks. Correlations between SNA variables and resident personal attributes, including results of standardised self-report measures, are presented. Following these inferential statistics, Section 4.5 details results of qualitative analyses that provide insight into residents' friendship schema and perceptions of their current relationships with coresidents. Data is triangulated, synthesised, and interpreted in the brief case study of 'Lily', a woman who lived in Unit 1.

In Section 4.6, care staff perceptions of residents' positive, ambivalent, and negative social relationships are detailed and graphed. Staff assessments of residents' level of social engagement or withdrawal are presented. These are followed by correlations between staff-reported network variables and residents' personal attributes, and correlations between network variables and residents' self-reported attachment profiles and perceived social support. In Section 4.7, observer perceptions of residents' multi-valenced relationships are similarly presented along with correlations between network variables, residents' attributes, and results of standardised measures. Finally, Section 4.8 presents a summary and discussion of the results of this chapter in light of the literature.

4.2 Descriptive statistics (Casey et al., 2015)

4.2.1 Participant characteristics

4.2.1.1 Demographics

The 36 participants who consented to interviews ranged in age from 63 to 94 years ($M = 81.8$) and were ethnically diverse (see Table 3 and Appendix A). Just over 60% of participants were born in a country other than Australia ($n = 22$, 61.1%). Although over a third of participants spoke English as a second language ($n = 13$, 36.1%), nearly all participants could communicate in English ($n = 32$, 88.9%). A higher percentage of women participated than men ($n = 22$, 61.1%) and more than 58% of participants ($n = 21$) did not have a spouse or partner. Of participants whose level of education was known ($n = 30$), 56.7% had completed 12 or more years of formal education ($n = 17$, 52.8%). Nearly all participants ($n = 35$) lived with at least one ($n = 16$, 44.4%) and as many as three ($n = 10$, 27.8%) roommates. Length of time spent in care ranged from 3 months to 10.75 years ($Mdn = 1.5$ years, $IQR = .5$ – 2.7) and participants had an average of 4.5 ($SD = 2.3$) diagnosed comorbid (physical) health conditions. Three-quarters of residents ($n = 27$) had a charted dementia diagnosis. Nearly 67% of residents ($n = 24$) had a charted mood disorder diagnosis and 19.4% ($n = 7$) a diagnosed anxiety disorder. The median number of comorbid psychiatric diagnoses (dementia included) was two ($IQR = 1$ – 2). Two-thirds of residents had impaired speech ($n = 24$, 66.7%), over two-fifths had impaired vision ($n = 15$, 41.7%), and less than a quarter had impaired hearing ($n = 8$, 22.2%).

Unit 1 had proportionally more residents who were Australian-born ($n = 9$, 60%), spoke English as a first language ($n = 11$, 73.3%), were male ($n = 8$, 53.3%), and had clear vision ($n = 9$, 60%) and hearing ($n = 12$, 80%). Unit 1 residents had the fewest comorbid health conditions on average ($Mdn = 4$, $IQR = 2$ – 6) and had spent less time in care ($Mdn = 1$, $IQR = 0.5$ – 1.9 years) than residents in other units. All Unit 1 residents had two or more roommates (see Table 6). Unit 3 had the highest proportions of residents with unimpaired speech ($n = 5$, 41.7%) and proportionally more residents who had spouses ($n = 7$, 58.3%). The DSU had the most residents who spoke English as a second language ($n = 5$, 55.6%), the highest median number of comorbid physical health conditions ($Mdn = 6$, $IQR = 3$ – 8), and the highest proportions of residents with mood ($n = 8$, 88.1%) and anxiety ($n = 3$, 33.3%) disorders. Results of Mann-Whitney U tests indicated that DSU residents had a significantly higher number of comorbid

psychiatric diagnoses ($Mdn = 2$, $IQR = 2-3$) than either Unit1 [$(Mdn = 1$, $IQR = 1-2$) $U = 33.5$, $p = .035$ $r = -.43$] or Unit 3 [$(Mdn = 2$, $IQR = 1-2$) $U = 24.0$, $p = .024$, $r = -.49$]. Additional descriptive statistics for charted demographic and health-related data may be found in Appendix A.

4.2.1.2 Psychogeriatric Assessment Scale scores

Psychogeriatric Assessment Scale cognitive impairment scale scores indicated that 83.3% of residents ($n = 30$) had reduced cognitive capacity. The scores of nearly three-fifths of the residents suggested 'severe' impairment ($n = 21$, 58.3%). A quarter of scores suggested that residents experienced 'moderate' ($n = 4$, 11.1%) or 'mild' ($n = 5$, 13.9%) impairment. Mann-Whitney U tests indicated no significant differences between care units in Psychogeriatric Assessment Scale scores.

4.2.1.3 Global Deterioration Scale staging and Barthel Index scores

Global Deterioration Scale ratings indicated that 94.4% of residents ($n = 34$) experienced cognitive-functional impairment to the level of MCI or dementia. A fifth of residents were rated as 'stage 3' or MCI ($n = 4$, 11.1%) or 'stage 4', early dementia ($n = 3$, 8.3%). Half of the residents rated as '5', moderate dementia ($n = 4$, 11.1%), or '6', moderately severe dementia ($n = 14$, 38.9%), and 25% ($n = 9$) were rated as '7', severe dementia. Although Barthel Index scores ranged from 0 to 75 points (out of 100), in general, scores were consistently low across all three care units ($Mdn = 10$), reflecting residents' high-care status and high dependence on staff for assistance with activities of daily living (Table 6). Just under 14% of residents ($n = 5$) walked and transferred (sitting to standing) unassisted and 22.2% ($n = 8$) transferred or walked short distances with assistance. Most residents were unable to walk and depended on staff to mobilise them in wheelchairs ($n = 14$, 38.9%) or waterchairs ($n = 9$, 25%).

There were significant differences between care units in residents' Global Deterioration Scale staging and Barthel Index scores. Mann-Whitney U tests confirmed that DSU residents had significantly higher Global Deterioration Scale ratings ($Mdn = 7$, $IQR = 6-7$) than Unit 1 residents [$(Mdn = 5$, $IQR = 4-6$) $U = 14.0$, $p = .001$, $r = -.69$]. There were no significant differences between DSU and Unit 3 residents' ratings [$(Mdn = 6$, $IQR = 6-7$) $U = 32.0$, $p = .097$, $r = -.36$] or between Unit 1 and Unit 3 ratings ($U = 80.5$, $p = .632$, $r = -.09$). Similarly, DSU residents had significantly lower Barthel Index scores ($Mdn = 5$, $IQR = 0-17$) than Unit 1 residents [$(Mdn = 15$, $IQR = 5-35$) $U = 27.0$, $p = .015$, $r = -.50$]. There were no significant differences between Barthel Index scores between DSU and Unit 3 residents [$(Mdn = 10$, $IQR = 1-18$) $U = 38.5$, $p = .259$, $r = -.25$], or between Unit 1 and Unit 3 residents ($U = 66.5$, $p = .247$, $r = -.22$).

Taken together, results of descriptive and inferential statistics indicated that residents in different care units could be differentiated according to their 1) level of physical and psychological health as represented by number of diagnosed comorbid psychiatric diagnoses and comorbid physical health conditions, 2) ability in activities of daily living as represented by Barthel Index scores, and 3) level of dementia severity as represented by Global Deterioration Scale ratings. Inferential statistics confirm that Unit 1 residents had better physical and mental health and were more independent in activities of daily living than DSU residents. Residents were segregated in a step-wise manner according to physical and mental health and cognitive-functional ability such that Unit 1 residents generally experienced the best health, cognition, and function; Unit 3 residents experienced slightly poorer health, cognition, and function; and DSU residents experienced the poorest health, cognition, and function.

Table 3

Characteristics of Participating Care Units and Participants Consented to Interviews

Care units	Unit 1	DSU	Unit 3	Total
Number of observed residents	40	18	33	91 ^a
Number of women, <i>n</i> (%)	18 (45)	12 (66.7)	23 (69.7)	53 (58.2)
Average number of care staff per shift ^b	7	4	6	17 ^c
Interview participants	Unit 1, <i>n</i> = 15	DSU, <i>n</i> = 9	Unit 3, <i>n</i> = 12	Total, <i>n</i> = 36
Demographics				
Average age in years, <i>M</i> ± <i>SD</i>	82.9 ± 7.7	83.2 ± 5.5	79.3 ± 9	81.8 ± 7.7
Years lived in care, <i>Mdn</i> 1 st –3 rd Q	1, .5–1.9	2, .7–5.8	2, .4–2.9	1.5, .5–2.7
Women, <i>n</i> (%)	7 (46.7)	7 (77.8)	8 (66.7)	22 (61.1)
Born outside Australia, <i>n</i> (%)	6 (40)	6 (66.7)	10 (83.3)	22 (61.1)
English as a first language, <i>n</i> (%)	11 (73.3)	4 (44.4)	8 (66.7)	23 (63.9)
Married/Partnered, <i>n</i> (%)	6 (40)	2 (22.2)	7 (58.3)	15 (41.7)
Educated through year 12 or above, ^d <i>n</i> (%)	6 (42.9)	5 (55.6)	6 (85.7)	17 (56.7)
Number of roommates				
None—private room, <i>n</i> (%)	0 (0)	0 (0)	1 (8.3)	1 (2.8)
One—two-bed room, <i>n</i> (%)	0 (0)	8 (88.9)	8 (66.7)	16 (44.4)
Two—three-bed room, <i>n</i> (%)	7 (46.7)	0 (0)	2 (16.7)	9 (25)
Three—four-bed room, <i>n</i> (%)	8 (53.3)	1 (11.1)	1 (8.3)	10 (27.8)

Ability to communicate				
Speech—no impairment, <i>n</i> (%)	5 (33.3)	2 (22.2)	5 (41.7)	12 (33.3)
Vision—no impairment, <i>n</i> (%)	9 (60)	5 (55.6)	7 (58.3)	21 (58.3)
Hearing—no impairment, <i>n</i> (%)	12 (80)	7 (77.8)	9 (75)	28 (77.8)
Charted psychiatric diagnoses, <i>n</i> (%)				
Dementia, <i>n</i> (%)	10 (66.7)	9 (100)	8 (66.7)	27 (75)
Mood disorder, <i>n</i> (%)	9 (60)	8 (88.1)	7 (58.3)	24 (66.7)
Anxiety disorder, <i>n</i> (%)	3 (20)	3 (33.3)	1 (8.3)	7 (19.4)
Total comorbid psychiatric diagnoses, <i>Mdn</i> 1 st –3 rd Q	1, 1–2	2, 2–3	2, 1–2	2, 1–2
Number of comorbid diagnosed physical health conditions, <i>Mdn</i> 1 st –3 rd Q	4, 2–6	6, 3–8	5, 2–7	5, 3–7
Gerontological assessment				
Global Deterioration Scale, ^e <i>Mdn</i> 1 st –3 rd Q	5, 4–6	7, 6–7	6, 3–7	6, 4–6
Psychogeriatric Assessment Scale cognitive impairment scale, ^f <i>Mdn</i> 1 st –3 rd Q	17, 5–21	21, 15–21	13, 5–21	20, 5–21
Barthel Index—total score, ^g <i>Mdn</i> 1 st –3 rd Q	15, 5–35	5, 0–17	10, 1–18	10, 5–25
Barthel Index—-independent mobility, <i>n</i> (%)	4 (26.7)	0 (0)	1 (8.3)	5 (13.9)
Observational data—activity participation				
Number of activity types attended, <i>M</i> ± <i>SD</i>	4.6 ± 1.4	3.6 ± 2.6	1.8 ± 1.8	3.4 ± 2.3
Monthly celebratory events /performances, <i>n</i> (%)	15 (100)	6 (66.7)	8 (66.7)	29 (80.6)
Bi-weekly social groups, <i>n</i> (%)	6 (40)	2 (22.2)	0 (0)	8 (22.2)
Weekly therapeutic programs, <i>n</i> (%)	4 (26.7)	6 (66.7)	3 (25)	13 (36.1)
Multi-weekday DVD/TV viewing, <i>n</i> (%)	12 (80)	5 (55.5)	4 (33.3)	21 (58.3)
Impromptu activities, <i>n</i> (%)	1 (6.7)	3 (33.3)	0 (0)	4 (11.1)
Psychosocial assessment				
Adapted Lubben Social NetworkScale-6 Friends subscale, ^h <i>Mdn</i> 1 st –3 rd Q	5, 3–11	0, 0–8	8, 2–9	5, 2–10
Friendship Scale total, ⁱ <i>Mdn</i> 1 st –3 rd Q	17, 10–20	7, 6–9	14, 11–16	14, 9–17
MOSES Withdrawn Behaviour subscale, ^j <i>Mdn</i> 1 st – 3 rd Q	16, 12–17	27, 19–28	21, 16–25	18, 14–24

Note. DSU = Dementia Specific Unit. MOSES = Multidimensional Observation Scale for Elderly Subjects. ^aThe facility had 94 residents. Three residents were excluded from participation due to acute ill health. ^bIncluded one registered nurse (RN) plus *n* assistants in nursing (AINs) per shift. ^cTotal number of care staff employed by the facility including full- and part-time and casual = 90+. ^d*n* = 30. ^eStages: 1, subjectively and objectively normal; 2, subjective complaints of mild memory loss; 3, Mild Cognitive Impairment (MCI); 4, early dementia; 5, moderate dementia; 6, moderately

severe dementia; 7, severe dementia. ^f Range from 0 to 21 with higher scores indicating greater impairment: 0–3, nil impairment; 4–9, mild impairment; 10–15, moderate impairment; 16–21 severe impairment. ^g Range from 0 to 100 with higher scores indicating greater impairment. ^h Range from 0 to 45 with a cut-point ≤ 6 suggesting risk of social isolation through limited coresident ties. ⁱ Range from 0 to 24 with higher scores representing greater social connectedness. ^j Range from 8 to 33 with higher score indicating higher withdrawal. Reference: (Casey et al., 2015)

4.2.2 Attachment style profiles and social support and isolation

The following section firstly presents quantitative analyses of standardised survey data measuring residents' self-reported attachment style profiles, family/friend informant-report of resident attachment style, and residents' self-reported perceived social support/isolation. The section secondly describes social network data from residents' self-report of friendships and positive relationships with coresidents. Finally, correlations between residents' self-reported network variables and possible predictor variables were assessed, including specific background variables of interest and scores on standardised assessments of resident self-report.

4.2.2.1 Relationship Questionnaire: Self-report

Twenty residents completed both the forced-choice and Likert rating scale sections of the Relationship Questionnaire and four residents completed the first section by choosing one relationship style description that they felt best described them (Bartholomew & Horowitz, 1991). Half ($n = 12$) of the residents who completed the forced-choice section identified with dismissing attachment style, indicating less anxiety and more avoidance in relationships (Table 4). A third ($n = 8$) identified with secure style, indicating less anxiety and avoidance in relationships. Few residents identified with either fearful ($n = 3$, 12.5%) or preoccupied ($n = 1$, 4.2%) styles (see Table 4).

Fifteen of the 24 residents who completed attachment measures (62.5%) had a dementia diagnosis. Of these, nine residents identified with dismissing attachment style (60%), three with secure style (20%), two with fearful style (13.3%) and one with preoccupied style (7%). Dimensional attachment profile scores indicated that residents with dementia generally had a positive self-image, or a positive model of self ($Mdn = 4.5$, $IQR = 1.5–6$) featuring more secure and dismissing patterns and less preoccupied and fearful patterns. Attachment profile scores also indicated that residents had a generally negative image or negative model of others ($Mdn = -2$, $IQR = -6–0$), featuring more fearful and dismissing patterns and less secure and preoccupied patterns. Only four residents had a 'model of others' profile score greater than '0' and two of those

residents had a diagnosis of dementia. Sixteen residents had a 'model of others' profile score of ≤ 0 and 12 of those residents had a diagnosis of dementia.

Only four DSU residents completed both the forced-choice and Likert scale sections of the attachment profile, compared to eight Unit-3 residents and twelve Unit-1 residents. Unit-1 residents reported the highest proportion of secure attachment style ($n = 6$, 50%) and the lowest proportion of dismissing attachment style ($n = 4$, 33.3%), while DSU residents reported the highest proportion of dismissing attachment style ($n = 3$, 75%). None of the DSU residents reported secure style. Nonparametric pairwise comparisons indicated no significant differences in 'model of self' or 'model of others' profile scores between care units.

4.2.2.2 Relationship Questionnaire: Retrospective informant-report

Residents' family/friends who completed the adapted Relationship Questionnaire proxy version ($n = 23$) reported more secure ($n = 10$) pre-RACF attachment styles for their family/friends participating in the study and slightly fewer dismissing ($n = 10$) and fearful ($n = 2$) styles (Table 4). Spearman's rank-order tests indicated no significant correlations between residents' current self-rated 'model of self' and 'model of others' attachment profiles and informants' retrospective ratings of residents' pre-RACF profiles [self-model, $\rho(11) = -.27$, $p = .417$; other-model, $\rho(11) = -.29$, $p = .388$]. Informant retrospective attachment profile scores suggested that residents held generally positive Models of Self before RACF admission ($Mdn = 5$, $IQR = 3-6$), similar to those currently reported by residents. Informant report of residents' retrospective 'model of others' profiles diverged from residents' current reports, with informants suggesting more positive pre-admission Models of Other ($Mdn = 0$, $IQR = -6 - 6$) than those currently self-reported by residents (see Table 9). Of the three facility care levels in the current study, the greatest disparity between informants' retrospective report and residents' current profiles occurred within the Dementia-Specific Unit. Informants reported pre-admission styles that mainly reflected low anxiety and low avoidance, while residents self-reported styles that mainly reflected low anxiety and high avoidance.

Table 4

Self- and Informant-Rated Resident Adult Attachment Style and Dimensional Profile

PROFILE	Unit 1	DSU	Unit 3	Total
Relationship Questionnaire—Resident	(<i>n</i> = 12)	(<i>n</i> = 4)	(<i>n</i> = 8)	(<i>n</i> = 24)
Secure, <i>n</i> (%)	6 (50)	0 (0)	2 (25)	8 (33.3)
Fearful, <i>n</i> (%)	2 (16.7)	0 (0)	1 (12.5)	3 (12.5)
Preoccupied, <i>n</i> (%)	0 (0)	1 (25)	0 (0)	1 (4.2)
Dismissing, <i>n</i> (%)	4 (33.3)	3 (75)	5 (62.5)	12 (50)
Self model, ^a <i>Mdn</i> 1 st –3 rd Q	4, 1–6	6, 4–6	6, 1–6	5, 2–6
Others model, ^b <i>Mdn</i> 1 st –3 rd Q	–1, –2–4	–6 ^c	–6, –8––3	–2, –6–0
Relationship Questionnaire—Informant	(<i>n</i> = 9)	(<i>n</i> = 5)	(<i>n</i> = 9)	(<i>n</i> = 23)
Secure, <i>n</i> (%)	3, (33.3)	4 (80)	3 (33.3)	10 (43.5)
Fearful, <i>n</i> (%)	0 (0)	0 (0)	2 (22.2)	2 (8.7)
Preoccupied, <i>n</i> (%)	1 (11.1)	0 (0)	0 (0)	1 (4.3)
Dismissing, <i>n</i> (%)	5 (55.6)	1 (20)	4 (44.4)	10 (43.5)
Self model, ^a <i>Mdn</i> 1 st –3 rd Q	6, 3–6	4, 2.5–5.5	5, 1–6	5, 3–6
Others model, ^b <i>Mdn</i> 1 st –3 rd Q	–1, –5–6	5, –2.5–7	–3, –6–5.5	0, –6–6

Note. DSU = Dementia Specific Unit. *Mdn* = median. 1st – 3rd Q = quartile 1 – quartile 3. ^a Higher scores refer to more positive models of self and less anxiety. ^b Higher scores refer to more positive models of other and less avoidance. ^c All scores were identical.

4.2.2.3 Adapted LSNS-6 Friends subscale and the Friendship Scale

Low scores on the adapted LSNS-6 Friends subscale indicated that residents were at risk for social isolation (*Mdn* = 5, *IQR* = 2–10) as they had few coresidents whom they could visit, talk with on a regular basis, discuss private issues with, and/or on whom they could depend for help (Lubben et al., 2006). Friendship Scale total scores (*Mdn* = 14, *IQR* = 9–17) reflected similar social isolation (Table 3). There were no significant pairwise differences in adapted LSNS-6 subscale scores between DSU (*Mdn* = 0, *IQR* = 0–8) and Unit 3 residents [(*Mdn* = 8, *IQR* = 2–9) *U* = 8.5, *p* = .191, *r* = –.38], or between Unit 3 and Unit 1 residents [(*Mdn* = 5, *IQR* = 3–11) *U* = 38.0, *p* = .858, *r* = –.04], or between Unit 1 and DSU residents (*U* = 6.5, *p* = .055, *r* = –.51).

Nonparametric tests indicated significant pairwise differences in Friendship Scale scores between units with DSU residents reporting lower scores, indicating more subjective social isolation ($Mdn = 7$, $IQR = 6-9$) than Unit 1 [$(Mdn = 17$, $IQR = 10-20$), $U = 10.0$, $p = .034$, $r = -.51$] or Unit 3 residents [$(Mdn = 14$, $IQR = 11-16$), $U = 0.0$, $p = .003$, $r = -.82$]. There was no significant difference on Friendship Scale scores between Unit 1 and Unit 3 residents ($U = 33.5$, $p = .260$, $r = -.25$).

4.2.3 Participation in Structured Activities

Thirty-two residents (88.9%) participated in at least one ($M = 3.4$) type of staff-facilitated structured social activity. Twenty-eight (87.5%) residents required care staff assistance to attend and participate in activities. Activity types included large (19 to 36 residents) scheduled monthly celebratory events such as annual holiday parties, birthday teas, and performances; moderate-sized (5 to 11 residents) bi-monthly (every two weeks) social groups such as Men's Happy Hour and Women's Knitting; smaller (2 to 8 residents) weekly therapeutic programs including art therapy, reminiscence, and nationally recognised specialised therapeutic programs (Play Up®, <http://www.artshealthinstitute.org.au/Programs/Play-Up.aspx>; Spark of Life®, <http://www.dementiafoundation.org.au/introducing-spark-of-life/description>); and multi-weekday scheduled DVD/TV entertainment (3 to 12 residents) and impromptu activities including quizzes, sing-a-longs, and reading magazines (2 to 9 residents) (Leow, Pont, & Low, 2016; Storey, Joyner, & Schweitzer, 2008). These are typical activities for Australian RACFs (Travers et al., 2015).

The duration of structured social activities was typically 1 hour. Unit 1 had the largest common areas and access to an outdoor courtyard. Hence, larger monthly and bi-monthly group activities took place in and around Unit 1. Weekly therapeutic programs primarily took place in each unit's multipurpose common room and occasionally took place in the ground level outdoor courtyard. Six DSU residents and eight Unit 3 residents attended activities held in Unit 1, while only one Unit 1 resident attended activities held in the DSU. No Unit 1 or DSU residents attended activities held in Unit 3 during observations. Two Recreational Activities Officers (RAOs) covered the three care units. Trained professional therapists came to the facility to assist RAOs in conducting therapeutic visual arts and performing arts programs.

More residents attended large celebratory events ($n = 29$, 80.6%) and DVD/TV entertainment ($n = 21$, 58.3%) than social groups ($n = 8$, 22.2%) and therapeutic programs ($n = 13$, 36.1%). Twenty-four residents with dementia (88.9%) participated in at least one type of structured social activity during the study and three residents

(11.1%), including one resident without dementia, did not participate in any activities. T-tests indicated no significant difference in the average number of different activities attended by residents with and without dementia [$t(34) = -0.25, p = .962, d = 0.09$].

Not surprisingly, there were pairwise differences between care units in residents' participation in larger group activities. Unit 1 residents participated in a significantly greater number of activity types than Unit 3 residents [$F(1,25) = 19.95, p < .000, \eta^2 = .444$]. There were no differences in activity participation between Unit 1 and DSU residents [$F(1,22) = 1.47, p = .238, \eta^2 = .065$] nor between DSU and Unit 3 residents [$F(1,19) = 3.17, p = .091, \eta^2 = .143$]. Mann-Whitney U tests indicated that residents of Unit 1, where most large group events took place, participated in significantly more monthly celebratory events ($Mdn = 2, IQR = 1 - 3$) than DSU [$(Mdn = 1, IQR = 0-3) U = 35.0, p = .043, r = -.41$] and Unit 3 residents [$(Mdn = 1, IQR = 0-2) U = 42.5, p = .016, r = -.46$]. Unit 1 residents also participated in significantly more bi-weekly men's and women's group activities ($Mdn = 0, IQR = 0-1$) than Unit 3 residents [$(Mdn = 0, IQR = 0-0) U = 54.0, p = .015, r = -.47$], and watched significantly more DVD and TV programs together ($Mdn = 2, IQR = 1-2$) than Unit 3 residents [$(Mdn = 0, IQR = 0-1) U = 30.0, p = .002, r = -.60$]. As the DSU TV and DVD player were under repair during portions of the study, pairwise comparisons are not reported for this type of activity in the DSU.

DSU residents participated in significantly more weekly small group therapeutic activities ($Mdn = 1, IQR = 0-2$) than Unit 3 residents [$(Mdn = 0, IQR = 0-1) U = 28.5, p = .040, r = -.45$]. However, there were no significant differences between DSU and Unit 1 residents [$(Mdn = 0, IQR = 0-1) U = 46.5, p = .159, r = -.29$], nor between Unit 1 and Unit 3 residents in terms of participation in these therapeutic activities ($U = 84.0, p = .703, r = -.07$).

Unit 1 residents took part in more monthly, twice-monthly, and daily non-therapeutic activities involving larger groups of coresidents than did residents from other units. DSU residents took part in more weekly small-group therapeutic activities. Unit 3 residents were the least involved in staff-facilitated structured social activities (Table 3).

4.3 Residents' self-report of relationships with coresidents

(Casey et al., 2015)

4.3.1 Self-reported friendships and positive relationships with coresidents

Of the 29 residents who reported on their relationships, 17 (58.6%) identified having positive relationships with other residents. Eight residents (27.6%) identified having true friendships with coresidents (Table 5). Nine (31%) identified one or more casual friendships, two (6.9%) reported positive regard for other residents. None of the residents reported all three levels of relationship strength.

Sixteen residents reported having at least one 'true' or 'casual' friend, one resident reported having both 'true' and 'casual' friends, and one resident reported positive regard for several coresidents and identified one true friend. Ten Unit-1 residents reported true ($n = 7$, 46.7%) or casual ($n = 3$, 20%) friendships with unit coresidents and only one Unit 3 resident (8.3%). None of the DSU residents reported friendship within their unit. Of residents who reported network data, two residents (6.7%) reported true friendship with their roommate(s), and one person (3.4%) reported casual friendship with a roommate. One of these relationships was confirmed as reciprocal. None of the residents identified positive regard for a roommate.

Six residents (20.7%) spontaneously identified positive relationships with one or more peers living in other units (Unit 1, $n = 2$; DSU, $n = 1$; Unit 3, $n = 3$). One resident recalled their relationship partner's given name. The other five residents each described their partner using unique personal attributes that clearly identified and differentiated that person from other residents such that there was only one resident who fit their description. For example, describing a combination of demographic information such as the person's gender (i.e. 'lady', 'guy'), their location (i.e. 'downstairs', gesturing toward another unit and saying 'outside, down the hall') whether or not they were of similar age (i.e. 'older', 'about my age'), their nationality/language (i.e. 'Scottish', 'she speaks...'), and other identifiable features (i.e. 'in a chair like me', 'always dresses so nicely'). No Unit-1 or Unit-3 resident spontaneously identified a relationship with a DSU resident. Three Unit-1 residents (20%) spontaneously identified staff members ($n = 2$, one AIN and the RAO) and/or daily visitors ($n = 2$, another resident's daughter and another resident's husband) as friends or casual friends.

Nearly three-quarters of interviewed residents with dementia ($n = 20$, 74.1%) were able to report on their relationships with care unit coresidents and six of these

residents (30%) reported having a 'true' friend. Two residents (1 in Unit 1, 1 in DSU) spontaneously identified casual friendships with coresidents living in other care units.

Spontaneously identified positive relationships between residents of different units are of added interest because residents were motivated to maintain their relationships despite encountering one another less frequently than their unit coresidents, and requiring assistance to travel between care units. Residents recalled these friends and positive relationships from memory rather than through recognition of names or photographs. As propinquity (proximity) was not a key formative element in these relationships, information from interviews, resident charts, and observations provide some insight into other possible contributing factors.

Unit 1 resident 'Ralph' and Unit 3 resident 'Percy' identified a mutual casual friendship. Neither of the men had a dementia diagnosis and each used a wheelchair and waterchair, respectively. Both residents mentioned to the researcher that they 'talked' together and 'Percy' noted that they had both been involved with bands (i.e. jazz/rock). In addition to these similarities, the two men shared a number of additional attributes that may have made them more like one another and less like other residents. Although their ages differed by more than ten years, both men were younger than the average resident age, both had cerebrovascular accidents noted in their charts, they spoke the same first language and had similar cultural backgrounds. Both men had adult children, spouses who visited regularly, and both had roommates who were immobile and unable to speak. The two men did not explain why they identified one another as casual friends. However, the similarities in their personal attributes suggest that homophily and having someone they could 'talk' with were important factors.

Unit 3 resident 'Rita' identified positive regard for Unit 1 resident 'Eveline' and Unit 1 resident 'Hattie' who was not interviewed. 'Rita' did not have dementia. She communicated well with facial expressions and other non-verbal signals but she had difficulty speaking and was immobile in a waterchair. Her husband visited every day and they frequently went downstairs together to spend time in the outdoor courtyard. 'Rita' did not explain why she liked 'Eveline' and 'Hattie'. 'Rita' was younger than the average resident age and she had been in care longer than most residents. Although no personal attribute data were obtained for 'Hattie', observations confirmed that she had greater physical capacity than 'Rita'. 'Hattie' did not venture upstairs to Unit 3 and 'Rita' rarely attended structured activities in Unit 1, suggesting that they primarily encountered one another in and around Unit 1 when 'Rita' was with her husband. 'Eveline' was older and more physically capable than 'Rita', but less cognitively capable

than 'Rita'. 'Eveline' did not identify 'Rita', whose appearance and waterchair clearly identified her as having reduced physical capacity, as a friend. 'Eveline' attended large structured events, her room was near the facility's front entrance and she was observed to sit in the main corridor near the facility entrance/exit which opened into the outdoor courtyard. It is possible that 'Rita's' husband facilitated interaction and conversation between 'Rita' and the two ladies in Unit 1.

Despite encountering residents from the other units during structured activities, DSU resident were not spontaneously identified as friends by other interviewed residents. 'Eveline' from Unit 1 and 'Maritsa' who resided in the DSU, spontaneously identified casual friendships with Unit 3 roommates 'Keresi' and 'Evangeline'. 'Keresi', who did not have dementia, reciprocated 'Eveline's' friendship and was observed to visit with 'Eveline' in Unit 1. 'Maritsa', who still conversed fluently in multiple languages, explained to the researcher that she and 'Evangeline' spoke the same first language and that staff took her to visit 'Evangeline'. The researcher did not confirm if these visits were typically initiated by staff or at the residents' request. 'Maritsa' and 'Evangeline' were both unable to walk or move independently. They left their rooms with staff for personal care and they did not take part in group structured social activities. 'Evangeline' was not interviewed and therefore her perceptions were not recorded. Although she was not asked, 'Keresi' told the researcher that she and her roommate 'Evangeline' were not friends, that they disagreed about noise and being tidy and 'Keresi', who was concerned about hygiene, was disturbed by her roommate's incontinence. This negative roommate relationship may have motivated 'Keresi' to look elsewhere for companionship and may have served as a motivation for staff to 'connect' the otherwise socially isolated 'Evangeline' and 'Maritsa'.

4.3.1.1 Network size

Residents' reported relationships with unit coresidents formed sparse networks (see Figure 1). When all potential relationships within care units were included in analyses, the median size of relationship networks was 'zero'. Resident network size ranged from 0 to 18 residents ($Mdn = 0$, $IQR = 0-1$). When only reported relationships were included in analyses, Mann-Whitney U tests indicated a significant difference between the median size of DSU residents' social networks ($Mdn = 0$, $IQR = 0-1$) and those of Unit 1 residents ($Mdn = 1$, $IQR = 1-2$) $U = 19.0$, $p = .031$, $r = -.47$. There was no significant difference between the size of DSU and Unit 3 resident networks ($Mdn = 0$, $IQR = 0-3$) $U = 21.0$, $p = .649$, $r = -.12$) or between networks of Unit 1 and Unit 3 residents ($U = 38.0$, $p = .138$, $r = -.31$).

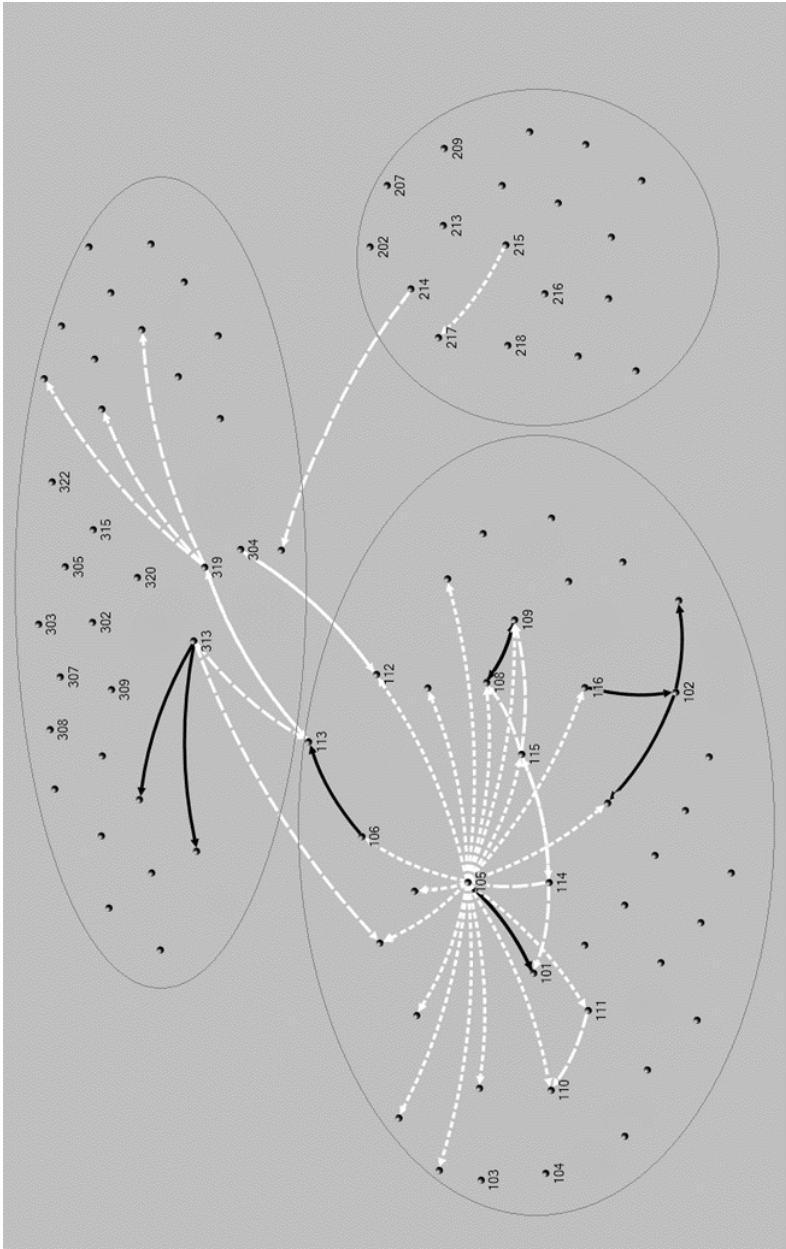


Figure 6. Interviewed residents' self-reported positive peer relationship networks. Spherical nodes represent (clockwise from lower left): 40 possible members of the Unit 1 network, 33 possible members of the Unit 2 network, and 18 possible members of the Dementia Specific Unit (DSU) network. Numbers represent randomly assigned participant ID numbers. Dark solid lines represent strong friendship ties. White lines represent weaker relationships. Dashed white lines indicate casual friendship ties and dotted white lines indicate positive regard. White lines that appear to be solid are overlapping reciprocal weak ties. Lines crossing network boundaries indicate spontaneously nominated relationships between residents from different units (egocentric data). Unnumbered unconnected nodes represent non-interviewed unit members not named in resident interviews. Peripheral placement implies lack of nomination only and does not imply network position based on graph-drawing algorithms. (Casey et al., 2015).

4.3.1.2 Network density, reciprocity, asymmetry, isolates, and distance

When analyses included all potential relationships, the number of received ties (in degree) ranged from 0 to 4 (*Mdn* = 1, *IQR* = 0–2). When only reported relationships were analysed, the median number of received ties was 2 (*IQR* = 1–3). Reported relationships represented a small proportion of all potential relationships between residents in each unit, resulting in few interconnected social ties and low network ‘densities’ of .003 to .02 (Table 5). A low proportion of reported ties were reciprocated (22.2%), indicating imbalance in social exchanges and differing perceptions of relationships. For example, two Unit 1 residents nominated having ‘true’ friendships with Unit 1 coresidents who in turn did not nominate any type of relationship with them. All within-unit reciprocal ties were reported by Unit 1 residents.

The percentage of reciprocity in reported relationships increased with increased relationship strength (Table 5). Over two-fifths of reported ties, including between-unit ties (42.2%, *n* = 19), were asymmetric due to incomplete dyadic data (Unit 1, *n* = 11; DSU, *n* = 2; Unit 3, *n* = 6). Over 38% of positive ties based on complete dyadic data sets (*n* = 26) were reciprocated (*n* = 10, 38.5%), including two ‘true’ and three ‘casual’ friendships. Ten (34.5%) of 29 residents reporting network data, and 17 (47.2%) of the 36 interviewed residents, were ‘isolates’ for whom no positive relationship (initiated or received) was reported.

Care unit network components featured short ‘path lengths’ with few steps separating residents with network connections from one another (*Mdn* = 1 to 2), indicating that connections were typically either direct dyadic relationships (‘one-step’ distance) or involved one shared connection (‘two-step’ distance, i.e. ‘friend of a friend’). However, path lengths ranged from 1 to 5 steps in Unit 1.

Table 5

Basic Structural Parameters of Residents' Positive Social Networks within Care Units

	No. of residents			Isolates ^a	Self-reported relationships				Reciprocity ^b	Density ^c	Path length ^d			
	T	I	R		Total	Max	Mdn ^e	1 st –3 rd Q ^e			Min	Max	Mdn	1 st –3 rd Q
Unit 1 ^f	23	10	23	17	32	18	1	1–2	18.8%	.021	1	5	2	1–3
Friends	10	7	8	30	8	2	0	0–1	50.0%	.005	1	2	1	1–1
Casual friends	8	3	7	32	7	3	0	0–1	28.6%	.005	1	2	1	1–2
Positive regard	18	1	17	22	17	17	0	0–0	0.0%	.011	1	1	1	1–1
DSU ^{f,g}	2	1	1	16	1	1	0	0–1	0.0%	.003	1	1	1	1–1
Positive regard	2	1	1	16	1	1	0	0–0	0.0%	.003	1	1	1	1–1
Unit 3 ^{f,h}	7	2	5	26	5	3	0	0–3	0.0%	.005	1	1	1	1–1
Friends	3	1	2	30	2	2	0	0–0	0.0%	.002	1	1	1	1–1
Casual friends	4	1	3	29	3	3	0	0–1	0.0%	.003	1	1	1	1–1

Note. No. = number. T = total number of residents involved in dyadic ties. I = number of residents initiating reports of relationship ties with others. R = number of residents receiving reported relationship ties. Max = maximum. Mdn = median. 1st–3rd Q = quartile 1–quartile 3. Min = minimum. DSU = Dementia Specific Unit. ^a Isolates indicating number of residents for whom no dyadic relationship was reported during interviews. ^b Arc-based reciprocity, total number of reciprocal ties as a proportion of actual ties. ^c Density calculated as the proportion of all possible dyadic relationships actually reported by residents. ^d Path length based on actual ties only and calculated within components. Path length for isolates = maximum path length + 1. ^e Medians and quartiles based on number of relationships reported by residents. Minimum number for all groups = 0. ^f Including sociocentric network data only (no between-unit ties). ^g No 'friends' or 'casual friends' reported. ^h No 'positive regard' reported. (Casey et al., 2015).

4.3.2 Positive relationships and demographic and health-related variables

Spearman's Rank Order correlations and Mann-Whitney U tests were used to investigate associations between resident background variables and resident self-reported positive relationship ties ($n = 29$). Spearman's Rank Order correlations were used to investigate associations between network variables and scores on standardised measures. No significant associations were found between resident positive social network size and residents' age, sex, spoken first language, country of birth, marital status, number of roommates, number of active visitors, having a charted dementia diagnosis, communication ability (hearing, vision, and speech), mobility status, and number of psychotropic and non-psychotropic medications.

Results indicated moderate negative correlations between number of comorbid psychiatric diagnoses and total number of positive relationships ($\rho = -.40, p = .034$) and number of reciprocated relationships ($\rho = -.44, p = .018$). The number of comorbid (physical) health conditions was weakly negatively correlated with number of ties initiated ($\rho = -.39, p = .017$) and reciprocated ($\rho = -.37, p = .026$). No correlations between number of psychiatric comorbidities and any category of positive ties approached significance for DSU and Unit 1 residents. There was a moderate correlation between number of comorbid health conditions and number of positive ties initiated but not reciprocated for Unit 1 residents ($\rho = .52, p = .049$) but not for DSU ($\rho = .32, p = .537$) and Unit 3 ($\rho = .23, p = .585$) residents. There were no significant correlation between the number of physical diagnoses of Unit 1 residents and either their 'isolate' status (no positive ties) or their tie nominations received but not reciprocated.

Unit 3 results indicated a strong negative correlation between the number of comorbid psychiatric diagnoses and the total number of positive ties ($n = 8, \rho = -.81, p = .014$). Pairwise comparisons indicated that residents with more psychiatric diagnoses ($Mdn = 2, IQR = 1-3$) were more likely to be 'isolates' than residents with fewer psychiatric diagnoses [$(Mdn = 0, IQR = 0-0) U = 1.0, p = .044, r = -.71$]. However, as only two Unit 3 residents reported relationships with coresidents, and each with coresidents who were not interviewed, results should be interpreted with caution.

4.3.3 Positive relationships and standardised measures

4.3.3.1 Relationships and PAS cognitive impairment scale and Global Deterioration Scale scores

There were no significant correlations between PAS cognitive impairment scale scores and any category of resident self-reported social network ties or 'isolate' status. Higher cognitive impairment as measured using the Global Deterioration Scale was weakly negatively associated with network size ($\rho = -.37$, $p = .046$) and number of reciprocated ties ($\rho = -.39$, $p = .037$) such that residents rated as being in a more advanced stage of dementia had smaller networks and fewer reciprocal positive relationships. However, there were no pairwise differences on Global Deterioration Scale scores between residents who had at least one reported positive relationship with a coresident ($Mdn = 5$, $IQR = 3-6$) and residents who were 'isolates' without positive relationships [$(Mdn = 6$, $IQR = 5-6$) $U = 65.0$, $p = .143$, $r = -.27$]. Correlational tests within care units indicated that Unit 3 residents who had higher PAS scores, indicating greater cognitive impairment, received fewer (in degree) positive tie nominations ($n = 7$, $\rho = -.81$, $p = .029$).

4.3.3.2 Relationships and Barthel Index scores

Barthel Index scores showed a weak moderately positive correlation with receiving more positive relationships (in degree) without reciprocating ($\rho = .37$, $p = .046$). Tests indicated no significant correlations between Barthel Index scores and other relationship categories. There were no significant correlations between Barthel Index scores and network variables within care units.

4.3.3.3 Relationships and Relationship Questionnaire profile scores

'Model of self' attachment profile scores were moderately negatively correlated with network variables ($\rho(20) = -.59$, $p = .027$), such that residents who reported attachment profiles featuring greater security (a more positive cognitive model of self) received more positive nominations from others without reciprocating. 'Model of others' attachment profile scores were also strongly positively correlated with network size ($\rho(20) = .65$, $p = .002$), such that residents who reported attachment profiles featuring lower fearfulness and lower avoidance had larger positive social networks. However, having a diagnosis of dementia appeared to moderate this association (Table 6).

There were no significant pairwise differences between residents who had at least one reported positive social tie and resident 'isolates' on 'model of self' attachment profile scores [(*Mdn* = 4, *IQR* = 2–6 ; *Mdn* = 6, *IQR* = 3–6, respectively) $U = 36.5$, $p = .351$, $r = -.21$]. Residents with at least one positive social relationship had significantly higher 'model of others' attachment profile scores (*Mdn* = -1, *IQR* = -2–4) than residents without positive ties [(*Mdn* = -6, *IQR* = -6–-2.3) $U = 18.5$, $p = .020$, $r = -.52$].

Strong correlations between the self-reported attachment style profiles of people with dementia and their self-reported network variables indicated that larger patterns within social networks may have been influenced by this personality attribute and conversely that residents' attachment 'style' behaviour and cognitions may have been cued in part by their positions within networks. Critical inspection and triangulation of available data from multiple sources, including residents' demographic information, information provided by residents during interviews, and information from family members and staff recorded in daily diarised field notes, suggest that the mechanisms linking attachment profiles and residents' perceptions of relationships with coresidents were complex and possibly associated with variables beyond the scope of the current study. Exploration of available data suggested that the 13 residents with negative 'model of others' scores (≤ 0) differed in the following ways from residents with more positive 'model of others' profile scores (> 0): Three were war veterans, two had been displaced by war, two had complex mental health diagnoses (i.e. dementia, schizophrenia, or depression), one had experience with the criminal justice system, and two had a charted diagnosis of substance abuse (i.e. ETOH). The two residents with dementia who had positive 'model of others' profile scores had not served in the military and had no substance abuse noted in their charts; one had comorbid psychiatric diagnoses (dementia and depression) and one had lived in Mediterranean Europe as a child during WWII although no specific traumas were noted. These results underscore the potential complexity of historical, psychological, and socio-emotional variables influencing residents' needs and perspectives and further emphasises the importance of understanding each resident as a unique and complex person in need of individualised care and assessment.

4.3.4 Relationships and scores on measures of social isolation

Friendship Scale scores were moderately positively associated with number of reciprocated ties [$\rho(25) = .49$, $p = .013$]—residents with more reciprocated relationships reported more perceived social support. No significant associations were found between

the adapted LSNS-6 Friends subscale and any of the tie categories examined. Tests indicated no significant pairwise differences between residents who had at least one reported positive social tie and resident ‘isolates’ (no positive ties) on adapted LSNS-6 subscale scores [(*Mdn* = 8, *IQR* = 4–11; *Mdn* = 3, *IQR* = 0–8) $U = 33.0$, $p = .115$, $r = -.34$] and Friendship Scale scores [($M = 13.1$, $SD = 6.01$; $M = 13.4$, $SD = 4.58$) $t(23) = .119$, $p = .906$], respectively.

Table 6

Spearman's Rank-Order Correlations of Resident Self-Reported Positive Relationship Ties with Scores on Measures of Cognitive-Functional Ability, Adult Attachment Profile, and Self-Reported Social Isolation

Measure	Positive Relationship Ties							
	Total nominated		Reciprocated		Nominated not reciprocated		Received not reciprocated	
	Rho	<i>p</i>	Rho	<i>p</i>	Rho	<i>p</i>	Rho	<i>p</i>
Global Deterioration Scale ^a	-.37	.046	-.39	.037	-.21	.283	-.04	.849
Residents with dementia ^b	-.39	.091	-.27	.242	-.31	.191	-.28	.236
Residents without dementia ^c	.03	.944	.23	.545	-.14	.719	.47	.200
Relationship Questionnaire – Self model ^d	-.05	.844	.19	.427	-.02	.936	-.42	.067
Residents with dementia ^e	-.15	.611	.18	.545	-.15	.611	-.59	.027
Residents without dementia ^f	.20	.709	.20	.709	.42	.410	-.38	.456
Relationship Questionnaire – Others model ^d	.65	.002	.60	.005	.56	.010	.38	.102
Residents with dementia ^e	.67	.007	.63	.016	.69	.007	.34	.239
Residents without dementia ^f	.64	.175	.64	.175	.67	.142	.43	.394
Adapted Lubben Social Network Scale-6 Friends subscale ^g	.16	.485	.23	.312	.04	.871	.29	.188
Residents with dementia ^h	.06	.847	.07	.814	.06	.847	.30	.299
Residents without dementia ⁱ	.13	.757	.17	.689	-.03	.947	.16	.708
Friendship Scale total score ^j	.15	.477	.49	.013	-.01	.952	.21	.308
Residents with dementia ^k	-.03	.934	.38	.151	-.02	.934	-.13	.624
Residents without dementia ^l	.16	.679	.46	.219	-.01	.979	.65	.060

Note. Significant correlations are indicated in blue/bold. ^a $n = 29$. ^b $n = 20$. ^c $n = 9$. ^d $n = 20$. ^e $n = 14$. ^f $n = 6$. ^g $n = 22$. ^h $n = 14$. ⁱ $n = 8$. ^j $n = 25$. ^k $n = 16$. ^l $n = 9$. (Casey et al., 2015).

4.3.5 Relationships and participation in structured activities

There were no significant correlations between the size of the positive social networks reported by people with and without dementia, respectively, and either the number of different structured activities that residents participated in [$\rho(20) = .31, p = .19$; $\rho(9) = .13, p = .731$] or between network size and activity types [monthly celebratory events, $\rho(20) = .35, p = .137$; bi-weekly social groups, $\rho(20) = -.21, p = .385$; weekly therapeutic programs, $\rho(20) = -.21, p = .384$; multi-weekday activities, $\rho(20) = .31, p = .18$], (monthly celebratory events, $\rho(9) = .35, p = .362$; bi-weekly social groups, $\rho(9) = .38, p = .310$; weekly therapeutic programs, $\rho(9) = .11, p = .778$; multi-weekday activities, $\rho(9) = -.46, p = .217$).

In a high-care RACF setting, different types of staff-facilitated activities may provide greater opportunity for resident social engagement, thereby potentially influencing resident perceptions of social support or isolation. Therefore, exploratory analyses were conducted to investigate possible correlations between residents' perceptions of social support/isolation as assessed by Friendship Scale scores and residents' opportunity to engage with coresidents through structured social activities. Tests indicated no significant correlations between perceived social isolation and the number of different structured activities in which residents with and without dementia participated (respectively, $\rho = -.33, p = .210$; $\rho = .09, p = .825$) or between perceived social isolation and any activity type [residents with dementia, (monthly, $\rho = -.34, p = .199$; biweekly, $\rho = .16, p = .548$; weekly, $\rho = -.39, p = .133$; multi-weekday, $\rho = -.20, p = .468$), [without dementia (monthly, $\rho = -.10, p = .802$; biweekly, $\rho = .63, p = .068$; weekly, $\rho = -.10, p = .795$; multi-weekday, $\rho = -.08, p = .836$).

4.4 Residents' concepts of friendship and positive relationships with coresidents (Casey et al., 2015)

4.4.1 Qualitative data

The following section will present results of data collected in semi-structured interviews with residents. Interview questions addressed the cognitions, emotions, and

expectations that residents associated with the construct of friendship, and their perceptions of their own social relationships with coresidents. As shown in Table 7, the majority of residents who consented to full participation ($n = 23$) were able to answer open-ended questions during interviews. Fifteen residents with a dementia diagnosis (55.6%) answered the questions “What does friendship mean to you?”, and “What do you like to do with friends?”, 16 (59.3%) answered the question “Who are your friends here?”, and two (7.4%) answered ‘I don’t know’ to each question.

4.4.1.1 “What does friendship mean to you?”

Residents most frequently ($n = 5$) used the word “share” in describing what friendship meant to them. They used this word in the contexts of sharing about oneself to establish intimacy and altruistic sharing of resources. Residents similarly used the words “trust” ($n = 4$), “honesty” ($n = 3$), “sincerity/sincere” ($n = 2$), “caring” ($n = 2$), and “love” ($n = 2$). Two residents each used the word “agreeing/agreement” and the phrases “shared experience” or “shared background”. One resident noted “shared activities”.

Residents identified personal qualities of a friend including “compassion”, “kind”, “understanding”, and “clever”. Responses also denoted expected actions of a friend including “listen”, “relate”, and “help”. Other residents described the “ease” and “satisfaction” that they felt in the company of friends. Some residents described constituent elements of the relationship such as “choice”, “proximity”, “reciprocity”, “takes time (in the moment)”, and “takes time (to develop)”. Others expressed how much they valued the relationship, saying that it was “deep”, “good”, or “important” and that it “means a lot”.

Residents were not asked but spontaneously reported barriers to friendship. They experienced uncertainty and ambiguity in relationships (Table 7). Friendship was “difficult” in their residential aged care context. One resident mentioned difficulty communicating due to “language barrier(s)” and the fact that others “have dementia”. Another resident described not having had enough time, and that others did not have enough “patience”, to “know” one another as friends. A younger resident noted the twenty-year “age gap” between herself and “most of the other people here”. One resident alluded to sex/gender as a barrier because he “fell in love with the ladies” who had partners.

4.4.1.2 “What do you like to do with friends?”

Communication and contact were common themes running through residents’ descriptions of what they liked to do with friends. Residents most frequently used the

words “talk” ($n = 9$) and “visit” ($n = 4$) and said they liked to “ring (phone)”, “correspond”, and “spend time with” friends. Friends could share thoughts and ideas, “learn together”, and “share beliefs”. Friends shared memories and would “talk about the old days”. Collectively, residents said that they enjoyed getting together with their friends to share meals and have drinks. Many responses included expectations of activities beyond the residential aged care environment (Table 7). For example, residents liked to go out and “meet at a café”, “go to restaurants”, or have friends come to their own (not the aged care) home to “BBQ”, “eat”, and “drink wine, beer”. These Sydney residents also liked to “go to the theatre”, “go to the beach”, and enjoyed “playing golf”, and attending events with friends such as “going dancing” at a local club.

Table 7
Exemplars of Resident Friendship Schema

Questions	Primary themes	Secondary themes	Resident Dementia study ID diagnosis and sex			GDS	Care unit	Exemplars
What does friendship mean to you?	Reasons for friendship	Pragmatism	213	F	Yes	7	DSU	“Being good (fair) with people. Paying (your) bills.”
		Personal benefit	113	F	No	6	Unit 1	“(Friendship) gives you confidence. It’s nice to make friends. I find it easy to make friends, enjoy sharing things about yourself.”
		Altruism	115	F	No	4	Unit 1	“I love them. They are important to me. I have to be sincere with them, honest. I want good things for them.”
		Relational attributes	216	F	Yes	6	DSU	“It means quite a lot. You have to know people’s names. You need five minutes wherever, take five or ten minutes.”

			304	M	No	3	Unit 3 “Someone you can tell your deep thoughts about. Shared experience. Reciprocity.”
			112	M	No	3	Unit 1 “A lot of satisfaction, proximity, mutual interests.”
	Personal attributes		214	F	Yes	6	DSU “They are alright with you. Sincerity.”
			111	M	Yes	6	Unit 1 “Well that depends, how honest he is with you. Honesty.”
			106	F	Yes	6	Unit 1 “Compassion.”
What do you like to do with friends?	Behavior and social exchange	Communication and contact	320	F	Yes	4	Unit 3 “Talk, ring on (the) phone, correspond, meet at (a) café.”
			102	M	Yes	5	Unit 1 “Talk and visit. Have a smoke.”
			103	M	No	5	Unit 1 “Just talk, visit, play cards. Too old to do much else.”
	Local activities		215	F	Yes	6	DSU “Go to the theatre. Visiting certain areas.”
			322	F	No	1	Unit 3 “(Go to) films, shopping, go to the beach, have tea together, but I was always busy looking after my family as well.”
			116	M	Yes	4	Unit 1 “Go out for lunch, go to the beach, go to (large public) Park.”
	Community clubs		214	F	Yes	6	DSU “Go dancing— (nationality specific) club.”

			105	F	Yes	6	Unit 1 "Go to the RSL (Returned & Services League of Australia Limited) club, play the (slot) machines. We like to go to different ones but it's best if you go in your own area."
			113	F	No	6	Unit 1 "(I) love my (horse) racing! 'Am a member of all the clubs."
	Providing hospitality or being hosted		308	M	Yes	6	Unit 3 "BBQ, play golf."
			309	M	Yes	6	Unit 3 "Go to party together, swing by and see your friends... plenty (of) things."
			115	F	No	4	Unit 1 "Invite them for dinner, coffee. Do nice things for them. Make them happy, not upset them."
Who are your friends here?	Barriers to building friendship	Uncertainty and ambiguity	213	F	Yes	7	DSU "None. Everyone is worrying about themselves."
			320	F	Yes	4	Unit 3 "It's difficult nowadays to say 'she is my friend' or 'he is my friend'. I know them but not to say 'friend'. Friendship is something deep. It takes time. Nowadays people have no patience to sit and listen to what you think or how you feel. Everyone has their own problems. I don't trust others not

					to say 'she said this or that'."
	115	F	No	4	Unit 1 "It is difficult to be friends, difficult to say who is or is not a friend. It is difficult to communicate. I don't know them enough. (There is a) language barrier. Some (residents) have dementia."
Age or gender	216	F	Yes	6	DSU "I had friends when we were younger."
	322	F	No	1	Unit 3 "(The) age gap is a barrier. I'm in my 60's and most of the other people here are in their 80's."
	104	M	Yes	6	Unit 1 "Not too many (friends) because I fall in love with the ladies too quickly and all of the ladies are married. No male friends here."

Note. ID = identification. Dementia diagnosis = dementia diagnosis noted in medical chart. GDS = Global Deterioration Scale stage. F = female. M = male. DSU = Dementia Specific Unit. (Casey et al., 2015).

4.4.2 Interpreting data in context: 'Lily's' perspective

Data triangulation and interpretation in context facilitated broader understanding of the meaning of friendship and relationships for the residents in this study. Collecting social network data from semi-structured interviews in conjunction with survey data enabled correlational analyses between resident self-report of their relationships and scores on standardised measures. Collecting data from resident medical charts enabled investigation of associations between residents' personal attributes and network variables. Observations provided information about social context and quantitative data on activity participation. Combining one woman's responses and information as a case study offers an example.

Unit 1 resident 'Lily' identified positive regard for many of her unit coresidents. Within the Unit 1 network graph, 'Lily' appears in the middle of a 'star' formation with ties to several residents (Figure 6, node '105'). Nearly all of 'Lily's' relationship ties were 'given' (out-degree), and only one relationship was confirmed as reciprocal. However, 'Lily' perceived many more network members than did her coresidents. Her position in the network may have provided more social opportunities and choices, prompting her to feel less constrained and more agentic, or 'outgoing', than other residents in different network positions.

'Lily' was an English-speaking Australian-born woman, 86 years of age, who practiced Catholicism and had lived at the RACF for the past year with two roommates. She was widowed, had two sons and three grandsons. Her chart indicated that she had three regular visitors—one female friend, one female relative, and one of her sons.

'Lily' had a charted diagnosis of Alzheimer's disease. Her score on the Psychogeriatric Assessment Scale and Global Deterioration Scale rating both indicated that she experienced moderately severe dementia. She also had a diagnosis of depression and received an anticonvulsant, an atypical antipsychotic, and a selective serotonin reuptake inhibitor regularly. She had multiple physical health conditions, was slow in her movement, had some sitting posture, transferred with assistance (x2), and was unable to walk. 'Lily' was capable of feeding herself with prompting, but otherwise was dependent in ADLs. She participated in a limited number of structured activities including occasionally watching DVDs and TV programs with others, looking through magazines

with tablemates, and attending large monthly celebratory activities that took place in the dining room and TV lounge where she normally spent her time.

In completing her survey for this study, 'Lily' identified with a secure attachment style and a positive model of self and 'model of others' profile. Her pre-admission attachment style assessment was not completed. 'Lily' was unable to complete the LSNS-6 Friends subscale but her Friendship Scale score indicated that she felt moderately supported. 'Lily's' responses to questions about the meaning of friendship alluded to uncertainty in knowing if people were really her friends or not. The thing that she liked to do with friends was to go to her neighbourhood RSL club (Returned & Services League of Australia Limited) and "play the machines" (a.k.a. gamble on the 'pokie/slot' machines), which she no longer did (Table 7).

Slight of frame, she spoke quietly and occasionally initiated conversation, had good eyesight and hearing, consistently made eye contact with people who passed by and smiled readily. She was seated at a small square table with the same three women nearly every day, including one of her roommates, just at the edge of the dining room near the TV area. The ladies sat directly across from one another, had most of their main meals and morning and afternoon tea together, typically avoided eye contact and rarely spoke to one another. On days when 'Lily' was placed facing the TV lounge she could see everyone who entered and exited the common rooms and everyone who came and left through the building's front entrance. She spent most of her time speaking little and watching others continually, from morning until after dinner. She occasionally commented as she observed interactions, apparently thinking about the connections between others, "He's her son," or "She must be his daughter."

In a typical network structure, 'Lily's' position in the social network may have offered her the power to influence others and to strengthen the larger network by bringing together people that she knew and facilitating the formation of new relationships (Cornwell, 2009, 2011; Schafer, 2013). The objective choices available to 'Lily' within this residential aged care environment, combined with her personal capacities, appeared to limit her ability to fully capitalise on her perceived choices. However, 'Lily's' perception of one close tie and several weak ties and generally secure internal models of herself and others may have helped her to feel adequately socially supported. Concurrently, 'Lily' may have chosen to maintain her close relationship and promote multiple pleasant but weak and superficial relationships of positive regard with others as a way of maintaining both a

positive emotional equilibrium and access to available social ‘resources’ within her current social context (English & Carstensen, 2014; Granovetter, 1973; Perkins et al., 2013).

4.5 Care-staff ratings of residents’ social relationships (Casey et al., 2016)

The following section will address direct care staff accounts of social relationships between residents. Results include staff perceptions of residents’ levels of social engagement/withdrawal as measured with the MOSES Withdrawn Behaviour subscale (Helses et al., 1987), as well as staff accounts of the positive, negative, and ambivalent social networks of residents living on their unit. Correlational analyses were conducted to investigate associations between staff-reported network variables and scores on standardised assessments of residents’ social support and engagement.

4.5.1 Staff-rated resident social engagement/withdrawal

MOSES subscale scores ($Mdn = 18$, $IQR = 14–24$) indicated that residents overall were moderately socially engaged. Mann-Whitney U tests indicated significant pairwise differences between units in MOSES subscale scores suggesting Unit 1 residents were more socially engaged ($Mdn = 16$, $IQR = 12–7$) than either DSU [$(Mdn = 27$, $IQR = 19–28$) $U = 11.5$, $p = .001$, $r = -.69$] or Unit 3 [$(Mdn = 21$, $IQR = 16–25$) $U = 48.0$, $p = .04$, $r = -.4$] residents. There was no significant difference in MOSES subscale score between DSU and Unit 3 ($U = 34.0$, $p = .154$, $r = -.31$).

4.5.2 Positive, negative, and ambivalent network sizes

Relationships between residents formed sparse, loosely connected networks of positive, negative, and ambivalent ties (Figure 7). Of the 91 residents included in observations, care staff identified 52 (57.1%) residents as initiating positive ties, 24 (26.4%) as initiating negative ties, and 10 (11%) as initiating ambivalent ties (Table 8). Approximately a third of residents initiated ($n = 30$, 33%) or received ($n = 34$, 37.4%) true and casual ‘friendship’ with coresidents. Staff perceived that 27.5% ($n = 25$) of these relationship ties were strong ‘true’ friendship. When all potential positive ties were included in analyses, care staff data indicated residents’ median positive network size as ‘1’ (i.e. one positive relationship with a co-resident), and median negative and ambivalent network

sizes as '0'. When only reported relationships were included in analyses, median positive network size for connected residents was two coresidents ($IQR = 1 - 4$), median negative network size was two coresidents ($IQR = 1 - 3$) and median ambivalent network size was one co-resident ($IQR = 1-2$).

4.5.2.1 Network density, reciprocity, asymmetry, and isolates

'Friendship' (true and casual) network densities were low (.01, rounded) and densities for positive, negative, and ambivalent networks were low overall (.04–.07, .02–.07, and .001–.01, respectively). Rates of generalised reciprocity in positive relationship networks (mutually positive nominations of any strength) ranged from 48% for Unit 3 residents to 78% for Unit 1 residents, with higher proportions of friendship relationships perceived to be reciprocal in Unit 3 (89%) and higher proportions of positive regard perceived to be reciprocal in Unit 1 (73%). Rates of generalised reciprocity in negative relationship networks (mutually negative nominations of any strength) ranged from 20% in the DSU to 46% in Unit 1. Although staff perceived relatively few negative relationships overall (Table 8), most 'strong dislike' in Unit 1 was perceived as reciprocal (80%) while staff perceived negative relationships in the DSU as primarily one-sided (asymmetrical) 'disregard'. Over two-thirds (67%) of the few ambivalent relationships identified in Unit 3 were perceived to be reciprocal. Asymmetrical relationships existed in all categories of relationships and types of networks. For example, 89% of Unit 1 'true friendships' were perceived to be reciprocal and 11% were asymmetrical with one resident seen to be a 'true friend' of a co-resident who was not a 'true friend' in return. A third of residents ($n = 30$, 33%) were identified as 'isolates' having no positive relationships, just under three-fifths (58%) of residents were identified as having no negative relationships, and over two-thirds (77%) were not identified as having ambivalent relationships.

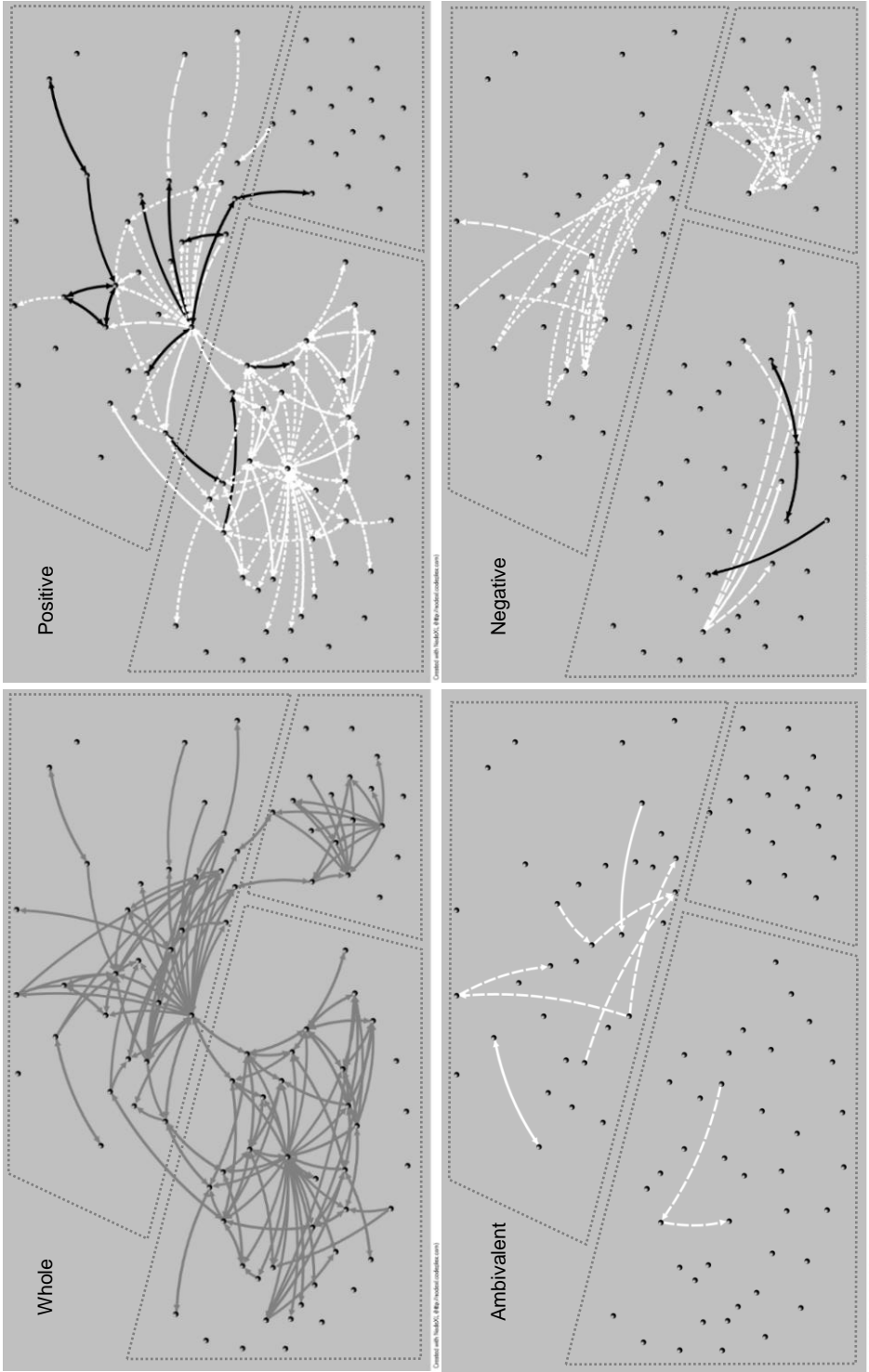


Figure 7. Staff-rated resident social networks. (clockwise from upper left) 1) whole; 2) positive social relationships; 3) negative social relationships; 4) ambivalent social relationships. Within graphs, spherical nodes represent (clockwise from the lower left corner of each graph): 40 possible members of the Unit 1 network, 33 possible members of the Unit 3 network, and 18 possible members of the Dementia Specific Unit (DSU) network. Black lines represent strong ties, white dashed and dotted lines represent weaker ties, white lines that appear to be overlapping reciprocal weak ties. (Casey et al., 2016).

Table 8

Basic Network-Level Structural Parameters of Care-Staff Rated Resident Positive, Negative, and Ambivalent Social Networks

	No. of residents Isolates				Network size ^a				Recip ^b	Density	Path length ^c			
	Total Init Recv				Total Max ^d Mdn 1 st –3 rd Q						Min Max Mdn 1 st –3 rd Q			
Unit 1 ^{e, h}														
All positive	32	30	31	8	105	25	2	1–3	78%	.070	1	6	3	2–3
Friends	4	3	3	36	3	1	0	0–0	67%	.005	1	1	1	1–1
Casual friends	6	4	4	35	4	1	0	0–0	50%	.003	1	1	1	1–1
Positive regard	32	30	31	8	98	25	2	1–3	73%	.063	1	6	3	2–3
All negative	11	6	10	29	13	5	0	0–0	46%	.008	1	2	1	1–2
Strong dislike	5	4	4	35	5	2	0	0–0	80%	.003	1	2	1	1–2
Moderate dislike	7	3	6	33	8	4	0	0–0	25%	.005	1	2	1	1–2
All ambivalent (Mild)	3	2	2	37	2	1	0	0–0	0%	.001	1	2	1	1–2
DSU ^{f, h, i, j}														
All negative (Disregard)	12	8	9	6	20	9	0	0–1	20%	.065	1	1	1	1–1
Unit 3 ^{g, h}														
All positive	25	18	24	8	46	18	1	0–2	48%	.044	1	6	2	3–3
Friends	12	11	12	21	18	4	0	0–1	89%	.017	1	3	1	1–2
Casual friends	10	6	9	23	9	4	0	0–1	44%	.009	1	3	1	1–2
Positive regard	16	8	14	17	19	10	0	0–1	11%	.018	1	5	3	1–3
All negative	15	10	10	18	19	5	0	0–1	0%	.018	1	4	2	1–2
Moderate dislike	6	2	4	27	4	3	0	0–0	0%	.004	1	1	1	1–1
Disregard	13	9	8	20	15	2	0	0–1	0%	.014	1	4	2	1–3
All ambivalent	12	8	8	21	9	2	0	0–0	22%	.009	1	2	1	1–1
Moderate	4	3	3	29	3	1	0	0–0	67%	.003	1	1	1	1–1
Mild	8	5	5	25	6	2	0	0–0	0%	.006	1	2	1	1–1

Note. No. = number. Init = residents initiated ties. Recv = residents received ties. Max = maximum. Mdn = median. 1st–3rd Q = quartile 1–quartile 3. Recip = reciprocated ties. Min = minimum. DSU = Dementia Specific Unit. ^a Number of initiated relationship ties, including

mutual ties. ^b Arc-based reciprocity—total number of reciprocal ties as a proportion of actual ties. ^c Path length based on observed ties only. Path length for isolates = maximum path length + 1. Distance-based measures were calculated within components. ^d Minimum network size for all networks was zero. ^e $n = 40$. ^f $n = 18$. ^g $n = 33$. ^h Includes dyadic ties within units only. ⁱ No ‘friends’, ‘casual friends’, or ‘positive regard’ reported. ^j No ambivalent relationships reported. (Casey et al., 2016).

4.5.3 Ratios of positive to negative network sizes

Care staff reported no positive ties between DSU residents. When spontaneously reported ties between residents who lived in different care units were included, tests indicated no significant differences between Unit 1 and Unit 3 in the size of residents’ positive, negative, and ambivalent relationship networks. Ratios of positive to negative network size, calculated for residents for whom both positive and negative relationships were reported, indicated a median ratio of 1:1 overall ($n = 26$, $IQR = 0.5–2.5$).

4.5.4 Multi-valenced relationships and resident attributes

Nonparametric tests were used to investigate associations between number of staff-reported co-resident ($n = 36$) positive, negative, and ambivalent peer relationships and resident personal background attributes. No significant correlations were found for resident age, time in care, sex, country of birth, spoken language, marital status, level of education, and communication ability. Mann-Whitney U tests indicated that amongst interviewed residents who provided network data, those with a charted dementia diagnosis had smaller staff-rated positive relationship networks (total number of positive relationships: $Mdn = 2$, $IQR = 0–5$) than those without a charted dementia diagnosis [$(Mdn = 5$, $IQR = 2–7)$ $U = 66.5$, $p = .042$, $r = -.34$]. Residents’ independence in activities of daily living (Barthel Index score) was weakly positively correlated with staff-reported total positive ($\rho = .35$, $p = .039$) and total ambivalent ties ($\rho = .36$, $p = .033$). Number of staff-reported total positive ties was weakly negatively correlated with residents’ number of comorbid psychiatric diagnoses ($\rho = -0.36$, $p = .030$) and weakly positively correlated with number of active visitors ($\rho = 0.37$, $p = .028$). Results indicated moderate positive correlations for total positive ties with residents’ number of roommates ($\rho = 0.47$, $p = .004$). A higher total number of positive ties and a higher number of reciprocated ties correlated moderately with the number of different types of structured activities residents participated in (total ties, $\rho = .42$, $p = .011$; reciprocated ties, $\rho = .46$, $p = .005$). Participation in

monthly celebratory activities was moderately correlated with total number of positive ties ($\rho = 0.53, p = .001$) and reciprocated ties ($\rho = .50, p = .002$), and with initiating a greater number of ties that were not reciprocated ($\rho = .36, p = .029$).

No significant correlations were found between isolate status (no positive ties) and resident age, time in care, level of education, communication ability, number of comorbid physical diagnosis, comorbid psychiatric diagnoses, or total number of active visitors. Isolate status was weakly negatively correlated with number of roommates ($\rho = -.39, p = .019$) and possibly with Barthel Index score, for which correlation approached significance ($\rho = -.33, p = .051$). Fisher's Exact tests indicated no significant association between isolate status and sex ($p = .062$), dementia diagnosis ($p = .076$), country of birth ($p = .712$), or speaking English as a second language ($p = .693$). A negative association between marital status and isolate status approached significance ($p = .051$).

4.5.5 Multi-valenced relationships and standardised measures

Subcategories (total ties, reciprocated, initiated non-reciprocated, and received non-reciprocated) of positive, negative, and ambivalent ties and the absence of positive ties (network 'isolates') were correlated with Global Deterioration Scale score ($n = 36$), Relationship Questionnaire 'model of self' and 'model of others' attachment profile ($n = 20$), adapted LSNS-6 Friends subscale ($n = 22$), Friendship Scale ($n = 25$), and MOSES Withdrawn Behaviour subscale ($n = 36$) scores. Staff-rated positive and negative tie data showed weak-to-strong associations with multiple measures (Table 9).

4.5.5.1 Social relationships and Global Deterioration Scale scores

Data showed moderate negative correlations between resident Global Deterioration Scale score and staff-rated resident positive network size and number of reciprocated positive ties, respectively ($\rho = -.52, p = .001$; $\rho = -.53, p = .001$). There was a weak positive association between Global Deterioration Scale score and negative network size ($\rho = .37, p = .027$). Residents with no staff-rated positive relationship ties ('isolate' status) had higher Global Deterioration Scale scores ($Mdn = 7, IQR = 6-7$) than residents who had at least one positive relationship with a co-resident [$Mdn = 6, IQR = 4-6$] $U = 47.0, p = .005, r = -.47$].

4.5.5.2 Social relationships and Relationship Questionnaire attachment profiles

Scores in residents' self-reported Relationship Questionnaire 'model of others' profile were moderately to strongly correlated with staff-rated resident positive network size ($\rho = .57, p = .008$) and number of reciprocated ties ($\rho = .62, p = .004$). Higher 'model of others' profile scores were also moderately correlated with higher number of reciprocated negative ties ($\rho = .53, p = .015$) and with lower total number of ambivalent ties ($\rho = -.44, p = .050$) (Table 12). Mann-Whitney U tests indicated no significant difference in 'model of self' or 'model of others' scores between isolates and residents for whom staff identified positive ties.

4.5.5.3 Social relationships and Friendship Scale and adapted LSNS-6 Friends subscale scores

Higher Friendship Scale score (higher subjective social support) was moderately correlated with a higher total number of staff-rated positive ties and a higher number of reciprocated positive ties, respectively ($p = .44, p = .030$; $p = .41, p = .044$). Data indicated that residents who reported higher subjective social isolation (lower Friendship Scale scores) received a higher number of negative ties but did not reciprocate ($p = -.41, p = .041$). Residents reporting higher objective isolation (lower LSNS-6 subscale score) initiated more non-reciprocated negative ties ($p = -.46, p = .031$) and more negative ties in total ($p = -.44, p = .042$). No significant associations were found between ambivalent ties and scores on standardised measures of social isolation. Residents identified by staff as 'isolates' had significantly lower Friendship Scale scores (greater self-reported subjective social isolation) ($Mdn = 9, IQR = 6-12$) than those whom staff identified as having positive ties [($Mdn = 15, IQR = 10-18$) $U = 20.0, p = .041, r = -.41$]. Residents identified by staff as 'isolates' had significantly lower adapted LSNS-6 Friends subscale scores (greater self-reported objective social isolation) ($Mdn = 8, IQR = 3-11$) than those for whom staff identified positive ties [($Mdn = 0, IQR = 0-2$) $U = 4.0, p = .006, r = -.58$].

4.5.5.4 Social relationships and MOSES Withdrawn Behaviour subscale scores

A higher MOSES subscale score (higher withdrawal) was correlated with smaller positive network size ($\rho = -.70, p < .001$), and fewer reciprocated ($\rho = -.71, p < .001$) and 'initiated non-reciprocated' ($\rho = -.38, p = .023$) positive ties. Higher scores were moderately correlated with larger negative network size ($\rho = .51, p = .002$) and with a higher number of

negative ties received but not reciprocated ($p = .41$, $p = .012$). Residents without staff-rated positive relationship ties ('isolate' status) had higher MOSES Withdrawn Behaviour subscale scores ($Mdn = 25$, $IQR = 19-28$) than residents who had at least one positive relationship with a coresident [$(Mdn = 16$, $IQR = 13-21)$ $U = 34.5$, $p = .001$, $r = -.53$].

Table 9

Spearman's Rank-Order Correlations between Staff-Rated Resident Network Variables and Scores on Standardised Measures of Cognitive-Functional Ability, Adult Attachment Style Profiles, Social Isolation, and Social Engagement

Measure	Relationship ties											
	Positive				Negative				Ambivalent			
	Total	Recip	Init-nr	Rec-nr	Total	Recip	Init-nr	Rec-nr	Total	Recip	Init-nr	Rec-nr
	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho
	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>
GDS ^a	-.52, .001	-.53, .001	-.25, .146	-.17, .316	.37, .027	-.02, .918	.17, .316	.51, .002	-.15, .399	-.18, .299	-.11, .536	.05, .778
RQ Self ^b	-.11, .650	-.15, .528	-.44, .051	.16, .492	.20, .398	.33, .150	.03, .893	-.06, .793	-.08, .747	-.21, .376	-.11, .655	-.08, .724
RQ Others ^b	.57, .008	.62, .004	-.09, .698	-.02, .950	.01, .974	.53, .015	-.31, .183	.20, .388	-.44, .050	-.39, .091	-.18, .453	-.19, .435
LSNS-6 ^c	.40, .067	.31, .155	.37, .089	.36, .095	-.44, .042	-.20, .374	-.46, .031	-.08, .740	.09, .690	-.17, .442	.14, .543	-.04, .868
FS-t ^d	.44, .030	.41, .044	-.20, .335	.20, .349	-.26, .208	.13, .540	-.35, .090	-.41, .041	-.18, .402	.06, .787	-.21, .326	-.25, .234
MOSES ^a	-.70, < .001	-.71, < .001	-.38, .023	-.26, .122	.51, .002	.18, .308	.27, .116	.41, .012	-.22, .208	.18, .295	-.31, .070	-.20, .241

Note. Significant correlations are indicated in blue/bold. Recip = reciprocated ties. Init-nr = initiated ties not reciprocated. Rec-nr = received ties not reciprocated. RQ Self = resident self-rated Relationship Questionnaire model of self profile. RQ Others = resident self-rated Relationship Questionnaire model of others profile. LSNS-6 = adapted Lubben Social Network Scale – 6 Friends subscale. FS-t = Friendship Scale total score. MOSES = Multidimensional Observation Scale for Elderly Subjects Withdrawn Behavior subscale. ^a $n = 36$. ^b $n = 20$. ^c $n = 22$. ^d $n = 25$.

4.6 Observer rating of residents' social relationships

The following section will address observer perceptions of social relationships between residents. Results include observer-report of residents' positive, negative, and ambivalent social relationships. Correlational analyses were conducted to investigate associations between observer-reported network variables and residents' scores on standardised assessments.

4.6.1 Positive, negative, and ambivalent network sizes

Relationships between residents formed sparse, loosely connected networks of positive, negative, and ambivalent ties (Figure 8). Of 91 residents, the observer identified 53 (58.2%) residents who initiated positive ties, 28 (30.8%) who initiated negative ties, and 9 (9.9%) who initiated ambivalent ties (Table 10). Although approximately a third of residents initiated ($n = 28$, 30.8%) or received ($n = 29$, 31.9%) 'friendship' with coresidents, only four residents (4.4%) were perceived to initiate or receive strong 'true' friendship ties. When all potential positive ties were included in analyses, observer data indicated that residents' median positive network size was '1' (i.e. one positive relationship with a co-resident), and that median negative and ambivalent network sizes were '0'. When only reported relationships were included in analyses, median positive network size for connected residents was three coresidents ($IQR = 2-7$), median negative network size was two coresidents ($IQR = 2-4$) and median ambivalent network size was one co-resident ($IQR = 1-2$).

When ties between residents who lived in different care units were included, tests indicated few significant differences between care units in the size of residents' positive networks. Unit 1 residents' positive networks were significantly larger ($MDN = 6$, $IQR = 3-10$) than those of DSU [$(MDN = 2$, $IQR = 1-3$), $U = 48.0$, $p = .002$, $r = -.48$], and Unit 3 residents [$(MDN = 1$, $IQR = 1-3$), $U = 83.5$, $p < .001$, $r = -.56$]. No significant differences were found between care units in the size of residents' negative and ambivalent relationship networks.

4.6.1.1 Network density, reciprocity, asymmetry, and isolates

'Friendship' (true and casual) network densities were low (.01, rounded) and densities for positive, negative, and ambivalent networks were low overall (.03-.12, .01-

.11, and .001–.03, respectively). Rates of generalised reciprocity in positive relationship networks (mutually positive nominations) ranged from 67% for Unit 3 residents to 93% for DSU residents. Rates of generalised reciprocity in negative relationship networks (mutually negative nominations) ranged from 17% in Unit 1 to 44% in the DSU. Over a third ($n = 35$, 38%) of residents either initiated or received negative ties and the observer identified more reciprocal 'moderate dislike' between DSU coresidents than between residents of other units (Table 13). Half of the few ambivalent relationships identified in the DSU and all of the ambivalent relationships in Units 1 and 3 were perceived to be reciprocal. A third of residents ($n = 33$, 36.3%) were identified as 'isolates' having no positive relationships. Just under three-fifths (61.5%) of residents were identified as having no negative relationships, and 86.8% of residents were not found to have ambivalent relationships.

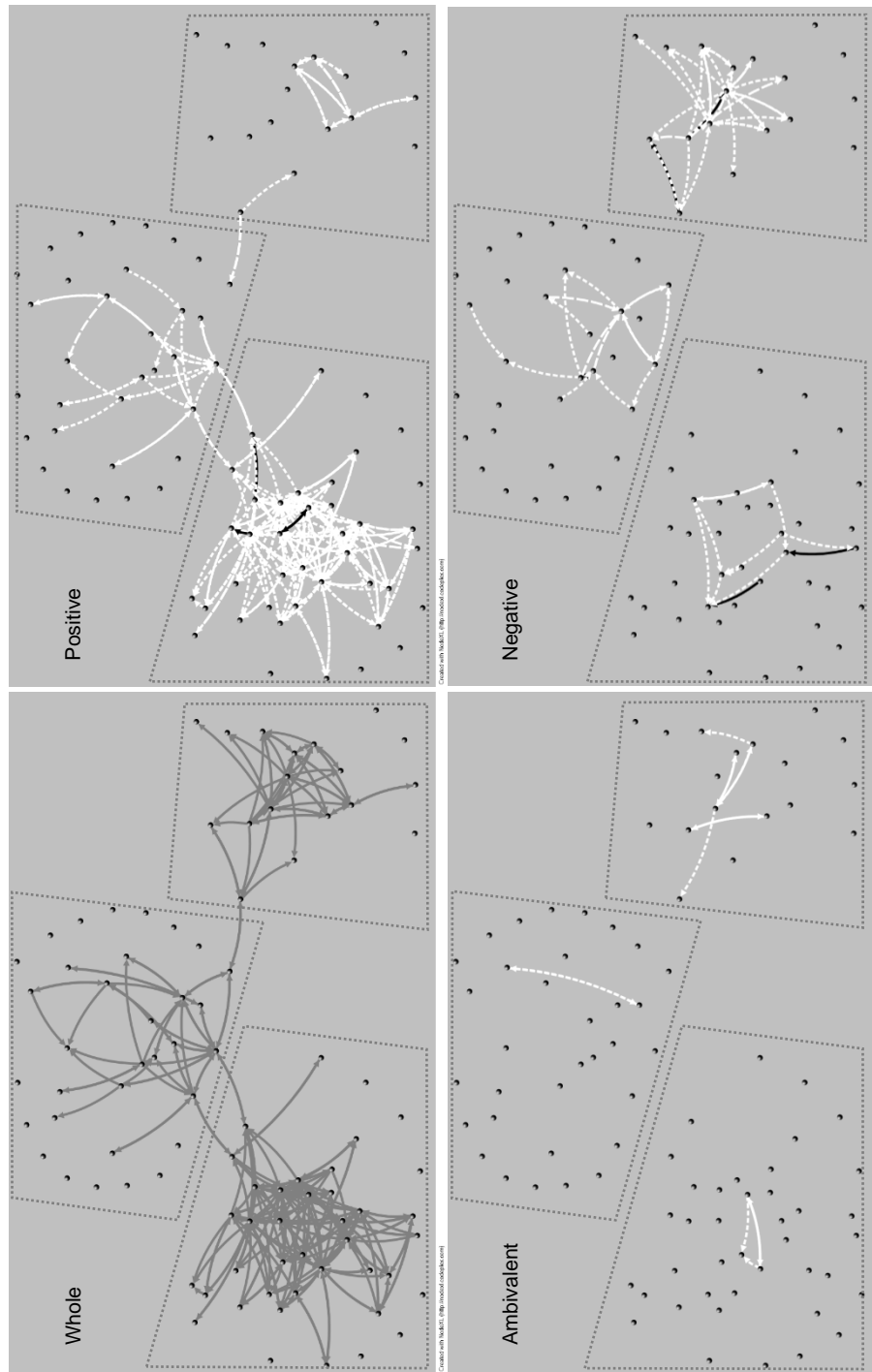


Figure 8. Observer-rated resident social networks. (clockwise from upper left) 1) whole; 2) positive; 3) negative; and 4) ambivalent social relationships. Within graphs, spherical nodes represent (clockwise from the lower left corner of each graph): 40 possible members of the Unit 1 network, 33 possible members of the Unit 3 network, and 18 possible members of the Dementia Specific Unit (DSU) network. Black lines represent strong ties, white dashed and dotted lines represent weaker ties, white lines that appear solid are overlapping reciprocal weak ties. Lines that appear black-and-white are overlapping strong and weaker ties.

Table 10

Basic Network-Level Structural Parameters of Observer-Rated Resident Positive Social Networks

	No. of residents			Isolate s	Network size ^a				Recip ^b Density		Path length ^c			
	Total	Init	Recv		Total	Max ^d	Mdn	1 st –3 rd Q			Min	Max	Mdn	1 st –3 rd Q
Combined floors^{e,i}														
<i>All positive</i>	58	53	56	33	236	16	1	0–4	78%	.029	1	7	3	2–4
Friends	6	4	4	85	4	1	0	0–0	50%	.001	1	1	1	1–1
Casual friends	30	24	25	61	38	4	0	0–1	53%	.005	1	7	2	1–4
Positive regard	55	50	52	36	194	14	1	0–3	69%	.024	1	5	2	2–3
<i>All negative</i>	35	28	28	56	63	8	0	0–1	38%	.007	1	7	2	1–3
Strong dislike	10	5	5	81	5	1	0	0–0	0%	.001	1	1	1	1–1
Moderate dislike	14	11	9	77	13	2	0	0–0	46%	.002	1	3	1	1–1
Disregard	33	23	25	58	45	7	0	0–0	27%	.006	1	6	2	1–3
<i>All ambivalent</i>	12	9	12	79	14	3	0	0–0	71%	.002	1	3	1	1–2
Moderate	7	5	6	84	6	2	0	0–0	67%	.001	1	1	1	1–1
Mild	10	7	6	81	8	2	0	0–0	25%	.001	1	2	1	1–1
Unit 1^{f,j}														
<i>All positive</i>	33	32	32	7	188	16	3	1–6	78%	.121	1	4	2	2–3
Friends	6	4	4	34	4	1	0	0–0	50%	.003	1	1	1	1–1
Casual friends	20	15	15	20	26	4	0	0–1	38%	.017	1	6	2	1–3
Positive regard	31	30	30	9	158	14	3	1–6	68%	.101	1	5	2	2–3
<i>All negative</i>	9	8	6	31	12	3	0	0–0	17%	.008	1	2	1	1–2
Strong dislike	4	2	2	36	2	1	0	0–0	0%	.001	1	1	1	1–1
Moderate dislike	2	2	2	38	2	1	0	0–0	100%	.001	1	1	1	1–1
Disregard	8	6	4	32	8	2	0	0–0	0%	.005	1	2	1	1–2
<i>All ambivalent</i>	3	2	3	37	4	2	0	0–0	50%	.003	1	1	1	1–1
Moderate	2	2	2	38	2	1	0	0–0	100%	.001	1	1	1	1–1
Mild	3	2	1	37	2	1	0	0–0	0%	.001	1	1	1	1–1
DSU^{g,j}														
<i>All positive^k</i>	8	7	7	10	15	4	0	0–1	93%	.049	1	3	2	1–2

Casual friends	2	2	2	16	2	1	0	0–0	100%	.007	1	1	1	1–1
Positive regard	8	7	7	10	13	1	0	0–1	92%	.043	1	4	2	1–3
<i>All negative</i>	14	10	13	4	32	8	1	0–2	44%	.105	1	4	2	1–3
Strong dislike	4	2	2	14	2	1	0	0–0	0%	.007	1	1	1	1–1
Moderate dislike	8	6	6	10	8	2	0	0–1	50%	.026	1	3	1	1–2
Disregard	13	8	12	5	22	7	0	0–1	27%	.072	1	6	2	2–3
<i>All ambivalent</i>	7	5	7	11	8	3	0	0–1	75%	.026	1	3	1	1–2
Moderate	5	3	4	13	4	2	0	0–0	50%	.013	1	1	1	1–1
Mild	5	3	3	13	4	2	0	0–0	0%	.013	1	2	1	1–2
Unit 3^{h,i}														
<i>All positive^k</i>	16	13	15	17	27	4	0	0–1	67%	.026	1	5	2	3–3
Casual friends	4	3	3	29	4	2	0	0–0	50%	.004	1	2	1	1–1
Positive regard	16	13	15	17	23	4	0	0–1	61%	.022	1	5	2	2–3
<i>All negative</i>	12	10	9	21	19	4	0	0–1	42%	.018	1	7	2	1–3
Strong dislike	2	1	1	31	1	1	0	0–0	0%	.001	1	1	1	1–1
Moderate dislike	4	3	1	29	3	1	0	0–0	0%	.003	1	1	1	1–1
Disregard	12	9	9	21	15	3	0	0–1	40%	.014	1	5	2	1–3
<i>All ambivalent</i>	2	2	2	31	2	1	0	0–0	100%	.002	1	1	1	1–1
Moderate	0	0	0	0	0	0	0	0–0	0%	.000	0	0	0	0–0
Mild	2	2	2	31	2	1	0	0–0	100%	.002	1	1	1	1–1

Note. No. = number. Init = initiated ties. Recv = received ties. Max = maximum. *Mdn* = median. 1st–3rd Q = quartile 1–quartile 3. Recip = reciprocated ties. Min = minimum. DSU = Dementia Specific Unit. ^a Number of relationship ties initiated. ^b Arc-based reciprocity—total number of reciprocal ties as a proportion of actual ties. ^c Path length based up observed ties only. Path length for isolates = maximum path length + 1. Distance-based measures were calculated within components. ^d Minimum network size for all networks was zero. ^e *n* = 91. ^f *n* = 40. ^g *n* = 18. ^h *n* = 33. ⁱ Includes dyadic ties between units. ^j Includes dyadic ties within units only. ^k No ‘true’ friendships reported.

4.6.1.2 Ratios of positive to negative network sizes

Ratios of the median numbers of people with whom residents had positive and negative relationships (positive and negative network sizes) were calculated for residents for whom both positive and negative relationships were reported. The median ratio of residents' positive to negative network members overall was 1:1 ($n = 28$, $IQR = 0.7-3$). Tests indicated significant differences in ratios between units with a higher median ratio of 3:1 ($IQR = 1.3-6.8$) for Unit 1 ($n = 9$) residents compared to 1:1 for Unit 3 ($n = 13$) residents [$(IQR = 0.5-1.9)$, $U = 24.0$, $p = .020$, $r = -.50$]. There were no significant differences between ratios for Unit 1 and DSU residents [$(Mdn = 1.1$, $IQR = 0.63-2.3)$ $U = 12.5$, $p = .086$, $r = -.44$] or between DSU and Unit 3 residents ($U = 35.5$, $p = .754$, $r = -.07$).

4.6.2 Social relationships and resident attributes

Spearman's Rank Order correlations and Mann Whitney U tests were used to investigate associations between number of observer-reported co-resident ($n = 36$) positive, negative, and ambivalent relationships and residents' personal attributes. No significant correlations were found for resident age, marital status, country of birth, spoken first language, level of education, number of active visitors, vision, speech or total communications score, dementia diagnosis, psychiatric diagnoses, physical comorbidities, number of medications, or Barthel Index score. Observer-reported total negative ties showed a moderate positive relationship with better hearing ($\rho = .47$, $p = .004$). Results indicated a moderate positive correlation for total positive ties and number of roommates ($\rho = .66$, $P < .001$). Sex was associated with number of observer-identified positive co-resident relationships, with male residents reported to have larger positive networks ($Mdn = 5.5$, $IQR = 1-15$) than female residents [$(Mdn = 1.5$, $IQR = 0-7)$ $U = 94.5$, $p = .050$, $r = -.33$].

Tests indicated no significant correlations between isolate status and any of the attributes noted above. Fisher's Exact tests indicated a significant association between isolate status and marital status ($p = .024$) with unmarried residents more likely to be 'isolates'. There was an association between isolate status and sex/gender that approached significance ($p = .054$).

Participation in a greater variety of structured activities was moderately correlated with all categories of observer-rated positive relationships (total, $\rho = .54$, $p = .001$; reciprocated, $\rho = .53$, $p = .001$; initiated not reciprocated, $\rho = .44$, $p = .007$; received not reciprocated, $\rho = .43$, $p = .009$). Initiating a greater number of negative ties that were not reciprocated was correlated with participating in a greater variety of

activities ($\rho = .43, p = .010$) and with participating in more large monthly celebratory events ($\rho = .56, p < .001$). Participating in twice-monthly men's and women's social groups was moderately correlated with initiating positive ties that were not reciprocated ($\rho = .37, p = .028$). Participating in a greater number of daily activities such as watching TV or sharing magazines with others was correlated with having more reciprocal relationships ($\rho = .35, p = .036$).

4.6.3 Multi-valenced relationships and standardised measures

Subcategories (total number, reciprocated, initiated non-reciprocated, and received non-reciprocated) of positive, negative, and ambivalent ties and the absence of positive ties (network 'isolates') were correlated with Global Deterioration Scale ($n = 36$), Relationship Questionnaire 'model of self' and 'model of others' attachment profile ($n = 20$), adapted LSNS-6 Friends subscale ($n = 22$), Friendship Scale ($n = 25$), and MOSES subscale ($n = 36$) scores. Observer-rated positive and negative tie data showed strong-to-weak correlations with multiple measures (Table 11).

4.6.3.1 Social relationships and Global Deterioration Scale scores

Observer-rated positive network data were moderately to weakly negatively correlated with resident Global Deterioration Scale score for all four positive tie subcategories (total ties, $\rho = -.50, p = .002$; reciprocated, $\rho = -.46, p = .005$; initiated but not reciprocated $\rho = -.41, p = .014$; received but not reciprocated, $\rho = -.37, p = .028$). Observer-rated negative network data showed a moderate positive correlation between Global Deterioration Scale score and received non-reciprocated ties ($\rho = .40, p = .015$). Mann-Whitney U tests indicated that residents who had at least one positive co-resident relationship had lower Global Deterioration Scale ratings ($Mdn = 6, IQR = 4-6$) than residents rated as 'isolates' [$(Mdn = 7, IQR = 6-7) U = 73.0, p = .036, r = -.35$].

4.6.3.2 Social relationships and Relationship Questionnaire attachment profiles

Scores on residents' self-reported Relationship Questionnaire 'model of others' profiles were strongly to moderately correlated with observer-rated resident positive network size ($\rho = .75, p < .001$), number of ties reciprocated ($\rho = .68, p = .001$), ties initiated but not reciprocated ($\rho = .49, p = .029$), and ties received but not reciprocated ($\rho = .47, p = .038$). Test results indicated no significant correlations between residents' 'model of others' profile scores and any category of observer-rated negative or

ambivalent ties, nor any significant correlations between residents' Model-of-Self profile scores and any category of observer-rated relationship ties (Table 11).

There was no significant difference in 'model of self' profile score between residents with or without positive ties. Residents who self-reported lower 'model of others' profile scores were more likely to be rated as 'isolates' by the observer ($Mdn = -6$, $IQR = -6-2$) than residents who self-reported higher 'model of others' profile scores [$(Mdn = -1$, $IQR = -10--6$) $U = 5.0$, $p = .026$, $r = -.50$].

4.6.3.3 Social relationships and adapted LSNS-6 Friends subscale and Friendship Scale scores

Spearman's rank-order tests indicated no significant correlations between adapted LSNS-6 Friend subscale scores (resident self-rated objective social support) and observer ratings of residents' positive and negative relationships. Friendship Scale score (resident self-rated higher subjective social support) was moderately associated with the total number of observer-rated positive ties and reciprocated ties ($\rho = .40$, $p = .045$ and $\rho = .40$, $p = .046$, respectively). No significant associations were found between ambivalent ties and scores on standardised measures.

Residents rated by the observer as having at least one positive co-resident relationship, self-reported higher adapted LSNS-6 Friend subscale scores ($Mdn = 8$, $IQR = 3-10$) than residents rated by the observer as 'isolates' [$(Mdn = 0$, $IQR = 0-2$) $U = 4.0$, $p = .006$, $r = -.58$]. Tests indicated no significant differences in the self-rated Friendship Scale scores between 'isolates' ($Mdn = 9$, $IQR = 6-16$) and residents with positive relationships [$(Mdn = 15$, $IQR = 9-18$) $U = 31.5$, $p = .207$, $r = -.25$].

4.6.3.4 Social relationships and MOSES Withdrawn Behaviour subscale scores

MOSES subscale score (higher withdrawal) showed a strong-to-moderate negative correlation with observer-reported total positive ties, reciprocated positive ties, and positive ties initiated but not reciprocated ($\rho = -.63$, $p < .001$; $\rho = -.57$, $p < .001$; $\rho = -.64$, $p < .001$; respectively). Scores showed a moderate-to-weak positive correlation with the number of received non-reciprocated negative ties ($\rho = .34$, $p = .045$). Residents whom the observer rated as having no positive relationships with coresidents had significantly higher staff-rated MOSES Withdrawn Behaviour subscale scores ($Mdn = 24$, $IQR = 19-27$) than those with at least one positive relationship [$(Mdn = 16$, $IQR = 13-21$) $U = 48.0$, $p = .004$, $r = -.48$].

Table 11

Spearman's Rank-Order Correlations between Observer-Rated Resident Network Variables and Scores on Standardised Measures of Cognitive-Functional Ability, Social Engagement, Social Isolation, and Adult Attachment Style

Measure	Relationship ties											
	Positive				Negative				Ambivalent			
	Total	Recip	Init-nr	Rec-nr	Total	Recip	Init-nr	Rec-nr	Total	Recip	Init-nr	Rec-nr
	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho	Rho
	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>P</i>
GDS ^a	-.50, .002	-.46, .005	-.41, .014	-.37, .028	.18, .300	.21, .220	-.12, .485	.40, .015	.03, .850	.16, .345	-.04, .816	-.19, .271
RQ Self ^b	-.18, .439	-.04, .869	-.20, .402	-.34, .141	.07, .760	-.30, .194	.18, .455	-.28, .228	.05, .846	.07, .787	.23, .329	-.21, .376
RQ Others ^b	.75, <.001	.68, .001	.49, .029	.47, .038	.10, .680	.11, .656	.08, .735	.30, .205	-.10, .685	.22, .356	.37, .111	-.02, .932
LSNS-6 ^c	.38, .080	.37, .091	.22, .334	.36, .096	-.22, .333	-.22, .324	-.19, .390	-.13, .569	-.30, .181	-.34, .121	-.21, .341	.21, .354
FS-t ^d	.40, .045	.40, .046	.24, .244	.23, .279	-.34, .100	-.14, .491	.28, .175	-.32, .124	-.09, .662	.02, .918	.04, .845	0, 0
MOSES ^a	-.63, .001	-.57, .001	-.64, .001	-.44, .008	.12, .493	.07, .684	-.20, .237	.34, .045	.20, .247	.06, .726	-.13, .464	.26, .130

Note. Significant correlations are indicated in blue/bold. Recip = reciprocated ties. Init-nr = initiated ties not reciprocated. Rec-nr = received ties not reciprocated. GDS = Global Deterioration Scale. RQ Self = resident self-rated Relationship Questionnaire model of self profile. RQ Others = resident self-rated Relationship Questionnaire model of others profile. LSNS-6 = adapted Lubben Social Network Scale-6 Friends subscale. FS-t = Friendship Scale total score. MOSES = Multidimensional Observation Scale for Elderly Subjects Withdrawn Behavior subscale. ^a n = 36. ^b n = 20. ^c n = 22. ^d n = 25.

4.6.4 Differences between staff- and observer-report of resident positive and negative relationship networks

4.6.4.1 Positive relationships

Results of Wilcoxon signed rank tests indicated differences between staff- and observer-report of the relationships of interviewed residents. Although staff and the observer identified the same number of initiated 'true' friendships among residents in Unit 1, staff reported significantly fewer initiations of casual friendships [(*Mdn* = 0, *IQR* = 0–0) $Z = -2.21$, $p = .027$, $r = -.57$] than the observer (*Mdn* = 1, *IQR* = 0–2) and also fewer instances of positive regard [(*Mdn* = 3, *IQR* = 3–5) $Z = -2.84$, $p = .005$, $r = -.73$] than the observer (*Mdn* = 6, *IQR* = 3–8). These differences were reflected in inconsistencies between staff and observer ratings for the total number of positive

relationships $Z = -3.18$, $p = .001$, $r = -.82$ ($Mdn = 5$, $IQR = 4-7$; $Mdn = 10$, $IQR = 6-14$, respectively), which also included consideration of relationships between residents of different care units.

Similarly, staff and observer ratings of Unit 3 and DSU residents' positive relationships differed. Although there were no significant differences between staff- and observer-ratings in the number of casual relationships initiated [$(Mdn = 5$, $IQR = 4-7$; $Mdn = 10$, $IQR = 6-14$, respectively) $Z = -0.45$, $p = .655$, $r = -.13$] or in the number of instances of initiated positive regard [$(Mdn = 5$, $IQR = 4-7$; $Mdn = 10$, $IQR = 6-14$, respectively) $Z = -0.97$, $p = .332$, $r = -.28$], staff identified 'true' friendships between Unit 3 residents ($Mdn = 0$, $IQR = 0-2$) and the observer identified none. In the DSU, the observer identified only a few instances of casual friendships ($Mdn = 0$, $IQR = 0-0$) and positive regard ($Mdn = 0$, $IQR = 0-1$) between residents. Staff identified no positive relationships between DSU residents, only positive relationships with residents of other units.

4.6.4.2 Negative relationships

There were no statistically significant differences between the total number of initiated negative relationships identified by staff and the observer, respectively, for Unit 1 residents [$(Mdn = 0$, $IQR = 0-1$; $Mdn = 0$, $IQR = 0-2$) $Z = -1.81$, $p = .071$, $r = -.47$], for DSU residents [$(Mdn = 2$, $IQR = 1-6$; $Mdn = 3$, $IQR = 1-6$) $Z = 0$, $p = 1$, $r = 0$] or for Unit 3 residents [$(Mdn = 0$, $IQR = 0-2$; $Mdn = 0$, $IQR = 0-1$) $Z = -0.36$, $p = .720$, $r = -.10$]. However, staff- and observer-ratings of residents' relationships differed in strength (Table 12). Staff identified few instances of strong dislike and moderate dislike in Unit 1 (Maximum = 1, $Mdn = 0$, $IQR = 0-0$ for both) but no 'disregard', while the observer identified all three levels of relationship strength (strong dislike and moderate dislike, Maximum = 1, $Mdn = 0$, $IQR = 0-0$; disregard, Maximum = 2, $Mdn = 0$, $IQR = 0-1$). Staff identified all negative relationships between DSU residents as 'disregard' ($Mdn = 1$, $IQR = 0-2$), while the observer identified a few relationships as either moderate dislike ($Mdn = 0$, $IQR = 0-2$) or strong dislike ($Mdn = 0$, $IQR = 0-1$), as well as disregard ($Mdn = 1$, $IQR = 0-3$). Neither staff nor the observer identified strong dislike between Unit 3 residents and there were no significant differences between staff and observer ratings of residents' initiated moderate dislike [$(Mdn = 0$, $IQR = 0-1$; $Mdn = 0$, $IQR = 0-2$) $Z = 0$, $p = 1$, $r = 0$] and disregard [$(Mdn = 0$, $IQR = 0-1$; $Mdn = 0$, $IQR = 0-2$) $Z = -1.29$, $p = .196$, $r = -.37$].

4.6.4.3 Ambivalent relationships

There were no significant differences in the small total number of initiated ambivalent relationships rated by the staff and observer for Unit 1 [(both Maximum = 2, $Mdn = 0$, $IQR = 0-0$) $Z = -0.55$, $p = .581$, $r = -.14$] or for Unit 3 [(Maximum = 2, $Mdn = 0$, $IQR = 0-1$; Maximum = 1, $Mdn = 0$, $IQR = 0-0$) $Z = -1.63$, $p = .102$, $r = -.47$]. Staff rated all ambivalent relationships in Unit 1 as 'mild' (Maximum = 1, $Mdn = 0$, $IQR = 0-0$), while the observer identified both mild and moderate ambivalence (both Maximum = 1, $Mdn = 0$, $IQR = 0-0$). Staff identified no ambivalent relationships between DSU residents either; the observer identified mild (Maximum = 1, $Mdn = 0$, $IQR = 0-0$) and moderate (Maximum = 2, $Mdn = 0$, $IQR = 0-1$) ambivalence.

Table 12

Wilcoxon Signed Rank Tests Comparing Staff and Observer Ratings of Resident Relationships

	Unit 1			DSU			Unit 3		
	Test statistic								
Ratings	Z	P	r	Z	P	r	Z	P	r
All positive	-3.18	.001	-.82	-1.7	.083	-.58	-1.90	.058	-.55
True friends	0	1	0		S			O	
Casual friends	-2.21	.027	-.57		S		-0.45	.655	-.13
Positive regard	-2.84	.005	-.73		S		-0.97	.332	-.28
All negative	-1.81	.071	-.47		0 1 0		-0.36	.720	-.10
Strong dislike	-0.58	.564	-.15		S			S, O	
Moderate dislike	-0.58	.564	-.15		S		0	1	0
Disregard		S		-0.14	.891	-.05	-1.29	.196	-.37
All ambivalent	-0.55	.581	-.14		S		-1.63	.102	-.47
Moderate ambivalence		S			S		-1.00	.317	-.29
Mild ambivalence	0	1	0		S		-0.82	.414	-.24

Note. S = Staff did not identify any relationships in this category. O = Observer did not identify any relationships in this category.

4.7 Results summary and discussion

Twenty-nine residents (80.6%), including 20 with dementia, were capable of discussing how they perceived their relationships with coresidents. Eight residents (27.6%), including six with dementia, identified having 'true' friendships. The percentage of residents reporting true friendship in this study was slightly lower than the percentage of 'close relationships' (36.4%) reported in previous larger-scale research with nursing home residents (Bitzan & Kruzich, 1990). Three of the residents who reported network data reported true or casual friendship with their roommates (10.3%) and only one of these relationships was confirmed as reciprocal. Low rates of friendship between roommates in this and a previous study (Bitzan & Kruzich, 1990) reflect the potential negative effects of roommate incompatibility reported by aged care residents (Cahill & Diaz-Ponce, 2011) and other populations such as student roommates (West et al., 2009) and adults living in shared homes (Wiltz, 2003).

Six residents spontaneously identified relationships with residents in other units. These relationships are of interest because residents recalled their relationship partners from memory instead of recognising them in photographs. The relationships are also of interest because residents maintained these social ties without the benefit of living in close proximity. Staff and family members facilitated the relationship by helping residents to travel between care units to visit one another. Additionally, at least one resident without dementia participated in each of these relationships. This suggested that better memory capacity may have played a part in relationship maintenance (Stiller & Dunbar, 2007). Although residents did not explain why they nominated one another, the similarities in their personal attributes suggested that homophily and having someone they could 'talk' with were important factors.

Nearly sixty percent (58.6%) of residents who provided network data reported that they had at least one positive relationship. This percentage was considerably higher than the 1% to 36% reported in some studies using egocentric approaches (Bitzan & Kruzich, 1990; Cheng, 2009; de Medeiros et al., 2012; Lee et al., 2005; Perkins et al., 2013). However, it is lower than the 80% previously reported in other research using egocentric methods (Abbott et al., 2013), and the 65% (Retsinas & Garrity, 1985) up to 100% (Abbott et al., 2013; Abbott & Pachucki, 2016; Schafer, 2011) reported in studies using sociocentric approaches.

Ten (34.5%) of 29 residents reporting network data, and 17 (47.2%) of the 36 interviewed residents, were 'isolates' for whom no positive relationships were reported.

Seven interviewed residents were identified as 'isolates' based on incomplete data sets (they did not provide data themselves). Triangulation of resident-, observer-, and staff-report indicated a lack of relationships for four of the residents. These numbers suggest that the percentage of isolated residents may have been closer to 38.9%. The lower percentage of 'isolated' residents aligns with proportions of 'loner' residents (35%) reported in previous research (Retsinas & Garrity, 1985), but is much higher than recent reports in which there were no 'isolates' among assisted living residents (Abbott et al., 2013), and only 10% (1 of 10) to 23.5% (4 of 17) 'isolates' among different cohorts of residents in a dementia special-care unit (Abbott et al., 2013; Abbott & Pachucki, 2016).

The median size of residents' networks in Unit 1 was one, and in the DSU and Unit 3 it was zero. Median network sizes of less than one are comparable to average sizes of resident networks in some studies (Cheng, 2009; de Medeiros et al., 2012; Lee et al., 2005; Perkins et al., 2013), but lower than those in others which reported median network sizes between 2.6 and 5.3 for assisted living residents and approximately 1.5 for residents of dementia special-care units (Abbott et al., 2013; Abbott & Pachucki, 2016; Schafer, 2011).

Only two of the true friendship relationships were reciprocal (50%) and one of these reciprocal dyads was a married couple. This percentage of reciprocity in true friendship is consistent with average levels reported in previous studies (Abbott et al., 2013; Abbott & Pachucki, 2016). Less than a quarter (22.2%) of positive relationships were reciprocated. However, over two-fifths of unreciprocated relationships (42.2%) were asymmetric because only one resident provided data. Similar proportions of incomplete dyadic data (45%) have been reported in large-scale friendship research with adolescents (Vaquera & Kao, 2008). Over 38% of relationships based on complete data (both residents reported) were reciprocal. Interestingly, this proportion is comparable to percentages of reciprocal friendships, ranging from 35% to 53%, reported in recent studies of friendships amongst adults in the community (Almaatouq, Radaelli, Pentland, & Shmueli, 2016).

Few relationships were interconnected, resulting in low network 'densities'. Connections between residents were primarily either direct dyadic relationships ('one-step' distance) or involved one shared connection ('two-step' distance, i.e. 'friend of a friend'). Ties greater than 'two-step' distance most likely did not translate into opportunities for meaningful social engagement between residents (Friedkin, 1983). This is not to say that residents could not have been influenced in other ways by these 'distant' connections. Large-scale longitudinal studies in the community suggest that

emotional states such as happiness and loneliness may flow through a social network and influence people who are connected to one another at a social distance of up to three steps or 'degrees of separation' (Cacioppo et al., 2009; Fowler & Christakis, 2008).

Residents with higher Barthel Index scores, indicating less impairment, received more positive relationship nominations without reciprocating. Residents who had a higher number of comorbid psychiatric diagnoses had fewer positive relationships than residents with better mental health. Residents with more diagnosed physical health conditions initiated fewer relationships, and experienced less reciprocity, than residents in better physical health. Residents in a more advanced stage of dementia (as measured using the Global Deterioration Scale) had smaller networks and fewer reciprocal relationships. Previous research reported that assisted living residents with better health were nominated more frequently as 'close ties' by coresidents and they were less likely to nominate coresidents with poorer health than themselves (Schafer, 2011, 2015). Results in the current study suggest similar associations between high-care residents' health status and positive network size. Residents who were physically or emotionally able could have more reciprocal relationships.

Half of the residents identified dismissing attachment style on the Relationship Questionnaire, a third identified secure style, and less than a fifth identified either fearful or preoccupied style. These results aligned with previous research indicating more self-reported dismissing/avoidant attachment style amongst older adults including those with dementia living in the community (Magai, 2008; Nelis et al., 2012). The results did not support previous findings of more fearful attachment amongst people with dementia (Molinari et al., 2001). Distributions of residents' pre-admission attachment styles as reported by family/friends (secure, 43.5%; dismissing 43.5%; fearful and preoccupied combined, 13%) were closely resembled distributions of pre-morbid attachment styles identified by carers in the Magai et al. (1997) study (secure, 42%; dismissing 39%; ambivalent, 19%), but indicated higher levels of dismissing attachment than those later reported (36.9%) in a larger sample (Magai & Cohen, 1998; Magai et al., 1997). Retrospective reports of residents' pre-admission attachment styles did not correlate with residents' current self-report. Differences suggest that one or more variables may have cued alterations in residents' attachment styles post-admission to residential aged care.

Residents with at least one positive social relationship had significantly higher 'model of others' profile scores on the Relationship Questionnaire than residents without positive ties. This indicated that residents who had more secure, positive

internal working models of others (i.e. thought and felt better about others generally) were more likely to establish relationships with coresidents. Further, residents with more secure profiles had larger networks and more reciprocal relationships than those with less secure profiles. Together, these results suggest that residents who were perceived as being more approachable were approached more and had more relationships. These results align with findings that older community-dwelling adults with greater attachment security have larger non-kin social networks with greater reciprocity, whereas those who are more dismissing have smaller non-kin networks (Fiori et al., 2011). The results may suggest that social networks were influenced by attachment, or conversely that residents' attachment-related behaviour and cognitions reflected their positions within networks. Critical inspection of all available data suggest that the mechanisms linking attachment profiles and residents' perceptions of social relationships were complex and possibly associated with variables including past traumatic experiences such as war and history of mental illness, although this information was not systematically collected.

Residents with more reciprocated relationships reported more perceived social support as measured using the Friendship Scale. Surprisingly, there were no significant differences in the perceptions of social support/isolation and friendship (as measured using the Friendship Scale and the adapted LSNS-6 Friends subscale) between residents with and without relationships. These results raise the possibility that residents may not have been thinking about relationships with coresidents when reporting their 'close relationships' using these scales, possibly thinking of family and friends who live outside the facility or about staff.

The size of residents' positive social networks was not correlated with participation in a greater number or specific types of structured activities. This suggests that simply bringing residents together during structured social activities, which may be perceived as providing opportunities for social engagement, did not translate into positive social relationships between residents (Bergland & Kirkevold, 2008; Knight & Mellor, 2007).

Residents said that friendship meant having "shared" experiences and backgrounds, suggesting that homophily was a valued part of the relationship. Their descriptions of friendship most often included words that suggested expectations of intimacy and altruism. Residents' expectations of homophily and intimacy between friends mirrored those reported previously by aged care residents (de Medeiros et al., 2012; Kemp et al., 2012; Perkins et al., 2013). Preferences for homophily in friendship align with existing evidence that homophily is a primary factor in affiliation and altruism,

and in the formation of close relationships (Curry & Dunbar, 2013; Fu et al., 2012; McPherson et al., 2001). Moreover, residents' expectations aligned with the universal standards of ideal friendship reported by Hall (2012), including expectations of 'similarity' (i.e. "shared" experiences and backgrounds), 'instrumental aid' (i.e. "help"), and 'symmetrical reciprocity' and 'communion' (i.e. "trust", "understanding").

In describing friendship, residents naturally described their own personal experience of friendship as something inherently "deep" and "good", and as something that provided "satisfaction". Descriptions of friendship as intrinsically valuable and emotionally rewarding resonate with Wright's (1984) description of friendship as a 'communal' relationship. Residents who described friendships in this way, as well as those who emphasised homophily, may have been more likely to associate friendships with their own emotional wellbeing and self-identity (Morry et al., 2013; Wright, 1984).

Multiple residents spontaneously spoke of reticence and ambivalence towards relationships with coresidents. These comments mirrored themes of 'relational boundaries' noted in previous research wherein residents described keeping their distance from others to protect their privacy, limit social obligation, and avoid emotional pain (Perkins et al., 2013). Age and sex/gender did not appear as common barriers to friendship, in contrast with previous research (Kemp et al., 2012; Perkins et al., 2013). Residents perceived friendship as "difficult" due to communication barriers caused by their coresidents' (not their own) cognitive impairment. These sentiments add to those of previous studies indicating that the inability to "talk" with coresidents who have reduced cognitive capacity inhibits relationships (Hauge & Kristin, 2008; Kemp et al., 2012; Knight & Mellor, 2007; Moyle, Fetherstonhaugh, Greben, Beattie, & AusQo, 2015; Roberts & Bowers, 2015). Some residents defined friendship by the abstract concepts that contributed to its development and maintenance such as "choice", "proximity", and that it "takes time". These responses are similar to those reported in previous research and illuminate the chasm between what residents felt were the necessary elements to foster meaningful relationships and what they experienced instead (Kemp et al., 2012; Perkins et al., 2013). Together, these responses touched upon key barriers to 'true' friendship in aged care environments and echoed the sentiments of residents from multiple studies who simply said "I don't know them enough" (Bonifas et al., 2014; de Medeiros et al., 2012; Kemp et al., 2012).

Only one resident said that friendship meant "shared activities". This is consistent with the SNA data suggesting no associations between participation in structured activities and social network size. This contrasts with the residential aged care view that providing opportunities for social engagement through structured

activities is sufficient to promote meaningful interactions and relationships between residents. Residents said that they liked to “talk” and “visit” with friends and spoke of spending time together through which they could share thoughts, ideas, and memories with each other. These same responses, indicating the will to seek out friends to share private face-to-face conversations, are universally reported in similar studies with aged care residents (Ayalon & Green, 2013; Bergland & Kirkevold, 2006; Kemp et al., 2012; Moyle et al., 2015). Residents also explained that friendship meant active communication and contact through correspondence and calling one another on the phone. However, none of the residents that participated in this study had access to phones or computers, and most residents were no longer physically capable of typing or writing letters.

As with ‘correspondence’ and ‘ringing (calling)’ friends to keep in touch, many of the activities and places that residents described within ‘things they liked to do with friends’ were activities that they no longer experienced and places that they no longer visited. For example, going out to the theatre, going to the beach, playing golf, or going dancing at their favourite club. Most residents mentioned sharing meals and hospitality, either going out to meet friends at cafés and restaurants or hosting friends at their home. All activities mentioned by residents closely mirrored the responses of community dwelling older people when asked about the social activities that they engaged in with friends (National Seniors Productive Ageing Centre, 2013).

Residents’ spontaneous responses suggested that many relationships with coresidents had not progressed past the second or third ‘stages’ predicted by models of friendship development (Altman & Taylor, 1973; Levinger & Snoek, 1972; Perlman & Fehr, 1986). Aligning with Levinger and Snoek’s (1972) model, residents who were aware of each other perceived and evaluated one another based on external factors such as appearance. Residents’ responses and descriptions of their current relationships appeared to support Finkel et al.’s (2015) proposed relationship-stage model linking familiarity and attraction. The relationship-stage model predicts that familiarity can promote attraction, but the inability to integrate information about a person becomes a barrier to attraction, too much exposure to a person promotes boredom or disgust, and too much interdependence (such as might be experienced by roommates) fosters interpersonal conflict (Finkel et al., 2015).

Residents’ accounts represented their own individual lived experiences of social relationships in care. When reporting network data, each resident presented their own perspective of a relationship (i.e. ‘he/she is my friend’). Both staff and observer accounts considered the contribution of each resident within a relationship (i.e.

“together he and she are friends”). In this way, staff and the observer had similar ‘outsider’ perspectives of resident relationships. However, their accounts also represented individual views. Comparison of staff and observer accounts provided insight into similarities and differences in their perceptions of residents’ relationship networks.

Staff and the observer had similar perceptions regarding the proportion of residents who initiated positive ties (57.1% and 58.2%). However, perceptions differed regarding the number and strength or ‘closeness’ of relationships. Staff rated a greater number of strong ties of ‘true’ friendship and the observer perceived a greater number of weaker, ‘casual’ friendship ties. Differences in staff and observer perceptions of the existence and strength of friendship have been reported previously (de Medeiros et al., 2012). Both staff and the observer perceived that at least a third of residents (33% and 36.3%) were ‘isolates’ without positive relationships. When only reported relationships were included in analyses, staff-report indicated that the median positive network size for connected residents was ‘2’ and observer-report indicated a slightly larger network size of ‘3’. These median network sizes aligned with those previously reported for people with a higher cognitively-functional capacity residing in assisted living (Abbott et al., 2013; Perkins et al., 2013; Schafer, 2011).

Convergence and divergence of staff and observer perspectives were more pronounced within individual care units. DSU staff identified no positive relationships between DSU residents, however, the observer perceived weak ties of positive regard amongst multiple residents. It is possible that DSU staff simply followed instructions to identify ‘friends’ in a concrete manner, unlike staff in other units who also identified generally positive relationships. Staff who were busy fulfilling care duties may have focused more on negative interactions between residents than on positive interactions. Negative interactions were more likely to have required staff intervention to ‘de-escalate’ potentially harmful situations and positive interactions were less likely to have required their attention (Rosen, Lachs, et al., 2008). Conversely, observing residents’ interactions across a large portion of the day may have led the observer to witness a greater number of ‘pro-social’ actions and interactions between residents than staff, who were fulfilling care duties (Cohen-Mansfield et al., 2015). In Unit 3, staff perceived many more positive relationships and friendships than the observer. The observer did not monitor residents in their private rooms. Staff perceptions may have incorporated knowledge of residents’ interactions that occurred in these spaces. Interviewed Unit 3 staff members were RNs, however, one RN had also served as a Recreational Activities Officer during her tenure at the facility. It is possible that her experiences in this role contributed to

greater recall of positive social exchanges between residents and that this translated into more positive aggregate impressions of relationships between residents. Staff and the observer had very similar perceptions of the number of relationships in Unit 1 and of the level of reciprocity in relationships. However, the observer perceived more interconnection between these relationships and a greater sense of cohesion in the network. Most structured activities in the facility took place in Unit 1 and these residents appeared to have greater opportunity to share enjoyable social experiences than residents in other units. Relatively frequent observation of residents participating in shared social activities may have contributed to the observer's impression that a greater number of residents had positive relationships.

Staff and the observer agreed that the majority of residents had few negative and ambivalent relationships. Negative network densities were low, indicating that these relationships were typically not interconnected. The observer perceived more negative relationships than the staff and identified that 38% of residents either initiated or received negative ties. Descriptions of negativity in relationships amongst residents are consistent with data reported in a diverse range of studies in long-term aged care, suggesting that negative interactions and hostility in interpersonal relationships among nursing home residents is common and ongoing (Caspi, 2015; MacAndrew et al., 2015; Perkins et al., 2013; Pillemer et al., 2012; Rosen, Lachs, et al., 2008; Rosen, Pillemer, & Lachs, 2008; Trompetter et al., 2011). Few ambivalent relationships were identified. These results align with previous research indicating that the 'oldest old' (≥ 80 years of age) may experience few ambivalent relationships with friends and acquaintances in their social networks (Fingerman et al., 2004).

Staff and observer data indicated a ratio of 1:1 positive-to-negative relationships in resident networks overall. Previous research with more cognitively capable nursing home residents suggested a ratio of 2.9:1 positive-to-negative emotional experiences differentiated residents who were 'flourishing' from those with lower wellbeing (Meeks et al., 2012). The observer reported a similar ratio of 3:1 positive-to-negative relationships in Unit 1 where residents were generally more physically and cognitively capable than residents in other units. Low ratios of positive-to-negative relationships may have reflected vulnerability to negative emotional experiences brought about by unpleasant or aggressive interactions, particularly for Unit 3 and DSU residents (August et al., 2007; English & Carstensen, 2014). However, contrary to previous research, affect was not directly measured in this study (Meeks et al., 2012) and network data represented aggregated perceptions of relationship networks rather than counts of affective experiences (English & Carstensen, 2014).

Staff-reported relationships were not associated with demographic variables. The observer perceived that fewer male than female residents had positive relationships, however, male residents had larger positive networks. Compared to females, male residents had more 'weak' ties of positive regard. These differences contrasted with previous research reporting no association between gender and networks of aged care residents (Perkins et al., 2013).

Staff completed the MOSES Withdrawn Behaviour subscale in order to rate residents' level of social engagement or withdrawal across different social situations in care (Helmes et al., 1987). MOSES subscale scores indicated that residents were moderately socially engaged during care routines, with other residents, and with people and events beyond their immediate aged care environment. Unit 1 residents were significantly more socially engaged than Unit 3 and DSU residents, who were more withdrawn. Residents whom staff rated as more socially withdrawn were also perceived by staff and the observer to have smaller positive networks, fewer reciprocated relationships, and they were more likely to have been perceived as 'isolates'. Interestingly, residents who were more withdrawn were also perceived by staff to have had a greater number of negative relationships and both staff and the observer perceived that these residents received more negative ties without reciprocating.

Residents who had higher Friendship Scale (Hawthorne, 2006) scores, indicating greater self-rated subjective feelings of social support, were also perceived by staff and the observer to have more positive relationships with coresidents and to have greater reciprocity in relationships. Correlations between staff and observer ratings of isolate status and residents' Friendship Scale scores proved equivocal. Staff data indicated that residents who did not have relationships with coresidents felt more socially isolated. Observer data indicated that residents with and without positive relationships did not differ significantly in their subjective feelings of social support.

Staff- and observer-ratings of positive relationships were not correlated with residents' adapted LSNS-6 Friends subscale scores (Lubben et al., 2006). Residents identified by staff and the observer as 'isolates' had significantly lower adapted LSNS-6 subscale scores (greater self-reported objective social isolation) than did residents who were identified as having positive ties. This suggested that residents, staff, and the observer may have perceived the absence of supportive relationships similarly.

Staff- and observer-ratings of ambivalent ties were not correlated with residents' self-reported social support or isolation. Observer ratings of residents' negative relationships were not correlated with residents' Friendship Scale scores and adapted LSNS-6 subscale scores. Residents who reported lower Friendship Scale scores

(higher subjective social isolation) were perceived by staff to have received a higher number of negative ties without reciprocating. Residents who received negativity in relationships without reciprocating may be part of relationships featuring an imbalance in power such that they experienced exclusion, aggression, and 'bullying' from others (Meter & Card, 2015). Residents reporting higher objective isolation (lower adapted LSNS-6 Friends subscale scores) were perceived by staff to have initiated more negative ties that were not reciprocated and to have more negative ties in total. It may be interpreted that these residents exercised more power in imbalanced relationships, possibly excluding, acting aggressively, or 'bullying' others (Meter & Card, 2015).

5 Results and Discussion—Part 2

5.1 Introduction

This chapter presents the detailed explanation of a novel psychosocial approach that was used to code and analyse social interactions between residents from transcribed observational field note data. The chapter begins with definitions of thematic categories that resulted from qualitative analyses of observational data. Section 5.2.2 presents results of content analyses and describes the interpretation of residents' psychosocial needs as 'internal motivators', and factors in the social environment as 'external motivators', of actions and interactions. The themes and categories described in these preliminary sections are then synthesised in Section 5.3 to describe the process of coding and analysing residents' social actions and interactions in sequences as 'social interaction trajectories'. This is followed by a description of the socio-emotional outcomes of interactions, interpreted as 'social resting states' experienced by residents. Each section provides examples of resident interactions taken from field note data in order to illustrate concepts and code applications.

Codes and categories produced through qualitative analyses were converted into counts of occurrence for quantitative description (Section 5.4). Section 5.4.1 presents the prevalence of interactions that occurred during specific time-activity contexts across daytime care schedules. Sections 5.4.2 to 5.4.5 address the ratio of positive and negative actions, in terms of both the initiation and its socio-emotional outcomes.

Section 5.5 focuses specifically on observational results for the 27 interviewed residents who had a dementia diagnosis. Sections 5.5.1 and 5.5.2 report the ratio of positive to negative interactions and results of correlations between qualities of interactions and chart and interview data (i.e. cognitive-functional stage). Finally, all results are summarised and discussed in light of the literature in Section 5.6.

5.2 Resident interactions

5.2.1 Thematic categories: Reaching-out, approached, and continuous states

Resident interactions were reviewed as series of temporal events (brief occurrences) and experiential states (conditions at or across certain points in time) within a dyadic exchange (Kitwood, 1993). Interactions began and ended with each resident in one of two overarching social states: social 'connection' with their coresidents or social 'disconnection' from their coresidents. Cases in which residents did not interact with others during an entire day's observational period were reviewed as daily temporal states. In these cases, residents began and ended the day in the same social state of either 'connection' or 'disconnection' from their coresidents. Through analyses and interpretation, three main categories of residents' social actions and interactions emerged, indicating states of 'reaching-out', being 'approached', or being in a 'continuous' state.

The first two categories encompassed patterns of actions and interactions that began with residents in a state of either 'connection' or 'disconnection', followed by an event involving internal and external variables. This 'catalyst' event led to interaction with others. The interaction resulted in outcomes that represented new states of connection or disconnection. The third category encompassed the daily temporal states, such that residents were in a 'continuous state' of connection or disconnection throughout an observational period. Resident interviews indicated that few residents had close relationship ties with coresidents (i.e. close friends, or two residents who were a married couple) that could be considered as ongoing 'connection' with others. Therefore, in most instances residents were interpreted as 'reaching out' or being 'approached' from an initial state of social 'disconnection' from the other residents around them.

In the first interaction category, residents purposefully 'reached out' to interact with others through initiating verbal and non-verbal actions. In the second category, residents were 'approached' by others who were 'reaching out'. Residents' social exchanges began with actions indicating 'positive' or 'negative' socio-emotional valence. Therefore, states of 'reaching-out' and being 'approached' were further categorised to identify when residents were 'reaching-out' and 'approached' in a socially 'positive' or 'negative' manner. The third category represented residents who experienced a continuous state of connection or disconnection due to a resident's personal choice, the actions of others, or circumstance.

5.2.2 Internal and external motivators of actions and interactions

Internal and external factors acted as catalysts, motivating residents to transition from their current state of connection or disconnection into states of reaching-out and being approached, or alternatively to remain in a continuous social state of connection or disconnection. Internal motivators are described and categorised below (Table 13) according to their socio-emotional valence ('positive' and 'negative'). External factors are described in the section that follows. Example excerpts from field note transcripts are provided. Resident names have been replaced by pseudonyms in all examples.

5.2.3 Internal motivators for reaching-out and being approached positively

The state of reaching-out involved residents enacting behaviours motivated by internal and external variables that were unique to each individual and to their environmental context. Review of field note transcripts suggested that residents rarely reached out to one another to seek help in satisfying unmet physiological needs such as hunger or thirst. Residents' reaching out in a positive manner appeared to be motivated by their need for conversation and stimulation, the sharing of enjoyment and fun, for attention to unmet needs through comfort and reassurance, and to provide practical support (i.e. passing a newspaper or clearing dishes).

5.2.3.1 Conversation and stimulation

The following example shows one resident reaching-out and one resident being approached positively for conversation. Staff placed two DSU residents next to one another on a sofa in the TV lounge late in the afternoon. The residents overcame communication barriers to interact with one another. 'Adam' was an Australian-born native English speaker and 'Alessandro' was born outside of Australia and had a Culturally and Linguistically Diverse (CALD) background. Both men had moderately severe to severe dementia and had difficulty with productive speech. 'Alessandro' appeared to reach out positively for conversation. 'Adam' was approached positively for conversation, but their interaction ended in disconnection.

Tuesday, 02/10, 16:24

'Alessandro': (Leans into 'Adam', touches his shoulder, makes eye contact, smiles and nods.)

'Adam': (Smiles politely, nods, makes eye contact and says) "Oh yes?"

'Alessandro': (Stares at 'Adam' without speaking.)

'Adam': (Begins to shift in his seat, looks away from 'Alessandro' and appears uncomfortable.)

'Alessandro': (Again makes eye contact and speaks to 'Adam' in [language].)

'Adam': (Again smiles politely, nods, and says) "Oh yes."

'Alessandro': (Continues to stare at 'Adam', speaks to him again in [language].)

'Adam': (Appears to see humour in the situation, smiles, chuckles, and nods at 'Alessandro' while he is speaking in [language] then looks away.)

'Alessandro': (Begins to clap at 'Adam'.)

'Adam': (Looks away, appears uncomfortable and a bit worried.)

5.2.3.2 Sharing enjoyment and fun

A game of 'balloon tag' with visiting creative arts therapists illustrates how DSU resident 'Giovani', who walked unassisted, reached out to share enjoyment and fun with immobile coresidents and experienced connection.

Wednesday, 03/10, 11:00

[Therapists]: (Play balloon tag with 'Janis', 'Lee', and 'Maggie'. Make eye contact with them, smile, and clap.)

'Giovani': (Watches [the] balloon tag game. Smiles, laughs, mumbles in [language]. The balloon floats over in front of 'Giovani', who picks-up the balloon and hands it to [Therapist], smiles, laughs, and mumbles in [language].)

[Therapist]: (Smiles and thanks 'Giovani'.)

(Noise levels are now medium-to-high.)

'Giovani': (The balloon [again] floats over to 'Giovani', who holds on to the balloon, smiles, and teases [Therapists]) "Aaaaa..."

Visitor ['Giovani's wife']: (Arrives for her daily visit to find the residents engaged in balloon tag with [Therapists]. She has been standing and watching the game for a minute but now approaches her husband 'Giovani' [and says]) "Give them the ball." (Takes the balloon and hands it to [Therapist].)

'Giovani': (Smiles.)

Visitor ['Giovani's wife']: (Sits with husband 'Giovani', smooths his hair, smiles at him.)

'Giovani': (Smiles back with a relaxed face.)

5.2.3.3 Comfort and reassurance

In this example, independently mobile Unit 3 residents 'Sharon' and 'Rose', who have moderately severe dementia, encounter one another in the corridor. The women

reach out to one another for comfort and reassurance at different points in their 'travels' and are connected.

Thursday, 25/10, 15:50

('Sharon' and 'Rose' are both walking down the corridor toward one another in opposite directions.)

'Sharon': (Makes eye contact with 'Rose' without smiling.)

'Rose': (Approaches her plaintively [saying]) "We don't know what to do."

'Sharon': (Stares at 'Rose' and mumbles.)

'Rose': (Smiles at 'Sharon' and introduces 'Sharon' to the observer as) "My lovely friend."

'Sharon': (Smiles back at 'Rose' and then walks toward the lift [elevator].)

Visitor ['Magda's daughter']: ('Magda's daughter' has brought her mother back upstairs in the lift and now wheels her toward where 'Rose' is standing.)

'Sharon': (Has followed 'Magda' and 'Magda's daughter' smiling toward 'Rose'. Smiles at 'Rose' and hugs her.)

'Rose': (Smiles and hugs 'Sharon' back. Both appear happy.)

5.2.3.4 Providing care and practical assistance

In another example, independently mobile Unit 1 resident 'Myra', who has a dementia diagnosis, reached out to her husband 'Roman'. 'Myra' had previously been a carer for 'Roman', who was immobile but did not have dementia. 'Myra' continued to assist 'Roman' as well as other residents. In this instance, she reached out positively to provide care for her husband and their tablemate 'Eleanor', who were approached positively, and their interaction ended in connection.

Thursday, 23/08, 10:30

'Myra': (Smiles, stands and makes eye contact with 'Roman' [her husband] and 'Eleanor', gestures toward their tea cups and asks if they have finished their tea.)

Roman: (Nods 'yes'.)

Eleanor: (Nods 'yes'.)

Myra: (Assists 'Roman' and 'Eleanor' by clearing their tea cups from the table and taking the cups to the kitchenette sink to be washed.)

5.2.3.5 Politeness and kindness

Residents also reached out and responded to one another with politeness and kindness. Residents at all levels of cognition and function showed empathy and

altruism. They reached out to soothe and assist, or responded to overtures for assistance. Their actions indicated a willingness to help others. In this example, Unit 1 resident 'Charlie', who had moderately severe dementia and could walk, reached out in kindness to comfort 'Lydia'. 'Lydia' had advanced dementia and called out incoherently from her waterchair in the TV lounge. 'Lydia', was approached negatively, from her perspective, and the interaction between them ends in a disconnected state (both are assisted by staff).

Thursday, 23/08, 12:38

'Charlie': (Walks over to 'Lydia', looks at her intently with concern and tries to comfort her) "It's alright Luv."

AIN [woman's name]: (Approaches to check on 'Lydia'.)

'Lydia': (Yells and pushes at both [AIN] and 'Charlie'.)

Admin [woman's name]: (Approaches to check on 'Lydia'.)

'Charlie': (Nods his head at 'Lydia' and says quietly) "Ok Luv." (He turns to [Admin] and says) "Thanks for looking after her."

Admin [woman's name]: (Smiles kindly at 'Charlie' and says) "That's ok Luv."

'Charlie': (Sits in a nearby armchair and watches 'Lydia'. Shaking his head he says sympathetically) "It's not fair. It just comes out of her mouth."

AIN [woman's name]: (Smiles at 'Charlie', sees that he looks sad and asks if she can bring him a cup of tea or coffee.)

AIN [man's name]: (Approaches 'Charlie', reaches out and shakes his hand, sits with him and asks him quietly) "How ya' goin' mate?"

'Charlie': (His eyes are tearing up) "Not so good. Walking around. Thinking about the kids and wife. That's life."

AIN [man's name]: (Talks with 'Charlie', tries to reassure and comfort him, pats 'Charlie' gently on the back.)

'Charlie': (Says) "It breaks your heart. When I think about it. (Sniffs). Can't keep crying all the time."

AIN [man's name]: (Responds) "It's good to sit down and have a chat."

'Charlie': (Replies) "That's right mate."

5.2.3.6 Defending

The sense of responsibility toward others illustrated by the example above also extended to defending coresidents against perceived harm. For example, DSU resident 'Janis', who was in a waterchair, tried to intervene when coresident 'Giovani' began to

push resident 'Maggie' who was also in a waterchair. 'Giovani' reached out negatively to push 'Maggie's' chair. 'Maggie' was approached negatively. 'Janis' reached out positively to intervene and defend 'Maggie' and to protect 'Giovani' by stopping him from doing something that might inadvertently have caused harm.

Thursday, 04/10, 13:39

'Giovani': (Approaches 'Maggie's' waterchair from behind, mumbles in [language] and begins to push 'Maggie's' chair toward 'Janis' who is nearby in her waterchair next to the TV.)

'Maggie': (Scowls and shouts around the side of her chair at 'Giovani') "Speak English!"

'Janis': (Tries to call the AIN, points at 'Giovani' and says calmly, trying to stop him pushing 'Maggie's' chair) "No, darl' ('darling')."

5.2.4 Internal motivators for reaching out and being approached negatively

As illustrated in the example above, residents also reached out and were approached 'negatively'. This happened indirectly due to circumstance (i.e. being 'in the wrong place at the wrong time') and negative social evaluation (i.e. being the focus of gossip), and directly through targeted action (i.e. verbal or physical aggression).

5.2.4.1 Boundary-crossing

Residents reached out and were approached negatively when one individual purposefully or accidentally breached another individual's personal space. This 'boundary-crossing' occurred at physical distance, for example by walking uninvited into coresidents' rooms and taking their belongings. It also occurred at close physical proximity, for example by making unwanted physical contact with a coresident or staring at them too directly. In the examples below, DSU resident 'Valerie' and Unit 3 resident 'Rose' both walked and repeatedly travelled along the same paths within their respective care units. Their walking patterns took them through common areas and private areas. 'Valerie' and 'Rose' frequently impinged upon the personal space of less mobile residents. In these instances, 'Valerie' and 'Rose' reached out negatively and the residents they encountered were approached negatively through their boundary-crossing. These interactions typically ended in disconnection.

Tuesday, 09/10, 11:11

'Valerie': (Walks into the common [TV/dining] room on her circuit and bumps into 'Emma's' chair as she tries to pass behind her and into the corner.)

'Emma': (Shouts) "Stop bumping into my chair!"

'Valerie': (Ignores her and continues on her circuit.)

Monday, 05/11, 14:05

'Rose': (Enters 'Evangeline' and 'Keresi's' room and begins to look through 'Keresi's' things.)

'Keresi': (Tells her) "Get out."

'Rose': (Tells 'Keresi') "Shut your mouth!" (Curses as she leaves.)

5.2.4.2 Devaluing

Residents reached out negatively to devalue one another and gossip, and make fun or be dismissive of others' needs. In the first example below, Unit 1 residents 'Lily' and 'Florence', who have moderate to moderately severe dementia, sit together at a dining table and gossip about their more cognitively capable tablemate and her visitor. In the second example, Unit 3 resident 'Percy' is dismissive of coresident 'Rose' who has moderately severe dementia. 'Rose' is dismissive in return.

Friday, 24/08, 11:27

Visitor ['Eleanor's son']: (Goes to make a cup of tea for 'Eleanor'.)

'Lily': (Looks across the table at 'Florence', glances at 'Eleanor' then to 'Florence', and says) "She's always with him."

'Florence': (Smiles and nods in response.)

'Eleanor': (Looks over at 'Lily' and says) "Would you want to be treated this way?"

Tuesday, 23/10, 13:45

'Rose': (Walks past the TV lounge doorway.)

'Percy': (Watches from his waterchair smiling and tells the observer) "She wanders around all day."

'Rose': (Hears the comment, enters the lounge and approaches 'Percy' asking) "What did you say?"

'Percy': (Repeats for 'Rose') "You wander around all day."

'Rose': (Responds with frustration) "What? I can't hear you." (Dismisses 'Percy' with a wave of her hand and a vocal) "Ffft" (Walks back to the corridor.)

5.2.4.3 Reprimanding and censoring

Residents punished perceived social transgressions and attempted to protect themselves and others more forcefully in a negative manner by asserting authority (i.e.

reprimanding, rebuking). In these examples, Unit 1 resident 'Loretta', who had moderate dementia, and DSU resident 'Maggie' reprimanded their respective coresidents. In Unit 1, 'Loretta' had joined the 'Men's Happy Hour' gathering and reached out negatively to reprimand tablemate 'Riccardo' for a perceived social transgression. In the DSU, 'Maggie' reached out negatively to rebuke coresident 'Michael' for shouting unkindly at their coresident 'Grace', who had reached out positively. Both interactions ended in disconnection.

Tuesday, 21/08, 14:54

'Loretta': (Sees 'Riccardo' pouring himself a glass of lemonade [soda] from the bottle in the middle of the table. She narrows her eyes and scolds him) "No, no, no!"

'Riccardo': (Looks embarrassed, replaces the bottle and looks away.)

'Loretta': (Stares at 'Riccardo', rises from her chair and leaves the party.)

Thursday, 04/10, 11:16

'Grace': (Makes eye contact with 'Michael' sitting in his waterchair. 'Grace' approaches 'Michael', smiling and singing to him.)

'Michael': (Shouts) "Be quiet!"

'Grace': (Continues to sing, looking sad with a furrowed brow and then laughs.)

'Maggie': (Shouts at Michael) "Shut-up! Shut-up!"

5.2.4.4 Verbal abuse and silencing

Some residents verbally abused their coresidents, shouted criticisms, cursed and name-called, or threatened and silenced them. In the examples below, residents with moderate to moderately severe dementia reached out to verbally abuse coresidents. The first instance describes verbal abuse between Unit 1 coresidents 'Loretta' and 'Marco'. The second instance illustrates an incident involving multiple DSU residents. Each interaction ended in disconnection.

Friday, 31/08, 15:16

'Loretta': (Walks out of her room and takes a seat on the sofa in the TV lounge. She has a patch over her eye, her hair is dishevelled, and she is only wearing a short nightgown.)

'Marco': (Stares at 'Loretta', brow furrowed.)

'Loretta': (Furrows her brow and shouts angrily at 'Marco') "Oh, shut-up!"

'Marco': (Shouts back) "I didn't say anything to ya', ya' bloody bitch! Go back to your room!"

'Loretta': (Shouts the reply) "Don't tell me off!"

5.2.4.5 Direct physical aggression

Occasionally, residents reached out or were approached with direct physical aggression and violence. Even residents in waterchairs engaged in physical aggression when negative interactions escalated between people placed within reach of one another. DSU residents 'Janis' and 'Maggie' had been left to their own devices in the late afternoon after a particularly difficult day in their unit. They reached out and were approached, respectively, in a physically violent manner before their interaction de-escalated and ended in disconnection.

Friday, 12/10, 16:00

'Janis': (Grabs 'Maggie's' arm and pulls her over toward her, moving their waterchairs.) ('Maggie' and 'Janis' grab each other's hands to fight, 'Janis' snarling.)

'Maggie': (Appearing frightened, shouts) "Let go! I'll call the police on you!"

(Both residents hold on to one another for about 15 seconds then let go, appearing to be out of strength.)

'Janis': (Sits back in her chair, pauses for a moment appearing lost, makes eye contact with 'Maggie' and says) "Why'd I do that?"

'Maggie': (Replies quietly) "I'm sick of life. Are you?"

'Janis': (Says) "Yeah."

'Maggie': (Says) "I don't know where my shoes are. My brother [name] came back."

'Janis': (Asks) "[Name] who?"

'Maggie': (Shouts her brother's name.)

'Janis': (Replies matter-of-factly) "Oh. I don't know him."

Table 13

Positive and Negative Internal Motivators of Reaching out and being Approached

Codes	Description of motivation and observed behaviour
Positive internal motivators	
Conversation and stimulation	Breaking the isolation out of want or need to talk, engage, discuss, and share information with others. Need for cognitive stimulation. Talking, conversing.
Attention	Wanting to connect out of personal need, anxiety, or emotional discomfort. Seeking comfort, reassurance, simple assistance. Trying to get someone's attention.
Politeness, kindness	Showing understanding, sympathy, empathy, kindness, or concern for another. Polite exchange, respectful engagement, acknowledging others.
Help, care	Provide practical care, service, make things more pleasant. Verbal and nonverbal action to assist, aid, make more pleasant.
Defending	Protecting another from perceived harm. Watching for signs of danger, difficulty, or transgressions. Verbal and nonverbal action to intervene.
Enjoyment	Sharing appreciation, pleasure, and diversion in a moment or event. Humour, fun, and play.
Negative internal motivators	
Devaluing	Devaluing another person and being dismissive of another's needs. Speaking unkindly about or to another resident, gossiping, ridiculing.
Verbally abusing	Saying abusive or unkind things with the intention of emotional harm or silencing. Screaming, yelling, or shouting at another resident, cursing, threatening.
Boundary crossing	Misunderstanding, disregarding another's personal boundaries, privacy, space, or claim to objects. Intruding into another's personal space, stealing, staring, or intimidating through physical presence.
Violence	Wanting to physically harm, impede, or force withdrawal of another. Aggressive physical contact or purposefully causing an object to make physical contact with another resident.
Reprimanding	Seeking to control or regulate others' behaviour. Rebuking, censoring, chastising for perceived transgressions.

5.2.5 External environmental factors: Care routines and time-activity contexts

Residents interacted within multiple time-activity contexts (Casey et al., 2014) throughout their daily care routines, including structured social activities (AM and PM), unstructured time (pre- and post- morning and afternoon tea), mealtimes (morning tea, lunch, afternoon tea, dinner) and structured pre- and post-mealtime care routines (pre- and post-lunch, pre-dinner). For residents, pre-mealtime routines involved being taken to the toilet, wearing towelling bibs, sitting in close proximity to coresidents at dining tables, waiting for food to arrive, and waiting to be fed. Mealtimes were times of increased activity, noise, greatly increased numbers of coresidents and staff in close proximity, and of focused interactions with staff only. Post-mealtime routines involved being taken to the toilet and waiting for the next staff-facilitated activity or unstructured time. Structured social activities focused resident attention on staff, therapists, and visiting performers, and primarily distracted residents from one another. These activities provided individual residents with rare focused attention from staff without the intrusion of task-oriented interaction typical of meals and personal care routines.

Table 14

Chronological Time-Activity Contexts

Codes	Descriptions
Unstructured time: Pre-tea AM	Early morning free time prior to morning tea service, not including meal service, structured activities, or care routines.
Mealtime: Morning tea	Residents' mid-morning light food and beverage service. Typically between 10 and 10:30 AM
Structured activity AM	Staff-facilitated social, recreational activity. Typically starting between 10 and 11 AM
Unstructured time: Post-tea AM	Late morning free time after morning tea and prior to lunch, not including meal service, structured activities, or care routines.
Structured pre-meal routine: Lunch	Care staff assisted medical and personal hygiene routines prior to service of residents' midday meal. Typically from 11:15 until lunch.
Mealtime: Lunch	Residents' midday meal service. Typically at noon.

Structured post-meal routine: Lunch	Care staff assisted medical and personal hygiene routines after residents had finished their midday meal.
Unstructured time: Pre-tea PM	Early afternoon free time after lunch, not including meal service, structured activities, or care routines.
Mealtimes: Afternoon tea	Residents' mid-afternoon light food and beverage service. Typically between 2:30 and 3:00 PM
Structured activity PM	Staff-facilitated social, recreational activity. Times varied.
Unstructured time: Post-tea PM	Late afternoon free time prior to dinner, not including meal service, structured activities, or care routines.
Structured pre-meal routine: Dinner	Care staff assisted medical and personal hygiene routines prior to service of residents' evening meal. Typically from 4pm.
Mealtimes: Dinner	Residents' evening meal service. Typically 5 PM

5.2.6 External environmental factors: Proximity and lack of choice

As illustrated in the previous excerpts from field note transcripts, both internal and external variables acted as catalysts for resident interaction. External factors did not emerge as consistent themes within resident interactions, but rather as underlying themes within the context that allowed interactions to occur. In the example of 'Janis' and 'Maggie's' physical altercation, proximity and lack of choice were influential external factors that facilitated their aggressive interaction. Most residents were immobile in wheelchairs and waterchairs and completely dependent upon staff and visitors to assist them in approaching or avoiding coresidents. These residents could only interact with the coresidents who were seated or positioned in close proximity to them at small tables, with those seated next to them during group activities, and with those at short distances within activity rooms and corridors. A lack of independent mobility created a lack of choice, and placed immobile residents in a position of vulnerability when relating to coresidents positioned nearby and when relating to walking residents who could approach or avoid them at will.

Proximity and lack of choice within the RACF also left residents vulnerable to environmental factors that they could neither alter nor avoid such as noise level and temperature. In the previous example of 'Charlie' and 'Lydia', the sound of 'Lydia's'

calling out within the facility created external sensory ‘input’ that contributed to environmental context and influenced ‘Charlie’s’ social behaviour. Similarly, changes in ambient room temperature altered both the environment and care routines and influenced residents’ social interactions.

Field notes from an unseasonably hot day on Unit 1 illustrated differential social experiences for five residents who were able to exercise choice and for five other residents who lacked choice. The facility was short-staffed on this day. At the time of these events, Unit 1 AINs attended to residents in their rooms, and RAOs in Unit 3 conducted a weekly outdoor activity that had been moved indoors. Unit 1 residents were seated in their dining room or gathered in the adjacent TV room to watch a classic DVD. Field notes indicated that the facility’s air conditioning was at full capacity, yet heat radiated through the windows. The following excerpt describes a point in time late that morning.

Thursday, 23/08, 11:15

“Five male residents—‘Allen’, ‘Feras’, ‘Richard’, ‘Gregory’, and one other unidentified—are outside in the heat together having a smoko (smoking cigarettes, talking). ‘Helen’ and ‘Florence’ (tablemates) are rubbing or scrunching their tablecloth, ‘Sophia’ is moaning loudly (in her waterchair near the window) and speaking in [language], ‘Myra’ is restless in her dining chair and fidgeting, and ‘Lucy’ is rocking slightly in her waterchair.”

Residents with choice who were left to their own devices gathered outside to smoke cigarettes together (the five men), while residents who lacked choice were unable to alter their situation (i.e. ‘Helen’ and ‘Florence’ at the table, ‘Sophia’ in front of the hot window). The men outside reached out and approached one another positively to converse, enjoyed their shared ‘activity’ and connected. The women inside did not interact and remained disconnected.

5.2.7 External environmental factors: Actions of staff and visitors

The presence, actions, and intervention of staff and visitors affected coresident interactions. As in the example above, the absence of staff and visitors appeared to facilitate interaction within the impromptu ‘men’s smoking group’. The staff’s earlier placement of residents inside appeared to foster social isolation and prolong disconnection between the women who were stationary.

Conversely, staff and visitor intervention also facilitated positive interaction between residents and de-escalated negative interactions. This was illustrated in the previous example when creative arts therapists used a game of balloon tag to encourage DSU residents to reach-out and approach one another for fun and enjoyment. The intervention of multiple staff members in 'Charlie' and 'Lydia's' emotionally complex encounter provided assistance for 'Lydia' and importantly also provided comfort and reassurance for 'Charlie' who had reached out to her with kindness and empathy.

5.2.8 Internal and external factors influencing continuous states

Internal and external factors contributed to residents experiencing continuous states of connection. 'Myra' and 'Roman', a married couple living in Unit 1, were the only two residents observed to be in a continuous state of 'connection'. They were originally from a culturally diverse background and spoke multiple languages including English, but used only their first non-English language when speaking with one another. Observational field note data indicated that the interactions between these two residents, but not the interactions that they had with other residents, were qualitatively and quantitatively different from all other coresident interactions. The observer's interpretation of 'Myra' and 'Roman's' non-verbal communication suggested that their interactions predominantly involved reaching out and being approached positively to share conversation and enjoyment, to provide reassurance, show kindness, provide practical support and care, and to defend against others. On occasion they also appeared to reach out and approach one another negatively to reprimand. As 'Myra' and 'Roman's' interactions represented those of a close relationship other than friendship and different to the social relationships of their coresidents, the interactions between these spouses were removed from the main interaction database and only the interactions that they had with other coresidents were included in further analyses.

Internal and external factors also contributed to residents experiencing continuous states of disconnection. Some residents remained disconnected by choice and avoided coresidents when possible through either total or selectively self-isolation. Other residents remained disconnected by circumstances such as acute fatigue or ill-health, or through social exclusion by others throughout daily observation periods. Residents who were disconnected through their own preference actively avoided interactions with coresidents by remaining in their private rooms, disengaging and withdrawing from those around them (avoiding eye contact, unresponsive to others), or selectively isolating through distancing themselves from others physically while in

common rooms (sitting at a distance, using earphones). Residents who were disconnected by the circumstance of ill-health were disengaged and isolated from others due to physical discomfort and need for rest, remaining in their rooms or at a distance from others through choice or placed by staff at a distance from others in common rooms. Some residents were isolated from others by others. They were excluded, not engaged, avoided or ignored as if not present.

5.2.9 Valenced actions, interactions, and experiences

Residents who reached out and were approached appeared to experience a series of sequential social states that encompassed emotionally-valenced actions, interactions, and shared experiences leading to outcomes of connection and disconnection. The states that residents experienced continued to be influenced by internal and external factors, including preceding states, and were shared by the dyadic partners (i.e. a resident was tolerated because another person was tolerating them and together they experienced a shared state of toleration).

Table 15

Valenced Sequential States

Codes	Descriptions
Reciprocation	Perception of positive reciprocal or balanced social engagement, relating, open acknowledgment, and communication (verbal and nonverbal).
Toleration	Ambivalent social engagement, unbalanced, partial relating, reluctant acknowledgement. Not openly negative but not truly accepting.
Mismatched intentions/misaligned emotions	Clashing or divergent goals, misunderstanding or misinterpretation of actions, reactions, and motivations. Incongruence between one's own immediate emotional experience and another's.
Confusion	Inability to understand or interpret situations or sequences of events. Perceived incongruity between expectations and outcomes, puzzlement,

	inability to reflect upon or predict outcomes.
Ignoring	Acting as if a person were not present, had not spoken, did not act, or did not request action or interaction. Negative, ambivalent, or ambiguous lack of acknowledgement.
Rejection	Negative dismissiveness, shutting-down, and open disengagement. Offensive or defensive interaction intended to discourage further engagement.
Aggression/Pursued	Intimidating and openly aggressive interaction communicating ill intent. Unwanted negative approach or intrusion.

5.2.9.1 Reciprocation and toleration

When residents reached out positively and encountered a positive response from the resident being approached, they experienced a state of 'reciprocation'.

Thursday, 30/08, 17:04

'Philip': (Walks over to where 'Gerald' and 'Charlie' are seated at a dining table, makes eye contact, smiles and greets them as he takes a seat at the table with them) "Good evening gents. How are we this evening?"

'Gerald': (Smiles and nods in greeting.)

'Charlie': (Smiles and says) "Hello."

In the example above, Unit 1 resident 'Philip', who had moderate cognitive-functional impairment, reached out positively with politeness to greet his dining companions 'Gerald' and 'Charlie' both of whom had moderately severe dementia. The two seated men were approached positively with politeness and returned 'Philip's' greeting, they all experienced a state of 'reciprocation', and 'Philip' connected with the two men.

At times, approached residents appeared to respond with accepting ambivalence, and both residents experienced a state of 'toleration'. In the following example, staff placed Unit 1 resident 'Hattie' beside 'Madonna' in the TV lounge, with both women seated side-by-side in their wheelchairs. The women reached out and were approached positively for conversation, respectively, but 'Madonna' did not

reciprocate. They both experienced a state of 'toleration' and were tenuously connected.

Wednesday, 28/08, 15:33

'Madonna': (Is watching the DVD when [RAO] brings 'Hattie' over to sit next to her.)

'Hattie': (Is very happy and begins chatting away to 'Madonna' without making eye contact, gossiping about 'Florence' and how she was "talking nonsense".)

'Madonna': (Appears to listen with a furrowed brow, no smile, and does not appear pleased to be seated next to her new companion who continues to talk nonstop.)

5.2.9.2 Mismatched intentions, misaligned emotions, confusion

Differences in coresidents' individual cognitive capacity, memory, communication and language skills (linguistic diversity, aphasia), and sensory impairment (sight, hearing, taste, smell) contributed to their difficulty in interpreting the needs, intentions, and mood of others during interactions. These misinterpretations of others' needs, intentions, and mood led residents who reached out and were approached to experience 'mismatched intentions' and 'misaligned emotions'. These states contributed to 'confusion' when residents encountered behaviour that they had not expected during interactions. The following two excerpts illustrate interactions that involved Unit 1 residents who reached out and were approached with kindness and politeness and experienced states of 'mismatched intentions/misaligned emotions' and 'confusion'. However, the two interactions produced very different social experiences for the residents involved.

Friday, 26/10, 16:05

'Rose': (Smiles and says) "I'm happy to see you."

'Magda': (Stares at 'Rose' and shouts) "Why?"

'Rose': (Replies) "I don't know but your face is so pretty."

'Magda': (Replies) "What?"

'Rose': (Explains) "Your face."

'Magda': (Responds) "You like the face?!"

'Rose': (Asks) "What face?"

RAO [woman's name]: (Explains to 'Magda') "She said she thinks your face is pretty."

'Magda': (Smiles, flattered and tries to make a self-deprecating joke) "That's what I said. You like the face?"

'Rose': (Is flustered and replies impatiently) "This face? Her face? Faces are all the same. It doesn't matter!" (Leaves the room confused.)

'Magda': (Smiles at the RAO and chuckles good-naturedly.)

Thursday, 01/11, 10:00

'Keresi': (Approaches 'Vera', who is in a waterchair in the corridor. 'Keresi' smiles, makes eye contact and greets her) "How are you?"

'Vera': (Panics and yells) "Help me, help me, help me! Get away!"

'Keresi': (Says with annoyance) "You are alright. I'm not trying to hurt you." (Departs.)

'Vera': (Still reacting to her encounter with 'Keresi', calling out to the RN) "Nurse! Nurse! Save me! Help me! I don't want to die!"

In the two examples above, residents who could walk encountered mismatched intentions, misaligned emotions, and confusion. They concluded interactions by disengaging and physically distancing themselves from their interaction partners. Residents in wheelchairs or waterchairs who were placed in close proximity to one another experienced prolonged states of social misalignment and confusion in interactions and had greater difficulty disengaging. In the following example, DSU residents 'Janis' and 'Maggie' were positioned facing one another in close proximity. They reached out and were approached negatively, experienced prolonged states of mismatched intentions and confusion, and eventually ended their interaction in disconnection.

Tuesday, 02/10, 13:13

'Janis': (Stares at 'Maggie' off and on for 4 min then says to 'Maggie') 'No!'

'Maggie': (Responds) "Why 'No'? What 'No'? 'No' for ice cream? 'No' for lunch? 'No' for..."

'Janis': (Her face is contorted in what appears to be anger, her eyes are glazed as she stares ahead of her but she does not respond to 'Maggie'.)

'Maggie': (Furrows her brow, glares at 'Janis' and shouts) "Shut up!"

'Janis': (Shouts slowly) "Nooooooooo!"

'Maggie': (Stares at 'Janis' and after a few seconds says) "No, no, no."

'Janis': (Says) "Oh shut-up."

'Maggie': (Shouts back) "Oh shut-up yourself!"

'Janis': (Both residents rest for a moment then 'Janis' begins again with) "No, no, no."

'Maggie': (Shouts) "'No' what?!"

'Janis': (Replies slowly) "Choice."

'Maggie': (Responds) "What the hell 're you talking about?"

'Janis': (Replies) "No choice."

'Maggie': (Does not appear to understand and shouts) "Speak English!"

'Janis': (Repeats herself, purposefully drawing-out each syllable) "Nooo choooooiccceee."

(Both wait a few seconds.)

'Janis': (Begins, leaning forward in her chair, staring in front of her and slurring her words) "I like... I need... I like to write."

'Maggie': (Appears unable to tolerate the conversation, glares at 'Janis' and shouts) "Shut up!"

'Janis': (Continues) "Maybe... maybe... maybe."

'Maggie': (Screams) "Maybe' what!"

'Janis': (Continues) "Maybe he writes."

'Maggie': (Narrows her eyes, sighs in apparent frustration and turns away.)

5.2.9.3 Being ignored, rejection, aggression, and being pursued

Residents who reached out encountered more dismissive ambivalent responses and experienced states of being 'ignored'. In the following example, Unit 1 resident 'Isabella', who had severe dementia and aphasia, reached out positively for comfort and reassurance and but the coresident she approached 'ignored' her.

Wednesday, 31/10, 13:40

'Isabella': (Is seated in a chair in the corridor near the picture window.)

'Diane': (Approaches the window near 'Isabella'.)

'Isabella': (Calls out) "Eeyck!"

'Diane': (Ignores her and comments) "There's a car out there. And another one." (Turns to walk away.)

'Isabella': (Reaches out for her saying) "Eeyck!"

'Diane': (Purposefully ignores her and continues walking.)

Often, residents simply experienced 'rejection'. In this example, Unit 1 resident 'Truman' was approached positively by 'Sharon' who reached out for reassurance and comfort. The encounter led to a state of 'rejection' and ended in disconnection.

Wednesday, 24/10, 15:38

'Truman': (Walking down the corridor toward the lift.)

'Sharon': (Approaches him walking away from the lift. She stops and reaches toward 'Truman' as if for a hug.)

'Truman': (Looks at her blankly and says abruptly) "Yes?" (He looks toward the ceiling in disgust then continues walking down the corridor, with 'Sharon' following close behind. 'Truman' stops to speak to the observer.)

'Sharon': (Approaches, touches his shoulder and smiles.)

'Truman': (Rebukes her) "Do you mind? I'm talking here."

'Sharon': (Mumbles) "Oh, sorry." (Departs down the corridor.)

'Truman': (Looks toward 'Sharon' as she departs, says) "You should be." (Continues talking to the observer.)

Residents also experienced states of 'aggression' and being 'pursued'. These states typically occurred secondary to preceding states such as 'mismatched intentions' and 'confusion'. However, some residents who reached out and were approached negatively experienced an almost spontaneous state of 'aggression' or being 'pursued' as in the two interactions detailed below between Unit 1 residents 'Gerald' and 'Riccardo' and Unit 3 residents 'Rose' and 'Diane', respectively.

Tuesday, 21/08, 13:17

'Gerald': ('Gerald' is tall, strong, and can walk. He is sitting in an armchair at the back of the TV lounge.)

('Riccardo' is wheeled into the lounge and placed in front of 'Gerald' so that 'Gerald' can no longer see the TV.)

'Gerald': (Rises from his chair without his walking frame, stomps over to 'Riccardo's' wheelchair, narrows his eyes, and begins trying to move 'Riccardo' saying) "You're blocking my view of the TV!"

'Riccardo': (Reacts, slightly panicked.)

Volunteer [woman's name]: (Intervenes, checks to see that both are ok, asks 'Riccardo' if ok to move and assists.)

'Gerald': (Stares at 'Riccardo's' back with narrowed eyes.)

Wednesday, 24/10, 10:36

('Rose' is walking down the corridor and 'Diane' is walking the opposite direction toward her.)

'Diane': (Scowls, walks into the path of 'Rose' and blocks her progression saying)

"Where are you going?!"

'Rose': (Tries to avoid or go around her and 'Diane' blocks her every attempt, repeating) "Where are you going?!"

'Rose': (Frightened, says) "Why! What is happening?!"

AIN [man's name]: (Calmly intervenes and 'Rose' follows him down the corridor while 'Diane' continues in the opposite direction.)

Residents in the examples above clearly reached out and were approached negatively, experienced states of 'aggression', and were physically 'pursued'. However, in the RACF context, any type of unwanted social overture could potentially lead to experiencing a state of being 'pursued', particularly when residents could not remove themselves from the situation. The following excerpt illustrates a scenario between DSU residents 'Alessandro' and 'Michael' when they reached out and were approached positively yet one man experienced a state of being 'pursued'.

Friday, 05/10, 16:16

'Alessandro': (Is sitting in his usual chair right next to the TV.)

'Michael': (Has been placed in his waterchair near 'Alessandro' with his feet near 'Alessandro'. 'Michael' begins asking 'Alessandro' repeatedly to help him take his socks off) "The sock off me foot (repeats 5 times). Can ya' pull the sock off me foot (repeats 4 times)!"

'Alessandro': (Sits and stares straight ahead without responding.)

'Michael': (Pauses and appears to have a moment of insight into 'Alessandro's' condition. Lowering his voice, he says softly) "No ya' can't (repeats 4 times)."

'Alessandro': (Is still sitting near Michael next to the TV, silently staring straight ahead.)

'Michael': (Appears to have been watching and thinking about 'Alessandro' and suddenly tries to give him his own eyeglasses saying) "Take my glasses (repeats 4 times). Here mate. The glasses will work mate. Put my glasses on the board (repeats 8 times)."

'Alessandro': (Stares ahead and begins to rock quickly back and forth in his chair and calls out loudly and repeatedly.)

'Michael': (Stares at 'Alessandro' with a deeply furrowed brow, appearing distressed and shouting) "Here (repeats 4 times)! Here's my glasses, here's my glasses!"

In this example, 'Michael' reached out positively for practical support (help with his sock). His approach evolved as he interpreted 'Alessandro's' lack of capacity to assist and empathised with 'Alessandro's' situation. This led to 'Michael' reaching out with kindness to offer 'Alessandro' assistance (he thought 'Alessandro' could not see and offered him his own eyeglasses). However, the intensity of 'Michael's' overtures, the residents' physical proximity to one another, and 'Alessandro's' inability to communicate verbally or extricate himself from the situation led to 'Alessandro' experiencing a state of being 'pursued'.

5.3 Social interaction trajectories

Residents' interactions were viewed in their entirety as series of events and temporal states within a dyadic exchange (Kitwood, 1993), beginning and ending with each resident in one of two overarching social states, either social connection with their coresidents or social disconnection from their coresidents. The three main categories of actions and interactions observed to emerge from these states were termed 'social trajectories'. The term 'trajectory' was influenced by a definition used in Control theory, an interdisciplinary subfield originating in engineering and mathematics, that has been adapted and applied in neurophysiology, psychology, and sociology. Control theory deals with the behaviour of dynamic systems, including inputs, outputs, and how behaviour is modified by feedback (Mansell & Marken, 2015). Using this definition as a guide, a 'trajectory' is a time-ordered set of states with the residents moving toward an expected social goal with internal and external forces providing feedback that influences the path of their ongoing interactions.

Broken down into stages (Figure 9), residents' 'social interaction trajectories' constituted the following sequence of states and events: 1) the residents began in a state of connection or disconnection, 2) residents experienced internal and external 'catalysts' which prompted 3) a 'threshold event' that led to a state of 'Reaching out' or of being 'Approached' in an emotionally positive or negative manner, triggering 4) a sequence of events and associated emotionally valenced states, with 5) the interaction concluding in a socio-emotional outcome represented as the coresidents' 'social resting states' of connection or disconnection. The following example illustrates how this method was applied to interpret and code an interaction in which noises external to the immediate observable environment within the DSU interacted with internal individual factors to influence the interaction between residents seated together at a dining table.

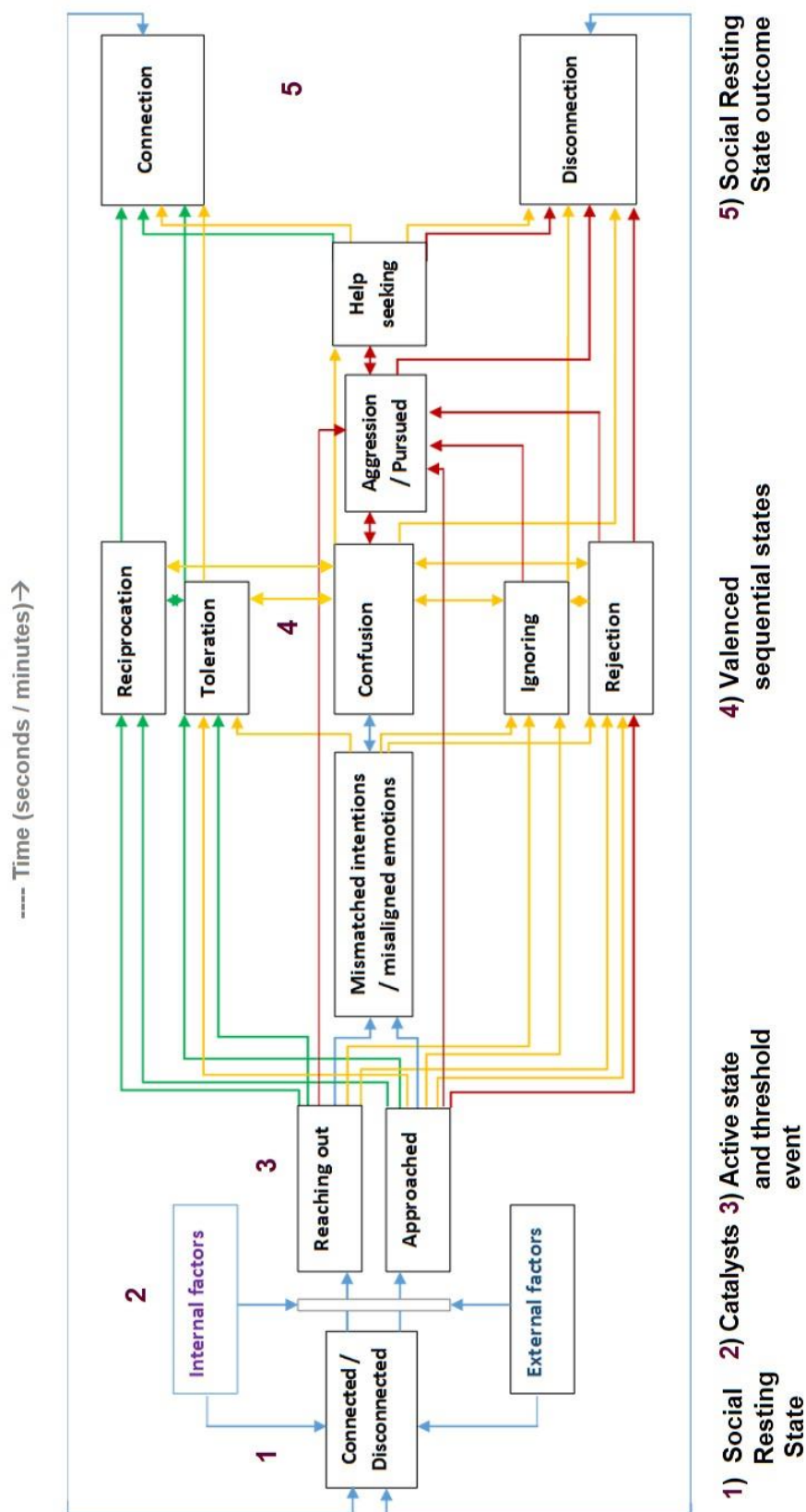


Figure 9. Interaction trajectories. Arrows indicate action direction and potential pathways between states. Line colour indicates potential socio-emotional valence of events and states for residents. Green = positive state. Yellow = ambivalent state. Red = negative state. Blue = varied.

Field notes and seating maps indicated that DSU residents 'Michael' and 'Lee' were seated at a dining table in the DSU TV/dining lounge near a large picture window. Two levels down in the outdoor courtyard below the window, stone masons used a special circular saw to cut stone to size while repairing damaged stonework around the courtyard and on the building façade. 'Michael' was seated in his waterchair with his head near the window. He became increasingly unsettled.

Tuesday, 09/10, 09:36

'Michael': (Appears worried, upset, makes eye contact with 'Lee' and asks loudly, almost accusatorially) "Do you have any work going? You'll be getting' money a' your own wouldn't ya?"

'Lee': (Smiles at 'Michael', who becomes frustrated by 'Lee's' response and repeats) "Oh Christ, oh Christ, oh Christ!" (Bangs the table with his open hand.)

'Lee': (Stares at 'Michael' but continues to smile, looking bemused by his behaviour.) ('Pearl' and 'Maggie', who are sitting in close proximity to one another in front of the TV, are bothered by 'Michael's' loud outburst from across the room.)

'Pearl': (Shouts at 'Michael') "Shut up!"

'Maggie': (Mistakenly thinking the comment was from 'Giovani' speaking to her, [tells] 'Giovani') "YOU shut up!"

AIN [man's name]: (Wheels another resident into the room.)

'Michael': (With eyebrows raised and mouth open, 'Michael' makes eye contact with AIN [man's name] and exclaims with frustration) "There's work outside!"

AIN [man's name]: (Did not hear 'Michael's' earlier comment...explains) "We can't go outside 'Michael'."

'Michael': (Appears almost panicked, saying) "We can't go outside?!"

AIN [man's name]: (Confirms) "No."

'Michael': (Looks away and says quietly in disbelief) "Oh Christ almighty!" (Suddenly turns to his tablemate 'Lee' and continues in the thread about having work) "You'll take the dole then?"

'Lee': (Shakes her head 'no'.)

'Michael': (Accuses) "Shakin' yer' head! Shakin' yer' head!" (Turns and addresses the observer) "They're all outside! No work to be had!"

'Michael' and 'Lee' began in a state of social disconnection. The start of the construction noise (external event), which was unexplained, unobserved, and out of context, appeared to interact with 'Michael's' past experiences, roles, and current

cognitive-functional capacity (internal variables) creating an unmet need for reassurance (internal variable) and together these variables acted as catalysts for the event of 'Michael' initiating conversation and his state of 'reaching out' to the nearest person in order to seek feedback. When 'Michael' did not receive a response consistent with his expectations, he experienced 'mismatched intentions/misaligned emotions' and 'confusion' leading to 'aggression'. 'Lee' was aphasic and having some insight into 'Michael's' behaviour and her own (internal variables), her response indicated a state of 'toleration'. The interaction between 'Michael' and 'Lee' concluded with 'Michael' in a social resting state of disconnection through rejecting 'Lee', and 'Lee' in a social resting state of disconnection through being rejected. The noise of their interaction became an external variable influencing 'Pearl' to begin a negative interaction with 'Michael' and for 'Maggie' to begin a negative interaction with 'Giovanni'. All interactions ended with residents in social resting states of disconnection through residents rejecting one another and being rejected.

Field notes indicated that the staff, busy with other work, attributed 'Michael's' unease to the volume of the noise rather than to any possible meaning and significance of the construction sounds to 'Michael'. Although staff were concerned by his apparent unease, and moved him further from the window, the construction sounds continued unabated and without receiving explanation or proper intervention, 'Michael's' unease over missing the "work outside" permeated his subsequent conversation and became visible distress. As the day progressed his social interactions with residents, staff, and visitors became more confrontational and aggressive, and he was eventually removed from the company of others and taken back to his room.

5.3.1 Social resting states

After applying the method above to interpret resident interactions, it appeared that although residents experienced global outcomes of social 'connection' or 'disconnection', they were also experiencing qualitatively different social resting states depending on the content of their interaction. For example, ending an interaction in a state of 'disconnection' would be experientially (qualitatively) different for someone if it followed a state of being ignored or excluded rather than if it followed a state of direct rejection or being repelled. The state of disconnection would also be qualitatively different for the person initiating the ignoring or rejecting, than for the person being ignored or rejected. After revisiting the transcripts and reviewing interaction trajectories, analyses suggested that residents experienced six unique 'connected social resting

states' (CSRS) and eight unique 'disconnected social resting states' (DSRS; Figure 10 and Table 16).

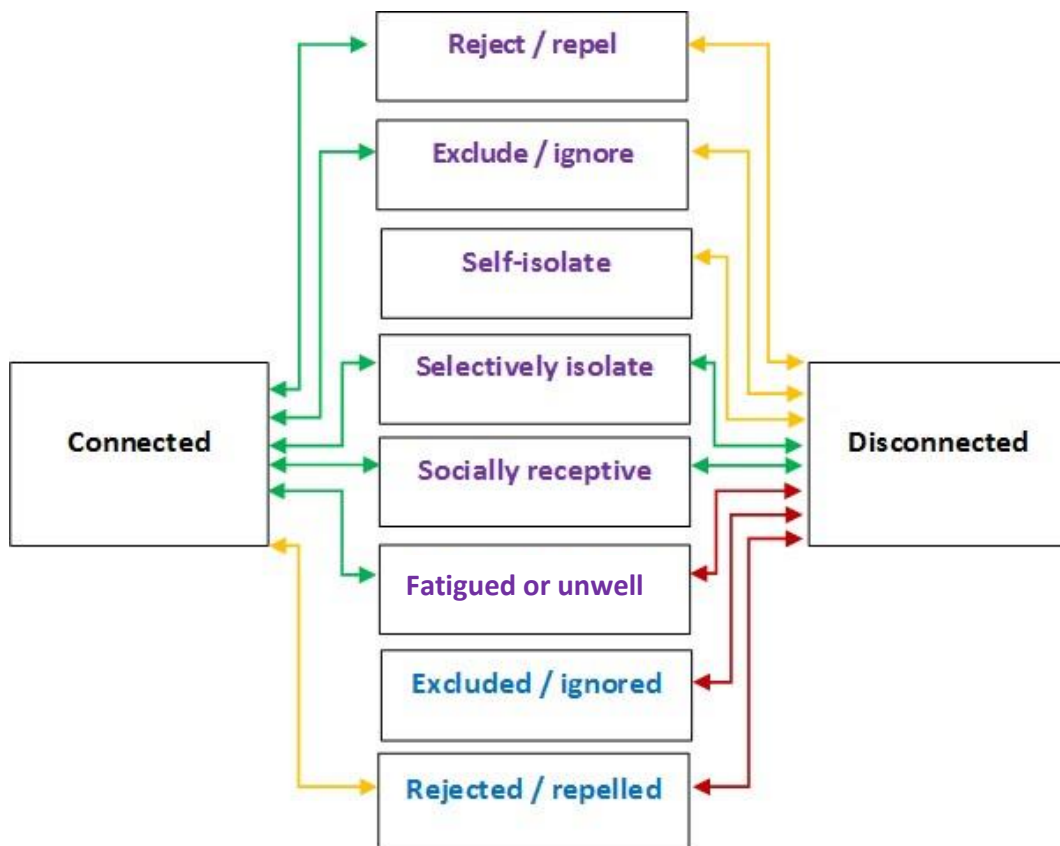


Figure 10. Social resting state categories and potential socio-emotional impact for residents. Arrows indicate direction of categories. Text colour indicates predominantly internal or external influences. Blue = external factors. Violet = internal factors. Line colour indicates potential socio-emotional valence of states for residents. Green = positive valence. Yellow = ambivalence. Red = negative valence.

5.3.1.1 Connected social resting states

Residents who experienced positive social connection and were open to interaction with others pre- or post-interaction were 'connected (and) socially receptive' (CSRS1; Table 16). In the following example, DSU resident 'Grace' approaches 'Giovani' during afternoon tea.

Monday 08/10 14:19

'Giovani': (Sitting on the sofa near the TV, eating his fruitcake.)

'Grace': (Approaches 'Giovani', makes eye contact, smiles, laughs, and eats her fruitcake.)

'Giovani': (Smiles up at 'Grace', speaks to her in [language], laughs, and eats his fruitcake.)

'Grace': (Eventually walks away, still content.)

(AIN [man's name] gives 'Giovani' a second slice of fruitcake.)

'Giovani': (Still sitting on the sofa near the TV, holding a slice of uneaten fruitcake.)

'Grace': (Again approaches 'Giovani' and they make eye contact.)

'Giovani': (Holds out his fruitcake and offers it to 'Grace'.)

'Grace': (Looks embarrassed and gently pushes the cake in his hand back toward him saying) "Now no, no, no."

'Giovani': (Persists and gives 'Grace' his fruitcake.)

'Grace': (Accepts it smiling and laughing and walks away happy.)

'Grace' reached out positively to 'Giovani' to share the enjoyment of eating the fruitcake, which was a special treat. 'Giovani' was approached positively and not only acknowledged 'Grace's' good will but also appeared to derive pleasure from 'Grace's' enjoyment of the experience and reciprocated by offering her his extra slice of fruitcake. Both 'Grace' and 'Giovani' ended their encounter 'connected and socially receptive'.

Residents who experienced positive social connection but who were selective in their social partners were 'connected selectively receptive' (CSRS2). Unit 1 resident 'Allen' was 'selectively receptive' in his interactions with others. He chose to spend each day in the common activity room, took all of his meals there, and spent the greatest part of each day alternating between sitting in his wheelchair watching programs on the large flat-screen TV and going outside to smoke. The following excerpt describes a typical interaction between 'Allen' and unit coresident 'Curtis'.
Tuesday 21/08 10:51

"'Curtis' has been placed in his wheelchair next to 'Allen' in the TV lounge. 'Curtis' begins a conversation with 'Allen' about the television program. 'Curtis' keeps the conversation going, with 'Allen' mostly responding with brief comments or sounds. They sit near one another in their wheelchairs, facing the TV, watching the program and only occasionally making eye contact. They talk about the weather, the TV program, and their children."

Field notes indicated that 'Allen' engaged with specific coresidents and did not avoid interactions. Yet he rarely reached out to others, except when he needed assistance. 'Curtis' identified 'Allen' as a friend. 'Allen' commented in his interview that he did not consider 'Curtis' a friend, saying that 'Curtis' was "...ok, but talks too much," and that he "...put up with him." 'Allen' identified one true friend, a man who wheeled 'Allen' outside to smoke each day. The two men did not share meals together or sit and talk together in the common room, but they were observed to talk together while smoking outside in the courtyard.

Occasionally, interactions resulted in complex socio-emotional outcomes, with one resident being 'connected' to another through aggression or, as illustrated in the next example, two residents connected to one another through 'excluding' (CSRS3) or 'bullying' a third resident (CSRS4). Field notes indicated that DSU residents 'Maggie' and 'Janis' (in waterchairs) and 'Ava' (in a wheelchair) were seated in close proximity to one another waiting for personal care during the pre-dinner care routine. 'Adam' was seated at a nearby dining table. Direct care staff were busy in other rooms assisting residents to change clothes and go to the toilet before dinner.

Thursday 04/10 14:13

'Ava': (Begins wailing.)

'Janis': (Snarls at 'Ava') "Be quiet. We're not interested."

'Maggie': (Furrows her brow and joins in, shouting at 'Ava') "Shut up!"

'Janis': (Concurs) "Yeah! Shut up. That's a good idea."

'Ava': (Ignores 'Maggie' and 'Janis' and continues to wail.)

'Maggie': (Shouts at 'Ava') "Shut up!"

'Ava': (Continues wailing.)

'Adam': (Is sitting nearby. Squinting his eyes, lowering his head and wincing at 'Ava's' wails, looks at her and loudly says) "SHHHHHH!"

'Ava': (Ceases for two minutes and then recommences wailing.)

'Janis': (Slurs) "You can stop. Nobody's interested."

'Maggie': (Shouts at 'Ava') "Shut up!"

'Ava' wailed to reach out for assistance or attention, to express unmet needs and possibly to express tension or frustration. 'Janis' was disturbed by 'Ava's' loud and persistent wailing, viewed it as 'complaining', and reached out negatively to reprimand and silence her. Frustrated, angry, and disturbed by the noise, 'Maggie' joined 'Janis' in trying to bully 'Ava' into silence. 'Adam' found the cacophony of wailing and shouting

painful and upsetting. He reached out negatively to reprimand 'Ava' and stop the noise. 'Ava' encountered rejection, aggression, and concluded in a state of disconnection. 'Janis' and 'Maggie' reached out negatively to reprimand and silence 'Ava' and to defend and support one another. Thus, 'Janis' and 'Maggie' connected with one another through bullying 'Ava'.

Illness, distress, or need could also promote connection with others through prompting altruistic attention and care (CSRS5). In the following excerpt, Unit 1 residents 'Myra', 'Roman', and 'Eleanor' were seated together in the dining room before lunch. 'Roman' was in need of personal care. 'Myra' had spent twenty minutes alternating between sitting and speaking with him in their first language and walking rapidly in and out of the dining room seeking assistance from an AIN who was busy helping other residents.

Thursday 23/08 11:29

'Eleanor': (Appears to understand that 'Myra' and 'Roman' are discussing AIN. Enters the discussion in English with quiet derogatory comments about AIN.)

'Myra': (Nods and gesticulates in agreement with 'Eleanor'.)

'Eleanor': (Makes eye contact and smiles at 'Roman' and 'Myra'. Asks if they are married.)

'Myra' and 'Roman': (Smile and nod 'Yes'.)

'Eleanor': (Commiserates with 'Myra' in English about the 'service'.) "It's terrible."

'Myra': (Nods in agreement.)

'Eleanor': (Reaches over and pats 'Roman's' hand.) "You'll be alright. Terrible when you have to wait like this." (She pauses then comments on the music CD that is playing) "Nice music." (Smiles.)

'Eleanor' did not understand the conversation between 'Myra' and 'Roman' and did not remember that they were married. However, she clearly understood their situation and empathised with their distress. 'Eleanor' reached out to offer support and comfort, aligned her emotions and intentions with theirs, and even attempted pleasant distractions by asking if they were married and diverting their focus to the music CD. 'Myra' and 'Roman' were approached positively, reciprocated, and their interaction with 'Eleanor' ended in a state of connection.

In complex interactions, residents could encounter altruistic overtures and experience connection after being rejected or repelled by a third resident (CSRS6). In this example, DSU residents 'Grace', 'Maggie', 'Janis', and 'Lee' navigate a circuitous

interaction sequence. Field notes indicate that 'Maggie' had tried to interact with 'Lee' over the course of the day without success and had vented her frustration by shouting at 'Lee' and also at 'Grace'. The three women were now seated in close proximity to one another, spending time with the RAO after finishing afternoon tea. Both 'Lee' and 'Grace' enjoyed cuddling baby dolls. The RAO had given 'Lee' a baby doll to hold.

Monday 08/10 15:04

'Grace': (Mumbles)

'Maggie': (Shouts at 'Grace', saying) "Shut up! Speak English!"

'Janis': (Makes eye contact with RAO and asks kindly) "Are you married?"

'Maggie': (Thinks the question is for her and responds) "I'm not married. No way!"

'Lee': (Smiles and shares her doll with 'Grace'.)

'Grace': (Smiles and smooths the doll's clothing.)

'Maggie' reached out negatively to silence and devalue 'Grace' and was distracted by 'Janis's' question. 'Lee' reached out to 'Grace' to show kindness by sharing the doll. 'Lee' showed insight, altruism, and support for 'Grace' by giving her something that would distract and comfort her. 'Grace' reciprocated by smiling and accepting her offering and the two ladies who had been bullied by 'Maggie' throughout the day experienced connection with one another.

5.3.1.2 Disconnected social resting states

Residents who were open to positive engagement with others but who were unable to reciprocate or establish connections were 'disconnected' while remaining 'socially receptive' (DSRS7). In the following example, DSU residents 'Irene', 'Maggie', and 'Emma' were all seated near one another during afternoon tea. They were sitting in silence, when 'Irene' suddenly spoke to 'Maggie':

Monday 08/10 14:19

'Irene': (Turns to 'Maggie' without making eye contact and says) "Now what can we do? There's a lady there that's English ['Emma']. I bet she'd like a song."

'Maggie': (Just stares at 'Irene'.)

'Irene' acknowledged 'Emma' and her cultural background (although 'Emma' later corrected that she was 'Welsh') and reached out to 'Maggie' to enlist her help in singing a song for 'Emma', thus also reaching out to show kindness to 'Emma'. However, 'Irene's' actions were not apropos in the moment and 'Maggie', who could

not sing, was left confused by 'Irene's' actions. 'Maggie', 'Irene', and 'Emma' did not ignore or reject one another but neither did they reciprocate and connect.

Some residents were disconnected by choice (Disconnected selectively isolating, DSRS8; Disconnected self-isolating, DSRS9). Whereas residents who were 'connected and selectively receptive' typically spent time in common areas and selectively interacted with others of their choosing, residents who were 'disconnected and selectively isolating' tended to remain in their rooms and emerge to interact with specific people.

For example, Unit 1 resident 'Ralph' spent most of his time in his room listening to 'talk radio', news, and sports broadcasts using a small radio and earphones. 'Ralph's' bedroom shared a common wall with the dining room. The door to the large TV/dining areas could be seen from his doorway. 'Ralph' left his room when his wife visited (they went outside to the front courtyard). On occasion he left his room to share a drink during a special structured activity in the common room, where he might have a chat with Unit 3 resident 'Percy'. 'Ralph' did not have a dementia diagnosis and he communicated easily with care staff. He had the choice and opportunity to leave his room with the help of staff or visitors. He chose to remain in his room. 'Ralph' commented anecdotally during his interview that he liked to keep up with current events, he had been listening to commentary on the US presidential election, and had "plenty to keep myself occupied". DSU resident 'Maritsa' and Unit 3 residents 'Klara' and 'Bethany' all similarly chose to stay in their bedrooms and read or watched television. All three women communicated easily with staff and visitors and could have requested to join their coresidents in common areas at any time. 'Maritsa' and 'Bethany' both explained during interviews that they preferred to watch TV in their rooms. 'Klara' had a roommate but explained in her interview that they did not get along and she did not "trust" others. 'Bethany' did not have a dementia diagnosis, was younger than other residents, and noted this "age gap" in her interview. 'Bethany' did not have a roommate, never left her room and did not allow visitors. She commented that, "Television can be company in and of itself."

Other residents were disconnected through circumstance (Disconnected fatigued or unwell, DSRS12). Daily diarised field notes described their absence of interactions, as in this example from one day's observations in the DSU.

Tuesday 02/10

"Jo": Recently returned from hospital. Spent most of the day in her room. Immobile in a waterchair."

“Pearl”: Spent almost the entire day in her waterchair, placed in front of the TV facing away from other residents. Pleasant but mainly perfunctory care interactions with staff.”

‘Jo’ was physically separated and disconnected from others due to her need for rest and recovery after her recent hospitalisation. ‘Pearl’s’ situation was quite different. ‘Pearl’ had muscle contracture, no sitting posture, and had difficulty moving her head to make eye contact. She was fatigued and experienced profound physical impairment. However, ‘Pearl’s’ comments in her interview indicated that she had insight and was aware of her own circumstances and of the people around her. ‘Pearl’ was disconnected by medical circumstance but she was also socially excluded and ignored in the company of others. ‘Pearl’ was both literally and figuratively placed on the periphery of the social group by care staff and coresidents.

Residents who experienced negative outcomes of interactions were disconnected due to being ‘ignored/excluded’ (DSRS13) or ‘rejected’ (DSRS14) by their coresidents or by choosing themselves to ‘ignore’ (DSRS10) or ‘reject’ (DSRS11) them. In the following example, DSU resident ‘Alessandro’, who had not been observed to walk unassisted prior to this interaction, suddenly rose from his seat in the common TV/dining room and shuffled calmly and slowly toward the table where coresidents ‘Michael’, ‘Lee’, and ‘Adam’ were arguing.

Thursday, 11/10, 09:36

‘Alessandro’: (Rises from his chair, walks across the room to the window table and attempts to comfort ‘Lee’, patting her gently on the arm and nodding as if to say ‘there, there’.)

‘Lee’: (Looks up, stunned.)

‘Adam’: (Looks up defensively and shouts) “What do you want!”

‘Alessandro’: (Backs away nodding and holding his hands in the air as if to reassure and say ‘Ok, ok’. Walks around the table toward ‘Michael’.)

‘Michael’: (Stares at ‘Alessandro’ horrified as if he’s seen a ghost and shouts) “Get away, get away, get away, get away!”

‘Alessandro’: (Sighs. Approaches the observer, sits down in the chair next to her, makes eye contact with her, begins gesticulating and speaking in [language], takes and holds her hand and hugs her.)

Observer and visitor [‘Giovani’s wife’]: (Look at one another across the room, gobsmacked.)

Visitor ['Giovani's wife']: (Begins to listen to what 'Alessandro' is saying, looks sad and comments) "Poor man."

Observer: (Looks to visitor ['Giovani's wife'] who translates for her.)

Visitor ['Giovani's wife']: "He says, 'I don't understand nothing. I don't know what's going on. I don't understand what I see and hear. I don't understand nothing.'"

'Alessandro': (After visitor ['Giovani's wife'] finishes translating, looks directly at the observer and nods, shrugs his shoulders, squeezes the observer's hand and looks away.)

In this complex interaction, 'Alessandro' reached out positively to help and reassure or comfort his female coresident 'Lee' and to diffuse the argument between everyone seated at the table. Although 'Alessandro' approached with noble intentions, his efforts were not appreciated. He encountered mismatched intentions and misaligned emotions and confusion with all three of his coresidents who appeared to feel shocked, angered, and threatened by his approach. 'Michael' and 'Adam' rejected and repelled 'Alessandro' with aggression. Their interaction ended in disconnected social resting states, with those seated at the table disconnected through rejecting 'Alessandro' (DSRS11), and 'Alessandro' in a state of disconnection through being rejected (DSRS14).

'Alessandro' ended his social encounter with coresidents in a negative socio-emotional state. Having been rejected and repelled by the people he was trying to help, 'Alessandro' sought comfort and reassurance by reaching out positively to non-residents. He encountered reciprocity that aligned with his intentions and emotions and connected with the observer and visitor. However, his simple yet profound statement clearly indicated that he experienced lingering negative socio-emotional repercussions from his encounter with coresidents.

Table 16

Social Resting States

Codes	Definition
Connected socially receptive (CSRS1)	Open to positive interaction with others pre- and post-interaction.
Connected selectively isolating (CSRS2)	Open to positive interaction with select others only.

Connected excluding/ignoring (CSRS3)	Engaging positively with another resident through excluding a third resident.
Connected rejecting/repelling (CSRS4)	Engaging positively with another resident through rejecting a third resident.
Connected fatigued/unwell (CSRS5)	Receiving positive attention and care due to ill-health or need.
Connected rejected/repelled (CSRS6)	Receiving positive engagement from one resident through being rejected or repelled by a third resident.
Disconnected socially receptive (DSRS7)	Disconnected but appearing neither to seek nor to avoid interactions with others.
Disconnected selectively isolating (DSRS8)	Purposefully distancing themselves physically but open to interaction with select others.
Disconnected self-isolating (DSRS9)	Actively avoiding interactions with coresidents by remaining in bedroom, disengaging and withdrawing from others.
Disconnected excluding/ignoring (DSRS10)	Purposefully excluding or ignoring specific others to distance and disengage from them.
Disconnected rejecting/repelling (DSRS11)	Rejecting or repelling others through non-aggressive or aggressive action.
Disconnected fatigued/unwell (DSRS12)	Disengaged and isolated from others due to physical discomfort and need for rest. Remaining in bedroom or at a distance from others through choice or staff placement.
Disconnected excluded/ignored (DSRS13)	Isolated from others by others; excluded, not engaged, avoided or ignored as if not present.
Disconnected rejected/repelled (DSRS14)	Rejected and repelled by others through their non-aggressive or aggressive action.

5.3.2 Summary—qualitative results from analyses of observational field notes

Residents commenced interactions from a 'resting state' of social 'disconnection' or 'connection' from others. As few residents were 'connected' in close ongoing relationships (spouses, close friends), most interactions began with the resident in a state of 'disconnection'. Residents were disconnected either by choice (disconnected—self-initiated), by circumstance (disconnected—fatigued, unwell), or by social exclusion (disconnected—socially isolated). From these initial states, residents participated in one of four social pathways with coresidents: continued 'connection' or 'disconnection', 'reaching out' to connect with others, or being 'approached' by others wishing to connect. Residents 'reaching-out' encountered a range of responses from coresidents, leading to variable interaction trajectories and resulting in either social 'connection' through reciprocity, tolerance, and ambiguity, or in 'disconnection' through confusion, aggression, and rejection.

Residents' actions and interactions were influenced by internal factors (personal attributes: individual psychosocial needs, capacities, beliefs, emotions) and external factors (environmental context: staff, visitors, care routines, physical environment). Observations of resident interactions suggested that residents made social choices in the moment and over time. Observations further suggested that the immediate 'trajectories' of social encounters were influenced by previous social encounters and by the broader social context in which residents lived.

The impact of social resting states of 'disconnection' on residents depended on whether disconnection was a state of choice, circumstance, or exclusion. Residents who were disconnected by choice exercised more autonomy and selectivity in deciding where and with whom they wished to interact. These residents preferred disconnection to connection and appeared to experience negative impact in the presence of their unit coresidents. Choosing to remain apart meant that they kept control of their lives in some way.

5.4 Quantitative description

Five-hundred and eighty-two interactions involving residents consented to interviews ($n = 36$, including 27 residents with dementia) and their coresidents ($n = 55$) were recorded in field notes across 213 hours of observations and 31.1 % of these interactions ($n = 181$) involved two focal residents. Just over 97% of interactions ($n = 567$, 97.4%) involved at least one resident with a dementia diagnosis and 25.8% ($n =$

150) occurred between two focal residents with dementia. The number of interactions per resident with dementia ranged from '1' to '156' ($MDN = 23$, $IQR = 5-30$). Although the total time that residents spent interacting with their coresidents ranged from ≤ 1 minute to 278 minutes ($MDN = 25$, $IQR = 5-73$), most interactions were brief ($MDN = 1$, $IQR = 1-1$, $Range = 1-41$) with 82.1% of interactions lasting ≤ 1 minute. Twelve residents did not interact with other residents in common areas on at least three out of ten weekdays and three residents were not seen to have interacted with any coresident during observations.

5.4.1 Time-activity contexts and interactions

The highest number of coresident interactions occurred during unstructured time post morning tea ($n = 86$, 14.8%) and unstructured time post afternoon tea ($n = 143$, 24.6%), with most of these interactions involving focal residents with dementia ($n = 82$, 95.3% and $n = 142$, 99.3%, respectively). More residents with dementia interacted with higher frequency after morning tea ($n = 17$, 63%; $MDN = 2$, $IQR = 0-7$) and post-afternoon tea ($n = 18$, 66.7%; $MDN = 2$, $IQR = 0-10$) than during other daytime activity contexts. Supplementary field notes suggest that these times coincided with points in the care routine when fewer staff were in common areas. Staff absences during these times were due to care staff taking scheduled breaks and helping individual residents in their rooms in the morning, or attending hand-over briefings in the afternoon.

The fewest number of interactions occurred during unstructured time before morning tea ($n = 18$, 3.1%) and during staff-facilitated structured social activities in the morning ($n = 16$, 2.7%), with a slightly smaller percentage of these interactions involving focal residents with dementia ($n = 16$, 2.7% and $n = 15$, 2.6% respectively). This also meant that less residents with dementia ($n = 9$, 33.3%) interacted, and at the lowest frequency ($MDN = 0$, $IQR = 0-1$), before morning tea and during staff-facilitated structured social activities in the morning ($n = 7$, 25.9%; $MDN = 0$, $IQR = 0-1$) than during other daytime time-activity contexts. The majority of residents with dementia ($n = 14$, 51.9%) interacted more frequently ($MDN = 2$, $IQR = 0-3$) during staff-facilitated structured social activities that took place in the afternoon. Although field notes indicated that staff-facilitated activities often included special food (party snacks) or morning or afternoon tea as part of the activity, residents with dementia were observed to interact with one another more frequently during standard morning tea ($n = 19$, 70.4%; $MDN = 1$, $IQR = 0-3$) than during staff-facilitated social activities in the morning.

5.4.2 Positive 'reaching-out' and 'approached'

The majority of interactions involving at least one focal resident ($n = 371$, 63.7%) began with residents 'reaching out' ($n = 288$) and being 'approached' ($n = 196$) in a positive manner rather than in a negative manner. In two cases when residents were observed walking together without a clear initiator, each resident was rated as 'reaching out' positively. Residents with dementia were involved in all but one ($n = 370$) of the interactions that began positively. Of the 27 focal residents with dementia, 18 (66.7%) initiated interactions with coresidents by 'reaching out' positively ($MDN = 7.5$, $IQR = 5-18.5$) and 22 (81.5%) were 'approached' positively ($MDN = 7.5$, $IQR = 2-11.5$).

When residents with dementia reached out to coresidents ($n = 265$), they did so for conversation ($n = 111$, 41.9%), through polite greetings or showing kindness ($n = 53$, 20%), and to seek attention in the form of minor assistance and reassurance ($n = 50$, 18.9%). They reached out less often through attempts at practical assistance ($n = 32$, 12.1%) and infrequently for enjoyment and fun ($n = 18$, 6.8%). Residents with dementia were approached in a positive manner ($n = 178$), most often for conversation ($n = 80$, 44.9%), through polite or kind gestures ($n = 46$, 25.8%), for reassurance or assistance with obtaining attention to unmet needs ($n = 20$, 11.2%), and through attempts of others to provide practical assistance such as clearing dishes ($n = 23$, 12.9%). Residents were rarely approached to share enjoyment ($n = 6$, 3.4%) or to have someone defend them against harm ($n = 3$, 1.7%).

In the few interactions where residents without dementia reached out positively to coresidents ($n = 21$), they did so to offer polite greetings or to show kindness ($n = 14$, 66.7%), and only rarely to initiate conversation ($n = 6$, 28.6%) or share enjoyment ($n = 1$, 4.8%). They were approached in a positive manner ($n = 18$) most often through polite greetings or acts of kindness ($n = 10$, 55.6%), rarely for conversation ($n = 4$, 22.2%), and even less often for assistance and reassurance ($n = 2$, 11.1%) or to share enjoyment ($n = 2$, 11.1%).

5.4.3 Negative 'reaching-out' and 'approached'

Just over thirty-six percent (36.3%) of interactions involving at least one focal resident ($n = 211$) began with residents reaching out ($n = 127$) and being approached ($n = 152$) in a negative manner. Fifteen residents with dementia (55.6%) reached out to coresidents in a negative manner ($n = 123$, $MDN = 5$, $IQR = 2-7$) and 20 residents (74.1%) were approached negatively ($n = 149$, $MDN = 2$, $IQR = 1-15.8$). Residents

with dementia most often reached out negatively to coresidents to verbally abuse ($n = 42$, 34.1%) and reprimand ($n = 44$, 35.8%). They reached out negatively less often to intrude into coresidents' personal space or through 'boundary crossing' ($n = 26$, 21.1%) or to devalue others ($n = 8$, 6.5%). Residents rarely reached out to engage in direct physical violence ($n = 3$, 2.4%). Residents were most often approached negatively through being reprimanded ($n = 67$, 45%), verbally abused ($n = 34$, 22.8%), having their personal space breached through 'boundary-crossing' ($n = 23$, 15.4%) and through being devalued ($n = 17$, 11.4%). Residents rarely encountered direct physical violence ($n = 8$, 5.4%). Residents without dementia rarely reached out negatively and when they did, only to reprimand coresidents ($n = 4$). They were approached negatively through reprimanding ($n = 2$) and devaluing ($n = 1$).

5.4.4 Sequential states

Resident interactions were analysed for the presence of sequential states that occurred subsequent to reaching out and being approached. As most interactions were brief, sequential states typically occurred once during an interaction. Complex, prolonged interactions created opportunity for residents to experience these states multiple times before concluding an interaction. For the purposes of these analyses, interactions were coded for the presence of a state within an interaction rather than for the total number of times that residents may have experienced each state across the duration of an interaction. For example, a person who reached out positively to a receptive partner may have encountered several actions that indicated reciprocity during a single interaction. However, only the presence of 'reciprocity' would be coded for the interaction and not the number of actions that indicated reciprocity.

5.4.4.1 Positive beginnings

Positive beginnings (reaching out or being approached positively) led to a positive experience through 'reciprocity' ($n = 224$, 46.3%) and to a more ambivalent experience through 'toleration' ($n = 150$, 31%). Residents with dementia who reached out positively experienced 'reciprocity' in 43% ($n = 114$) of their interactions and 'toleration' in 16.9% ($n = 45$) of interactions, while those who were approached positively experienced 'reciprocity' in 42.7% ($n = 76$) of their interactions and 'toleration' in 12.4% ($n = 22$). Over a third of the time, residents with dementia experienced mismatched intentions or misaligned emotions when reaching out ($n = 96$, 36.2%) and being approached ($n = 67$, 38.4%) positively. Residents frequently experienced 'confusion' in response to reaching-out ($n = 128$, 48.3%) and being approached ($n =$

68, 38.2%), much of which appeared subsequent to mismatched intention/misaligned emotions ($n = 79$, 61.7% and $n = 57$, 83.8% respectively).

Positive beginnings also led to negative responses for residents through ignoring, rejection, and aggression ($n = 183$, 37.8%). Residents with dementia were involved in each of these instances, and those who reached out positively ($n = 265$) were ignored in nearly 20% of all instances ($n = 49$, 18.5%), experienced rejection in nearly 10% ($n = 26$, 9.8%), and encountered aggression in 15.2% ($n = 36$) of interactions. Residents who were approached positively ($n = 178$) ignored their coresidents in 20.2% ($n = 36$) of interactions, rejected them in 7.3% ($n = 13$), and responded aggressively in 12.9% ($n = 23$). Two residents with dementia, one reaching out and one being approached, sought help from staff during an interaction that began positively.

5.4.4.2 Negative beginnings

Residents with dementia who reached out ($n = 123$) or were approached ($n = 149$) negatively experienced 'mismatched intentions/misaligned emotions' (reached out, $n = 86$, 70.3%; approached, $n = 114$, 74.3%) and 'confusion' ($n = 90$, 73.2% and $n = 117$, 78.5%, respectively). Residents who reached out and were approached negatively predominantly experienced 'confusion' subsequent to 'mismatched intentions/misaligned emotions' ($n = 77$, 85.6% and $n = 105$, 89.7%). Those who reached out negatively were ignored by their coresidents in 5.7% ($n = 7$) of interactions, experienced rejection in 12.2% ($n = 15$), and aggression in 76.4% ($n = 94$). Those who were approached negatively ignored their coresident in 5.4% ($n = 8$), rejected them in 24.8% ($n = 37$), and were aggressive toward them in 57.7% ($n = 86$) of interactions. Negative beginnings rarely led to residents encountering ambivalence through 'toleration' (reached out, $n = 6$, 4.9%; approached, $n = 8$, 5.4%). A few residents encountered 'positive' reciprocity ($n = 5$, 4.1% and $n = 2$, 1.3%, respectively) when the person who was approached negatively appeared to enjoy the negativity (i.e. found the other person's aggression amusing or exciting). Only four residents, three who reached out and one who was approached, sought help from staff during an interaction that began negatively.

5.4.4.3 Connection, disconnection, and social resting states

Nearly a third ($n = 190$, 32.6%) of social interaction trajectories concluded with residents in a state of social connection, while the remaining two-thirds ($n = 392$, 67.4%) concluded with residents in a state of social disconnection. One interaction in which partners were observed to interpret different outcomes (one 'connected', one

‘disconnected’) was categorised as concluding in ‘disconnection’. Nearly 93.2% ($n = 177$) of connections and all but one ($n = 391$, 99.7%) interaction ending in disconnection involved interviewed residents with dementia.

The largest percentage of interactions ending in social connection concluded with residents in a ‘connected and socially receptive’ state ($n = 185$, 97.4%). Residents with dementia were involved in 93% ($n = 172$) of these interactions. In a small number of interactions ($n = 5$, 2.6%), one resident in the interaction appeared to connect with a third person, with whom they were not interacting directly, through rejecting (‘connected rejecting’, $n = 4$, 2.1%) and ignoring (‘connected ignoring’, $n = 1$, 0.5%) their direct interaction partners.

Roughly one in six ($n = 66$, 16.8%) interactions concluded without a ‘negative’ ending but also without connection, leaving residents ($n = 78$) in a ‘disconnected (yet) socially receptive’ state (undisturbed and receptive to further interaction). All of these interactions involved residents with dementia. In the largest percentage of interactions ending in social disconnection ($n = 326$, 83.2%), residents were rejecting ($n = 153$, 39%) and being rejected ($n = 180$, 45.9%), or ignoring ($n = 57$, 14.5%) and being ignored ($n = 38$, 9.7%). Residents with dementia participated in all interactions that ended in ignoring partners, and all but one that ended in being ignored. They were also involved in nearly half of interactions that ended in rejecting ($n = 73$, 47.8%) and being rejected ($n = 68$, 37.8%).

5.4.5 Interaction trajectories: beginnings and conclusions

5.4.5.1 ‘Reaching out’ and being ‘approached’ positively

Less than half of all interactions that began with residents reaching out positively ended with those residents in a ‘connected socially receptive’ state ($n = 130$, 49.1%), including a smaller percentage for those initiated by residents with dementia ($n = 113$, 42.6%). Just under a fifth of interactions that began with reaching out positively ($n = 56$, 19.4%) ended with residents ‘disconnected socially receptive’. In 7.3% of interactions ($n = 21$) residents (all with dementia) ended their interactions in disconnection by ignoring (‘disconnected ignoring’ $n = 3$, 1%) or rejecting (‘disconnected rejecting’ $n = 18$, 6.3%) the person that they had initially reached out to. In more than a quarter of interactions ($n = 75$, 26%) the person who reached out was ignored (‘disconnected ignored’ $n = 36$, one person without dementia) or rejected (‘disconnected rejected’ $n = 39$, one person without dementia).

Over fifty percent of interactions that began with residents being approached positively ended with those residents ‘connected socially receptive’ ($n = 103$, 52.6%)

and 3.8% with residents 'disconnected socially receptive' ($n = 11$, all with dementia). In nearly 40% of interactions, residents ignored ($n = 40$, 20.4%, all residents with dementia) or rejected ($n = 34$, 17.3%, one resident without dementia) the person who approached them positively. In six interactions (3.1%) the person who was approached positively was eventually rejected.

5.4.5.2 'Reaching out' and being 'approached' negatively

Residents who reached out negatively rarely went on to ignore ($n = 4$, 3.1%) their partners. They most frequently carried on to reject ($n = 83$, 65.4%, four without dementia) or be rejected by ($n = 25$, 16.4%) their partners. Most residents who were approached negatively either rejected their partner ($n = 21$, 13.8%) or were eventually rejected by them ($n = 111$, 73%, three without dementia). Few residents who were approached negatively disconnected through ignoring the resident who approached them ($n = 9$, 5.9%). Five interactions that began with residents with dementia reaching-out ($n = 5$, 3.9%) or being approached negatively ($n = 4$, 2.6%) ended with those residents 'connected socially receptive', while seven interactions ended with residents 'disconnected socially receptive' ($n = 4$, 3.1% and $n = 5$, 3.3%, respectively). Three interactions that began with residents reaching out ($n = 2$, 1.6%) or being approached negatively ($n = 1$, 0.7%) ended with residents connecting indirectly with a third resident through rejecting their direct interaction partner ('connected rejecting').

5.4.6 Confusion, mismatched intentions/misaligned emotions, and disconnection

Approximately half of interactions that began positively, and roughly 85% of interactions that began negatively, ended in disconnection. Data were analysed to determine the percentage of time that states of confusion and mismatched intentions or misaligned emotions occurred in interactions prior to those interactions ending in disconnection.

5.4.6.1 'Reaching out' and being 'approached' positively and disconnection

In fourteen instances (4.9%), residents who reached out positively experienced confusion during their interaction and concluded in a disconnected state, having been ignored by their interaction partner. In just over half of these interactions ($n = 8$, 57.1%), the confusion followed the experience of mismatched intentions and misaligned emotions for both residents and did not lead to aggression. In thirty instances (10.4%), residents who reached out positively encountered confusion and

concluded in a disconnected state rejected by their partner. In over ninety percent of these interactions ($n = 28$, 93.3%), the confusion followed mismatched intentions or misaligned emotions and led to aggression 43.3% ($n = 13$) of the time.

In fourteen interactions (7.1%), residents who were approached positively experienced confusion and disconnected from their partner by ignoring them. These interactions involved mismatched intentions or misaligned emotions in 64.3% ($n = 9$) of all cases but this experience and its subsequent confusion did not lead to aggression. Nearly twice the number of interactions ($n = 32$) that involved residents both being approached positively and experiencing confusion concluded with the resident rejecting their partner and disconnecting. All but one of these interactions ($n = 31$, 96.9%) involved mismatched intentions or misaligned emotions, and over half the time ($n = 18$, 56.3%) this led to either verbal ($n = 15$, 46.9%) or physical ($n = 3$, 9.4%) aggression. In six interactions (3.1%), residents who were approached positively experienced 'confusion' and concluded in a disconnected state having been rejected by their partner. 'Confusion' was subsequent to 'mismatched intentions/misaligned emotions' in all but one of these cases and led to aggression in all but two cases. No resident was approached positively, experienced confusion, and was subsequently ignored by their partner.

5.4.6.2 'Reaching-out' and being 'approached' negatively and disconnection

Residents who reached out negatively encountered confusion and rejected their partners in 61 interactions (48%). Over 90% of these interactions ($n = 56$, 91.8%) involved mismatched intentions or misaligned emotions and over 75% ($n = 46$, 75.4%) led to verbal ($n = 44$, 72.1%) and physical ($n = 2$, 3.3%) aggression.

Residents were approached negatively and eventually rejected in ninety interactions (70.9%). Ninety percent of these interactions ($n = 81$) involved mismatched intentions or misaligned emotions and over half of the time ($n = 51$, 56.7%), either verbal ($n = 45$, 50%) or physical ($n = 6$, 6.7%) aggression was experienced as well. Residents were approached negatively, experienced confusion, and disconnected through ignoring their partner in only eight instances (5.3%), all involving mismatched intentions or misaligned emotions. Twice as often ($n = 16$), residents who were approached negatively experienced confusion and disconnected by rejecting their partner, with all but one of these encounters involving mismatched intentions or misaligned emotions leading to aggression ($n = 15$, 93.8%).

5.4.7 Interactions during structured social activities

Sixty-three of the observed interactions occurred during structured social activities (10.8%), 16 during morning activities (2.7%), and 47 during afternoon activities (8.1%). Five interactions that took place during morning structured social activities (31.3%) involved residents reaching out positively, encountering reciprocity, and concluding in connected and socially receptive states. In four of these instances (25%), the residents who reached out shared play or enjoyment and in one instance the resident acted politely (6.3%). Three of the five interactions occurred between residents in the DSU with staff present and facilitating. Fourteen interactions that occurred during afternoon structured social activities (29.8%) involved residents reaching out or being approached positively, encountering reciprocity, and emerging in a connected socially receptive state. Most interactions ($n = 10$, 71.4%) occurred in Unit 1 between coresidents from that unit. Two interactions were initiated by a DSU resident who attended an activity and interacted with a Unit 1 resident within that unit, and two interactions occurred between residents within the DSU. Staff were present during all but one of the interactions and facilitated less than half of the time ($n = 6$, 42.9%).

Six interactions that occurred during morning activities (37.5%) concluded with residents in a disconnected social state. The interactions had both positive ($n = 4$, 25%) and negative beginnings ($n = 2$, 12.5%). Staff and/or visiting therapists were present for all of these interactions and facilitated in two of the interactions. Residents in the facilitated interactions disconnected while remaining socially receptive and they either ignored or were ignored by their partner. Nearly sixty percent of interactions that occurred during afternoon activities ($n = 28$, 59.6%) concluded with residents in a disconnected state. Sixteen of these interactions (57.1%) took place in Unit 1 between residents of that unit and twelve interactions (42.9%) took place between DSU residents within their unit. Most interaction trajectories included either intrusion into personal space ('boundary crossing', $n = 3$, 10.7%) or verbal ($n = 18$, 64.3%) and physical aggression ($n = 2$, 7.1%). Staff were present during 82.1% ($n = 23$) of interactions, including 86.4% ($n = 19$) of aggressive incidents, and attempted to intervene in these instances 17.4% ($n = 4$) of the time, including the two incidents of physical aggression which took place in Unit 1.

5.5 Residents with dementia

Seventy-five percent of residents who consented to interviews ($n = 27$) had a dementia diagnosis, with all experiencing moderate to severe cognitive-functional impairment as indicated by their ratings on the Global Deterioration Scale staging instrument (Chapter 4 Results and Discussion—Part 1, Table 2). Ratios of positive to negative interactions were analysed and correlations between chart, interview, or standardised assessment data and the observed interaction variables were explored in order to better understand the social experience of the residents and the possible associations between residents' perceptions and personal attributes and their enactment of social relationships with coresidents.

5.5.1 Ratios of positive to negative interactions

Overall, the ratio of median number of interactions that began positively to interactions that began negatively was 1.6:1 for dementia residents ($n = 22$). When results were grouped by care unit, the ratio for Unit 1 residents with dementia ($n = 9$) was 5:1, the ratio for DSU residents ($n = 8$) was 0.73:1, and the ratio for Unit 3 residents ($n = 5$) was 1:1.

The overall ratio of median number of interactions observed ending in connection to those ending in disconnection was 0.33:1 for dementia residents ($n = 20$). Grouped by care unit, the ratio for Unit 1 residents ($n = 9$) was 1.9:1, the ratio for DSU residents ($n = 8$) was 0.20:1, and the ratio for Unit 3 residents ($n = 3$) was 0:1.

5.5.2 Correlations between chart and interview data and observed variables

5.5.2.1 Functional ability and interaction variables

Spearman's Rank Order correlations were used to investigate possible associations between residents' ability in vision, hearing, speech, and the number of interactions involving positive and negative 'reaching-out' or 'approached' states. No significant correlations were found between residents' vision and speech status and interaction variables. There was a significant moderate positive correlation between better hearing and the total number of interactions that residents were observed to have had with coresidents ($\rho = .56$, $p = .002$). Better hearing was significantly associated with residents reaching out ($\rho = .43$, $p = .024$) and being approached

positively ($\rho = .42, p = .031$), and reaching out ($\rho = .46, p = .016$) and being approached negatively ($\rho = .43, p = .027$).

Further tests exploring correlations between the same communication variables and sequential states experienced by residents during interactions (i.e. mismatched intentions/misaligned emotions, confusion, toleration) indicated significant weak-to-strong correlations between better hearing and mismatched intentions/misaligned emotions ($\rho = .58, p = .001$), confusion ($\rho = .53, p = .004$), toleration ($\rho = .42, p = .03$), ignoring ($\rho = .36, p = .047$), rejection ($\rho = .43, p = .026$), and aggression ($\rho = .51, p = .007$). Correlations between better hearing and reciprocity showed a similar trend, but did not reach significance ($\rho = .36, p = .062$).

There was a significant moderate positive correlation between better hearing and the total interaction duration in minutes ($\rho = .43, p = .024$). Results indicated moderate-to-strong positive correlations between better hearing and ending interactions in a disconnected social resting state category ($\rho = .56, p = .002$). Residents with better hearing ended more interactions 'disconnected but socially receptive' ($\rho = .45, p = .017$) or disconnected by being rejected ($\rho = .42, p = .030$).

5.5.2.2 Ability in activities of daily living and interaction variables

Results indicated moderate significant correlations between Barthel Index total scores and the number of times that residents reached out positively ($\rho = .44, p = .020$). Residents who were more independent in activities of daily living (higher Barthel Index total score) reached out positively to coresidents more often than their coresidents who were less independent. Higher Barthel Index scores were moderately correlated with experiencing reciprocity during interactions ($\rho = .47, p = .014$) and with concluding social interactions in a connected social resting state ($\rho = .43, p = .026$).

Exploratory analyses of interaction sub-categories and individual Barthel Index items suggested associations between reaching out positively with kindness/politeness and better continence ($\rho = .43, p = .025$), better ability to transfer from sitting to standing ($\rho = .69, p = .000$), and greater mobility ($\rho = .48, p = .012$). Residents with greater mobility were also approached with kindness/politeness more often ($\rho = .49, p = .009$) than less mobile residents. Residents who had fewer continence issues experienced more reciprocity in interactions ($\rho = .48, p = .011$) and were more likely to conclude social interactions in a connected social resting state ($\rho = .44, p = .022$).

5.5.2.3 Cognitive-functional assessment and interaction variables

Results indicated a weak but significant negative association between Higher Global Deterioration Scale (GDS) scores (more advanced stages of dementia) and

ending social interactions in a connected social resting state ($\rho = -.38, p = .049$). No other significant correlations were found between interaction variables and residents' cognitive-functional stage as indicated by their GDS score.

There were no significant correlations between Psychogeriatric Assessment Scale (PAS) cognitive impairment scale scores and key observed interaction variables. There was a weak positive trend toward association between PAS scores and total instances of reaching out negatively to other residents ($\rho = .37, p = .060$) such that residents with higher PAS scores (indicating higher cognitive impairment) reached out negatively more often than coresidents with lower PAS scores. Exploratory analyses suggested a weak positive association between PAS scores and states of mismatched intentions/misaligned emotions ($\rho = .38, p = .048$) and rejection ($\rho = .41, p = .036$), and weak positive trends toward association between higher PAS scores and more instances of confusion in interactions ($\rho = .38, p = .052$), and the number of interactions ending in a disconnected social resting state ($\rho = .37, p = .059$).

5.5.2.4 Adult attachment style profiles and interaction variables

A small number of residents ($n = 15$) identified their adult attachment style using the Relationship Questionnaire. Amongst these residents, results indicated a strong significant negative correlation between dismissing attachment style and being approached positively ($\rho = -.73, p = .002$). A dismissing attachment style was strongly negatively correlated with reciprocity in social interactions ($\rho = -.73, p = .002$) and with ending interactions in a connected social resting state ($\rho = -.79, p < .001$). Attachment style profiles indicating more positive views of others were strongly positively correlated with more reciprocity in interactions ($\rho = .60, p = .024$) and with ending interactions in a connected social resting state ($\rho = .62, p = .018$). Results of exploratory analyses suggested a strong negative association between dismissing attachment style and reaching out positively for conversation ($\rho = -.78, p = .001$), being approached positively for conversation ($\rho = -.86, p = .000$), and ending interactions 'connected socially receptive' ($\rho = -.79, p < .001$).

There was a moderate positive correlation between secure attachment style and being approached positively ($\rho = .56, p = .029$), and ending interactions in a connected social resting state ($\rho = .56, p = .029$). Exploratory analyses suggested a moderate positive association between secure attachment style and being approached positively for conversation ($\rho = .57, p = .028$).

5.5.2.5 Social support/isolation and interaction variables

Higher adapted Lubben Social Network Scale-6 (LSNS-6) Friends subscale scores were negatively correlated with total instances of being approached negatively ($\rho = -.61, p = .020$). The more people residents reported to be able to rely on for support, the fewer times they were observed to be approached in a negative manner. Exploratory analyses suggested strong negative associations between adapted LSNS-6 subscale scores and ending social interactions in a disconnected social resting state through rejecting others ($\rho = -.56, p = .037$) but also indicated a positive association between higher LSNS-6 subscale scores and negatively reaching out to others with violence ($\rho = .54, p = .048$). Friendship Scale scores measuring perceived social support were not correlated to any observed social interaction variable.

5.5.2.6 Social withdrawal/engagement and interaction variables

Staff-informant report of resident social withdrawal/engagement using the Multi-dimensional Observation Scale for Elderly Subjects (MOSES)—Withdrawn Behaviour subscale indicated no significant correlations between resident social engagement and key observed interaction variables. Further exploration suggested moderate negative correlations between higher MOSES subscale scores and residents experiencing more reciprocity during interactions ($\rho = -.44, p = .023$) and ending interactions in a connected social resting state ($\rho = -.45, p = .018$). Residents whom staff saw as more engaged appeared to experience more reciprocity and end interactions in a connected state.

5.5.2.7 Self-reported relationships and observed interaction variables

Twenty interviewed residents who reported on their own social network ties were also observed interacting with other residents. Analyses were conducted to investigate possible correlations between these residents' perceptions of their social network ties and observations of their social interactions. There was a moderate positive correlation between the total number of positive network ties that the resident had with coresidents and the total number of times that a resident was approached positively ($\rho = .45, p = .047$). A greater total number of reported positive ties with coresidents was positively correlated with the observation of reciprocity in more of the resident's interactions ($\rho = .55, p = .013$), and more interactions ending in a connected social resting state ($\rho = .56, p = .010$). There was also a trend toward a negative association between larger reported positive networks and aggression in interactions ($\rho = -.42, p = .065$), such that larger networks were associated with less aggression.

Exploratory analyses suggested that the number of reported reciprocal (mutual) positive ties was moderately correlated with the number of interactions ending in a connected social resting state ($\rho = .49, p = .030$). Being nominated by others in their positive relationship network but not reciprocating the nomination (receiving but not reciprocating/asymmetric relationships) was moderately positively associated with more instances of reaching out positively with kindness/politeness ($\rho = .46, p = .039$), and more instances of being approached positively with helping or caring behaviour ($\rho = .58, p = .008$). The number of positive ties that a resident nominated but that were not reciprocated (initiated not reciprocated/asymmetric ties) was moderately positively associated with the number of times they were observed to be approached positively for conversation ($\rho = .56, p = .01$). Results suggested that receiving but not reciprocating positive tie nominations was strongly positively associated with observed reciprocity in social interactions ($\rho = .63, p = .003$), and with the number of interactions ending in a connected social resting state ($\rho = .60, p = .005$).

Total number of positive ties was negatively associated with reaching out negatively to verbally abuse others ($\rho = -.52, p = .018$). The number of positive ties that a resident nominated (out-degree) was moderately negatively associated with reaching out negatively to verbally abuse others ($\rho = -.45, p = .047$).

5.5.3 Summary—quantitative results from analyses of observational data

Fewer residents with dementia interacted and those that did interacted less often during staff facilitated structured activities in the morning than during other time-activity contexts. Slightly more residents with dementia interacted more frequently during structured activities that took place in the afternoon. The highest interaction rate occurred during unstructured time after morning and afternoon tea. Interactions were generally very brief, lasting less than a minute. Diverse and prolonged interaction trajectories were most apparent during unstructured time when staff were busy helping residents in their rooms, taking breaks, or attending hand-over briefings.

Two-thirds of residents with dementia 'reached out' positively to engage with coresidents and four-fifths were 'approached' positively. However, the majority of these residents reached out or were approached positively less than eight times across all observations. Positive beginnings most often involved conversation and greetings or showing kindness, and less often involved assistance and reassurance. Over half of all residents with dementia reached out negatively, and nearly three-quarters were approached negatively. The majority of these residents only experienced negative interactions two to five times across all observations. The largest proportions of

interactions that began negatively involved reprimanding and verbal abuse. Direct physical aggression was rare.

Although nearly two-thirds of interactions began positively, two-thirds concluded with residents in states of disconnection. The highest proportion of disconnected social resting states involved 'rejection' rather than residents being ignored or excluded. Residents with dementia who reached out positively experienced a negative outcome and ended in disconnected social resting states in approximately three of every five interactions.

Greater cognitive impairment was only weakly associated with ending interactions in disconnection. Residents with more independence in activities of daily living were more likely to reach out positively to others and experienced more reciprocity than residents with less functional independence. Vision and speech capacity were not associated with interaction variables, but better hearing was associated with longer interactions and more interactions ending in disconnected social resting states. Residents with more secure attachment style profiles were more likely to encounter reciprocity and conclude interactions in connection, and residents with dismissing attachment profiles were less likely to be approached positively by others.

Residents' perceptions of their own social relationships appeared to align with observed qualities of their social interactions. Residents who self-reported a larger positive social network were observed to encounter more reciprocity in interactions and to conclude more interactions in connection. Residents who were observed to verbally abuse others reported smaller social networks.

5.6 Summary of results and discussion

Breaking-down resident interactions sequentially into trajectories and viewing them through psychosocial lenses enabled interpretation of the possible socio-emotional impacts of these interactions in context. Qualitatively different socio-emotional outcomes were identified for individual residents by analysing actions and interactions from the viewpoints of the residents who were involved. Completing this process for each resident highlighted interactional patterns and cumulative effects of interactions for individual residents across observation periods each day. Triangulating observational data with knowledge of the residents' personal history and attributes within the context of the immediate physical and social environment enabled interpretation of the meaning of interactions for residents.

Care routine time-activity contexts cued residents' social schemas and expectations of interactions. Pre- and post-mealtime routines signaled transition and waiting, including changes in the number of staff and the focus of their attention. Residents interacted at their lowest rates before morning tea and during morning structured activities. Residents in the company of increased numbers of coresidents during larger structured activities and meals rarely reached out to one another, focusing instead on the activity at hand and their responses to staff and visitors. Residents turned their attention to one another in the absence of staff, meaningful activity, or diversions.

Residents' interactions were influenced by their attempts to meet immediate psychological and socio-emotional needs. Internal motivators included the need for stimulation and meaningful activity, the need for attention, and the need for emotional comfort and assurance. Residents asserted authority, protected themselves and others, and punished perceived social transgressions. Residents at all levels of cognitive-functional staging also reached out to soothe or assist others.

Each social pathway ('reaching-out', being 'approached', continued 'connection', or continued 'disconnection') that residents chose and experienced resulted in socio-emotional outcomes. Nearly two-thirds of interaction trajectories began positively. By the time residents completed their interactions, the positive socio-emotional valence of interactions reversed and two-thirds of trajectories ended in states of social disconnection. Negative beginnings most often involved mismatched intentions or misaligned emotions and confusion, and frequently led to aggression. Positive beginnings most often led to 'reciprocity' and 'toleration'. However, residents with dementia who reached out positively experienced mismatched intentions or misaligned emotions over a third of the time. Residents with dementia who reached out positively were ignored in nearly 20% and rejected in nearly 10% of all instances, and they encountered aggression in 15% of interactions with coresidents. Of the interactions that took place during structured social activities, more ended with residents in disconnected social resting states than in socially connected states.

Current findings aligned with those of previous research with more cognitively capable nursing home residents (Roberts & Bowers, 2015) and research with residents with moderate to moderately severe dementia (Mabire et al., 2016) reporting that residents adapt their social actions to fit social contexts in care (Casey et al., 2014). Findings supported previous reports that residents with dementia spontaneously engaged in pro-social actions and interactions without staff facilitation (Mabire et al., 2016; Saunders et al., 2011). Findings of limited social interaction during mealtimes

aligned with previous research as well (Casey et al., 2014). Residents' focus on the task of eating may have been due to their limited ability to divide their attention (Garcia-Rodriguez, Vincent, Casares-Guillen, Ellgring, & Frank, 2012) and to their reduced physical capacities and reliance on staff assistance during meals. This could in part explain why results contrast with previous evidence that residents interact during mealtimes (Abbott et al., 2015; Diaz Moore, 1999) and that interactions increased during structured social activities involving food, such as afternoon tea or snacks (Carstensen & Erickson, 1986). Findings of negative social encounters across multiple social contexts contradicted a recent report that residents with moderate to moderately severe dementia do not engage in incongruous and negative interactions when placed in structured social contexts (Mabire et al., 2016).

Residents who spoke or understood more than one language reached out for conversation with coresidents from diverse linguistic backgrounds. Other residents were only capable of conversing in their primary language or had reduced verbal language capacity. Examples from field note transcripts illustrated that residents with reduced language capacity had difficulty finding words, used perseverative language (repeating phrases), expressed themselves in brief utterances, or conversely were circuitous in their discourse. Although inability to converse in English was not associated with residents' reaching-out or being approached, it greatly curtailed the number of coresidents with whom the residents could converse and therefore contributed to confusion, rejection, aggression, and disconnection, supporting similar assertions in research of resident-to-resident aggression (Rosen, Lachs, et al., 2008). Brief polite greetings and positive non-verbal communication were often more successful for achieving connection. Results indicated that asynchronous, incongruous conversation frequently reversed the socio-emotional valence of residents' encounters such that positive social overtures resulted in negative socio-emotional outcomes. Results concurred with previous reports that increased, prolonged verbal exchanges between residents with reduced capacities frequently end badly and contribute to social disconnection (Carstensen & Erickson, 1986; Hauge & Kristin, 2008; Mok & Müller, 2014). These findings are particularly troubling in light of data indicating that residents with dementia most frequently reached out and were approached positively for conversation, and most prolonged conversations took place when staff were not available to facilitate.

Residents with reduced cognitive capacity were less likely to end interactions in connection. Residents who were more independent in activities of daily living, including mobility, reached out positively and concluded social interactions in a connected social

resting state more often than residents who were more functionally dependent. Independently mobile residents constituted a unique minority who had greater capacity and choice to approach and avoid others. Stationary residents were more vulnerable to being approached and were only able to avoid others by ignoring or withdrawing inward. Occasionally, walking residents reached out to receptive others and connected. However, 'approached' residents were startled by those who walked, perceived them to be transgressing personal boundaries, and appeared to feel threatened by impending or actual physical contact. These findings align with reports that residents who have the greatest functional capacity exercise greater control over the socio-emotional outcomes of their interactions. They do so by withdrawing from common areas and choosing where and with whom they interact (Hauge & Kristin, 2008). Conversely, immobile residents are at a greater disadvantage in communal spaces as they had no recourse to establish privacy, create personal boundaries, or even have personally meaningful objects to "rest their eyes on" during the day (Hauge & Kristin, 2008; Kemp et al., 2012).

Proximity was a constant and fundamental factor influencing resident interactions. Close physical proximity facilitated interactions between people who relied heavily on non-verbal communication. Conversely, close proximity exacerbated the effects of differences in individual capacity, leading to confusion and aggression. Residents sitting in close proximity to one another in front of televisions primarily sat side-by-side or at slight angles where they could more easily avoid each other's gaze. Focused joint attention on programs enabled verbal interactions to occur without eye contact or a need to create novel and progressive conversational content. Immobile residents with reduced sitting posture were frequently placed at dining tables in the morning, where they remained until bedtime. In this way residents sat side-by-side or facing one to three coresidents throughout the day. They were also in the 'line-of-sight' of residents at nearby tables, across the room, and across corridors. Although consistent close proximity can promote familiarity (Kemp et al., 2012), such conditions in these cases differentially promoted disconnection or reaching out depending on residents' emotional needs and capacities (Kontos, 2012). In post-observation consultation, staff indicated that residents were most often placed at tables according to convenience and the space available for wheelchairs or waterchairs without consulting with residents about their social preferences. Findings closely mirrored those of previous field studies reporting that shared lounge rooms and dining spaces are areas of forced and unpredictable socialisation, akin to waiting rooms. Residents

who cannot withdraw from these shared environments primarily avoid eye contact and interact briefly and infrequently (Abbott et al., 2015; Hauge & Kristin, 2008).

Observational data were coded and analysed using this study's novel psychosocial approach. Findings indicated that residents' self-report of their positive social networks were borne out by their social behaviour. Exploratory investigation indicated significant correlations between observations of residents' interactions and residents' self-report of their social networks. Having a higher total number of positive relationships and more reciprocal relationships were correlated with higher total number of times that a resident was approached positively, encountered reciprocity, and ended interactions in connection. Findings suggest that residents with dementia were providing accurate accounts of their social networks.

Residents' subjective perceptions of social support (Friendship Scale scores) were not correlated with observed interaction variables. Although residents' positive actions and interactions often reflected positive social relationships with coresidents, residents may not have perceived these relationships as close and supportive. Residents' self-report of few friendships and greater prevalence of weak positive ties align with this interpretation. Concurrently, residents reported that they liked to talk with and visit friends and these intimate conversations were more likely to have occurred in private spaces outside of observed areas (Hauge & Kristin, 2008). Studies also suggest that duration of gazing and speaking may be longer between strangers and those less familiar with one another than between friends (Coutts & Schneider, 1976; Feyereisen, 1994; Rutter & Stephenson, 1979; Swain et al., 1982). Observations may have captured more superficial positive interactions between residents who were less 'familiar' with one another.

Residents with a dismissing attachment style were approached positively, experienced reciprocity, and were socially connected significantly less often than residents with secure attachment styles. More positive Model-of-Other attachment profiles were correlated with greater reciprocity in interactions and with ending interactions in a connected social resting state. These results once again indicated that residents' self-report of their relationship schema were borne out by observational data of their social behaviour. Residents with dismissing attachment profiles may have acted and interacted in ways that made them less approachable and residents with more secure attachment profiles may have acted and interacted in ways that made them more approachable to coresidents. Although comparable data for aged care residents with dementia are not available in the literature, findings suggest that residents had insight into their own relationship schemas, were actively interpreting coresidents'

behaviour and attitudes toward social interactions, and that they may have been avoiding or approaching others based on attachment-related personality characteristics (Bartholomew & Horowitz, 1991; Consedine & Magai, 2003; Griffin & Bartholomew, 1994).

6 Discussion

6.1 Introduction

Study motivation, aims, and objectives will be reviewed in Section 6.2. In Section 6.3, key results of the study will be reviewed and discussed in the context of the literature. Discussion of the practice and clinical implications of findings will follow in Sections 6.4 and 6.5. Research and theoretical implications will be summarised in Sections 6.6 and 6.7. Strengths and weaknesses of the research will be addressed in Section 6.8. Finally, future recommendations are presented in Section 6.9 followed by a concluding statement.

6.2 Review of study motivation, aims, and objectives

The motivation behind this thesis was to explore ways to assess and improve the quality of life of aged care residents through a better understanding of their social relationships in care. Although it was originally expected that the research would include residents with and without dementia, most residents who participated in interviews had a dementia diagnosis. Therefore, the study focused primarily on the experience of residents with dementia and included residents without dementia to provide a more informative description of social networks and the larger social environment in the facility.

Research of friendships and social relationships between people living in formal aged care has only recently begun to use social network analysis (SNA) methods to investigate the positive relationship networks of residents with dementia, including people living in specialised dementia care units (Abbott et al., 2013; de Medeiros et al., 2012). Few studies have included individuals with moderate to severe stages of neurocognitive disorders to seek out their perceptions of their own social relationships (Abbott & Pachucki, 2016; Abbott et al., 2015). Some researchers have investigated the overall balance of positive and negative emotions that residents experience as a results of their social interactions (Meeks et al., 2012). To date, most studies have focused on coresidents' positive and negative social relationships separately (Ferrah et al., 2015). Negative social relationships between residents have not previously been analysed using SNA methods. Emphasis on the influence of residents' personal attributes has often overshadowed consideration of the confluence of personal

attributes, relationship attributes, and context on resident social functioning (Bitzan & Kruzich, 1990; Kutner et al., 2000). Previous studies have presented either qualitative or quantitative report of residents' social relationships with rare triangulation of data from multiple methods (Caspi, 2015; de Medeiros et al., 2012).

This study aimed to describe the friendships, social interactions, and relationship networks of residents who lived in a Sydney long-term residential aged care facility. Multiple objectives were applied to meet the study aim and address limitations and gaps in the literature. The research extended SNA methods to include the perspectives of residents with moderate to severe dementia. Semi-structured interviews were used to gain a qualitative understanding of residents' perceptions of their own relationships with coresidents and of their personal friendship schema. Sociometric SNA data were analysed to identify broad patterns of relationships within care units.

Standardised measures were used to assess residents' functional and cognitive capacities, to collect residents' self-reported attachment style profiles and perceptions of social support, and staff-report of residents' level of social engagement. Staff and the observer provided their perceptions of the positive, ambivalent, and negative relationships between residents. Data were analysed to identify associations between characteristics of social relationships and residents' attachment profiles and perceived social support and engagement.

In addition, the study introduced a novel method applying a psychosocial perspective to deconstruct and analyse resident interactions based on observational field notes. This new approach was developed to enable interpretation of the potential meaning and significance of social interactions for residents. Data were triangulated, critically interrogated, and synthesised to explore the influence of relationship attributes and the immediate context on resident perceptions and behaviour.

6.3 Accounts of residents' social relationships

Residents, care staff, and outside observers each view residents' relationships from their own unique perspectives. Therefore, their accounts may not directly align. Perceptions that differ are not inherently 'wrong' or inaccurate on all points. Each perspective provides a different view of the complex, multi-dimensional construct that relationships represent (Gaugler, Leach, & Anderson, 2004).

6.3.1 Friendship and positive relationships

Twenty-nine of the 36 interviewed residents were capable of discussing how they perceived their relationships with coresidents. Over a quarter of these residents (27.6%) identified as having 'true' friendships with residents in their care unit. Triangulation of resident-, staff- and observer-report of resident relationships suggested that half ($n = 4$) of these non-kin 'true' friendships were reciprocal. Only ten percent of residents named their roommates as friends, supporting similar findings of few close relationships between nursing home roommates (Bitzan & Kruzich, 1990).

Over half of all residents (58.6%) felt that they had positive relationships with coresidents. This was lower than percentages (65% to 100%) reported previously in studies using sociocentric approaches in similar settings (Abbott et al., 2013; Abbott & Pachucki, 2016; Retsinas & Garrity, 1985; Schafer, 2011). However, resident self-reports triangulated with both staff and observer reports in the proportions of residents who initiated positive ties (57.1% and 58.2%). Both staff and the observer reported that at least a third of residents were 'isolates' and this proportion aligned closely with resident self-report. This percentage was much higher than in recent studies reporting no 'isolates' among assisted living residents (Abbott et al., 2013) and less than 25% among residents in a dementia special care unit (Abbott et al., 2013; Abbott & Pachucki, 2016). Most assisted living residents do not require continual medical care, whereas residents with significantly reduced cognitive-functional capacity require high levels of skilled nursing care. Assisted-living residences are typically more home-like than skilled-nursing facilities. They provide shared social activities and services that support residents' independence and autonomy. More capable assisted living residents may have had greater opportunity to interact with others socially than high-care residents living in skilled-nursing facilities.

Residents' self-reported median network sizes of one or less in this study were lower than those of studies cited above, which reported a median network size between 2.6 and 5.3 for assisted living residents and approximately 1.5 in dementia special care units (Abbott et al., 2013; Abbott & Pachucki, 2016; Schafer, 2011). The staff-reported and observer-reported median network sizes of '2' and '3', respectively, aligned more closely with those previously reported for people with higher cognitive-functional capacity residing in assisted living than with those reported by residents in the current study (Abbott et al., 2013; Perkins et al., 2013; Schafer, 2011).

Resident, staff, and observer accounts differed regarding the number and strength of relationships, particularly 'true' friendship, and similar differences in

accounts have been reported in previous studies (de Medeiros et al., 2012). Staff perceived the highest number of 'true' friendships ($n = 25$), residents perceived considerably fewer ($n = 8$), and the observer perceived the lowest number of strong 'true' friendship ties between residents ($n = 4$). The observer collected data exclusively in common areas (i.e. TV lounges, dining rooms, corridors) and may have witnessed a greater number of 'polite' encounters that occurred between residents due to their 'public' location (Knight & Mellor, 2007). Care staff accounts may have been influenced by knowledge of intimate exchanges between friends that took place in more private areas away from public view (Cohen-Mansfield et al., 2015; Rosen, Lachs, et al., 2008). Staff may also have attributed greater depth of affection to some relationships that residents felt were only 'casual' friendship (de Medeiros et al., 2012).

Six residents spontaneously recalled positive relationships with residents in other units. Triangulation with staff and observer reports confirmed three of these relationships. At least one resident without dementia was represented in each dyad and this suggested that better memory capacity may have aided relationship maintenance (Stiller & Dunbar, 2007). Staff and family members facilitated these relationships by helping residents to visit one another. Although residents did not explain why they initiated or maintained these relationships, triangulation of chart and interview data suggested that homophily in personal attributes and having someone they could 'talk' with may have been important factors.

6.3.2 Multi-valenced networks

Staff and the observer perceived that two-fifths of residents had negative relationships with coresidents. Fifteen percent of residents received strong to moderately strong dislike from coresidents. These findings added to previous evidence that negative relationships between residents are common and ongoing in aged care (Caspi, 2015; MacAndrew et al., 2015; Perkins et al., 2013; Pillemer et al., 2012; Rosen, Lachs, et al., 2008; Rosen, Pillemer, et al., 2008; Trompetter et al., 2011). Staff and observer accounts suggested that approximately 30% of residents had both positive and negative relationships in their networks with a median ratio of 1:1 positive-to-negative relationships in networks overall. Previous research based on counts of affective experiences suggests that higher ratios of positive-to-negative affect (2.9:1) differentiated more cognitively capable nursing home residents with higher wellbeing from those with lower wellbeing (Meeks et al., 2012). Additional research suggests that the emotional tone of networks predicts daily affective experiences and that negative relationships between residents detract from residents' emotional and physical

wellbeing (English & Carstensen, 2014; Ferrah et al., 2015; Pillemer et al., 2012). Only Unit 1 residents appeared to have the capacity to maintain a 'balanced' ratio of positive over negative interactions and relationships. Hence, residents with low ratios of positive-to-negative relationships may have been vulnerable to the effects of negative emotional experiences through unpleasant encounters with coresidents.

6.3.3 Network characteristics and residents' attributes

The observer perceived that fewer men than women had positive relationships, however, men had larger positive networks and more 'weak' ties of positive regard than women. This contrasted with previous research reporting no association between gender and self-reported networks of aged care residents (Perkins et al., 2013). Findings may differ in part due to differences in resident populations (a higher percentage of men in this study) and due to differences between observational report of social networks and resident self-report of networks (Perkins et al., 2013). Correlations between Global Deterioration Scale scores (Reisberg, 1982) and network variables indicated that residents with lower cognitive-functional capacity had smaller networks and less reciprocity in relationships. Only residents with moderate to moderately severe dementia were 'isolates'. Residents with better physical and psychological health may have been perceived as being more approachable and were approached more, and residents who were physically or emotionally able could have more reciprocal relationships. Findings support previous reports showing that residents are more likely to nominate 'close ties' with coresidents who have similar or better health than themselves (Schafer, 2011, 2015).

The predominance of dismissing attachment style among residents aligned with previous evidence of more self-reported dismissing/avoidant attachment among older adults, but did not support report of more fearful attachment among people with dementia (Magai, 2008; Molinari et al., 2001; Nelis et al., 2012). Family/friends' reports of residents' pre-admission attachment styles did not correlate with residents' current reports, suggesting that one or more variables may have altered attachment styles after admission to residential care. Findings that residents with more secure attachment profiles (i.e. they thought and felt better about others generally) had larger networks than residents with more dismissing profiles aligned with similar findings for older adults in the community (Fiori et al., 2011). The results suggest that residents' social networks may have been influenced by attachment style. Conversely, residents' attachment-related behaviour and cognitions may have been cued by their position within the network.

Participation in structured activities was not correlated with the size of residents' positive networks, supporting previous research indicating that simply bringing residents together for social activities does not translate into meaningful relationships between residents (Knight & Mellor, 2007). Resident, staff, and observer reports all indicated more reciprocated relationships for residents who reported more perceived social support using the Friendship Scale (Hawthorne, 2006). Residents who reported higher perceived social isolation (lower Friendship Scale scores) and residents whose MOSES subscale scores indicated that they were more withdrawn, were also perceived by staff to have received a higher number of negative ties of dislike and disregard without reciprocating (Helses et al., 1987). Residents reporting higher objective isolation (lower adapted LSNS-6 Friends subscale scores) were perceived by staff to have initiated more negative ties that were not reciprocated and to have had more negative ties in total. Residents who received dislike and disregard without reciprocating may have been vulnerable to exclusion, aggression, and 'bullying' from others, while residents who initiated more dislike and disregard may have been aggressors who excluded or 'bullied' others (Meter & Card, 2015; Trompetter et al., 2011). Previous research has identified that loneliness, feelings of abandonment, and the quality of residents' relationships both outside and within the aged care environment may all predict resident-to-resident aggression (Rosen, Lachs, et al., 2008).

6.3.4 What friendship meant to residents

Residents believed that friendship meant sharing similar experiences and backgrounds. They expected intimacy, mutuality, and altruism in the relationship. Residents' beliefs and expectations of homophily and intimacy between friends aligned with those expressed by assisted living residents and residents with dementia in previous studies (de Medeiros et al., 2012; Kemp et al., 2012; Perkins et al., 2013) and with universal standards of ideal friendship (Hall, 2012). Residents described their own experience of friendship as something inherently positive, meaningful, and valuable. Residents who emphasised similarity and intrinsic value in friendship may have been more likely to associate friendships with their own emotional wellbeing and self-identity (Morry et al., 2013; Wright, 1984).

Residents most frequently said that they liked to spend time visiting and talking with friends, echoing a common theme in earlier qualitative reports (Ayalon & Green, 2013; Bergland & Kirkevold, 2006; Kemp et al., 2012; Moyle et al., 2015). Other things

that residents mentioned they liked doing with friends primarily involved activities that they no longer experienced and places in the community they no longer visited.

Some residents spontaneously reported reluctance to engage in relationships with coresidents, supporting a theme of purposeful social distancing that pervades the qualitative literature (Hauge & Kristin, 2008; Knight & Mellor, 2007; Perkins et al., 2013). Age and sex/gender did not emerge as influential barriers, in contrast to previous research (Kemp et al., 2012; Perkins et al., 2013). Residents felt that others' cognitive impairment was a deterrent to forming relationships because they could not "talk" with them, a recurring sentiment across studies (Hauge & Kristin, 2008; Kemp et al., 2012; Moyle et al., 2015; Roberts & Bowers, 2015). Residents' description of friendship as requiring "choice" and "time" further illuminated the chasm between meaningful relationships and what these residents experienced instead (Kemp et al., 2012; Perkins et al., 2013).

6.3.5 A psychosocial view of interactions

Many residents 'reached out' to connect with others and were 'approached' by others wishing to connect. There were residents in each care unit who were disconnected by personal choice and by circumstances such as ill health. Other residents who may have wished to interact with coresidents were socially excluded, avoided or ignored. Time-activity contexts cued residents' social schemas and expectations of actions and interactions. In contrast to previous research (Carstensen & Erickson, 1986; Mabire et al., 2016), interaction between residents did not increase during structured social activities. This may have been due to increased interaction between residents and staff. Moreover, most activities were not tailored to promote meaningful interaction between residents. Interaction rates were lowest before morning tea and during morning structured activities and highest during unstructured time after morning and afternoon teas. Residents reached out and were approached for conversation, to be polite, and to show kindness. These findings add to evidence that residents with moderate to moderately severe dementia spontaneously engage in congenial and supportive interactions (Kontos, 2012; Mabire et al., 2016). However, residents who reached out and were 'approached' often encountered 'mismatched intentions' or 'misaligned emotions'. Perceived incongruity in social behaviour led to confusion and disconnection, in line with a previous report in long-term care residents with dementia (Mok & Müller, 2014). Residents reached out and were approached in a negative manner through verbal abuse and reprimanding. Physical violence was rare. Although nearly two-thirds of interaction trajectories began positively, two-thirds of all

trajectories ended in negative states of disconnection. Residents with dementia who reached out positively were ignored in nearly one in five instances, rejected in nearly one in ten instances, and encountered aggression in nearly one in six interactions. These findings corroborate that social aggression between residents is diverse in character and may represent emotional harm to residents (Pillemer et al., 2012; Rosen, Lachs, et al., 2008)

Social encounters were influenced by residents' individual attributes (capacities, beliefs, needs, and emotions) and by the aged care facility context (staff, visitors, care routines, and the physical environment). Residents who identified with more secure attachment style profiles were approached positively, experienced reciprocity, and ended interactions in connected social resting states more often than their coresidents who identified with more dismissing attachment style profiles (Bartholomew & Horowitz, 1991). Higher self-reported objective social support correlated with fewer instances of being approached negatively (Lubben et al., 2006). Residents' subjective perceptions of social support were not correlated with the quality of their interactions with others in common rooms (Hawthorne, 2006). Proximity was a fundamental factor influencing resident interactions. Proximity differentially promoted disconnection or 'reaching-out', depending on residents' emotional needs and capacities. Close physical proximity facilitated non-verbal communication. Conversely, close proximity exacerbated the effects of differences in individual capacity, leading to discordant interactions and negative socio-emotional outcomes. Residents who were more independent in activities of daily living reached out positively more often, experienced more reciprocity, and concluded social interactions in a connected social resting state more often than their coresidents who were less independent.

6.3.6 Triangulating evidence of resident relationships

Over half of all residents felt that they had at least one positive relationship with a coresident. Residents with larger positive networks also felt more socially supported. Aside from one married couple, only six interviewed residents felt that they had strong ties of 'true' friendship with other residents. Qualitative responses indicated that residents most enjoyed talking and visiting with friends and expected similarity, altruism, and reciprocity in these close relationships. Residents' spontaneous comments also showed that the absence of these qualities were key barriers to 'true' friendship in their aged care environment and echoed the sentiments of residents from multiple studies who stated simply "I don't know them enough" (de Medeiros et al., 2012; Kemp et al., 2012). However, some residents with higher cognitive-functional

capacities met and established casual reciprocal friendships with similar others whom they could visit and talk to in other care units with the help of staff and visitors.

Residents' qualitative responses suggested that many relationships with coresidents had not progressed past preliminary superficial evaluations and activity in 'public' spaces predicted by stage-models of friendship development (Altman & Taylor, 1973; Levinger & Snoek, 1972; Perlman & Fehr, 1986). Observational data confirmed that several residents repeatedly spent their days in communal spaces in the company of the same coresidents from their care unit, often in close physical proximity, interacting infrequently and briefly. This may have been protective. Qualitative analysis of interaction trajectories indicated that residents with dementia reached out to others in appropriate and supportive ways, but their attempts at meaningful interaction commonly ended in disappointment and aggression. Correlations between network data and results of standardised assessments suggested that having fewer positive relationships and less reciprocity in relationships was associated with lower cognitive-functional capacity. Such diminished positive networks were also associated with reporting a dismissing attachment style profile that featured more negative beliefs about others. In accord with relationship-stage models linking familiarity and attraction, residents' repeated exposure to one another and inability to accumulate and integrate information about one another may present barriers to relationship development, creating boredom or disgust and even interpersonal conflict (Finkel et al., 2015).

6.3.7 Summary

Triangulation between network data, qualitative views on friendship, and observational data highlights the difficulty that residents experienced in meeting their expectations of friendship in the facility, partly explaining why residents' social networks were so sparse. This impact was greater for more cognitively impaired residents and for residents who lived with more impaired residents. Residents who formed more reciprocal positive relationships with other residents felt more supported. Participation in activities did not necessarily promote meaningful interactions or supportive relationships with other residents. More residents reached out to engage with one another outside of structured activities and without staff facilitation. However, residents who were left to their own devices in common rooms frequently encountered communication breakdowns and misunderstanding, causing many initially positive interactions to end in rejection and disconnection. Repeated exposure to negative socio-emotional experiences with coresidents may have fostered relationships of dislike and disregard. The results suggested that residents who received more dislike

and disregard from others were also more withdrawn generally and that other residents who reported having fewer supportive relationships initiated discord. For these residents, social encounters with coresidents may have compromised their socio-emotional functioning.

6.4 Implications for practice

The person-centred model of care is built on the premise that the actions, emotions, and wellbeing of persons with dementia are a direct reflection of the quality of their interactions with others (Kitwood, 1993). Residents in this study experienced enriching relationships and unsupportive relationships that either supported the 'self' or diminished individual capacity. Person-centred care requires that care staff and clinicians assess the quality of residents' relationships, informed by knowledge of the person and their perceptions, and by observation of their interactions with others (Stein-Parbury et al., 2012).

Findings in this study and previous research indicate that frail older adults living in long-term care, particularly those with more advanced stages of cognitive-functional impairment, have impoverished social networks and experience great difficulty fulfilling their socio-emotional needs (de Medeiros et al., 2012; Kemp et al., 2012). Illness and reduced capacity have not changed their concepts of friendship, both in terms of what it means to them and what they like to do with friends. Their feelings, beliefs, and expectations about friendship are primarily the same as those of other older people (Adams, 2000; National Seniors Productive Ageing Centre, 2013). What has changed for residents is their context: where they live, the people and social environment, the opportunities and barriers within their social living environment, and their capacity and freedom to exercise autonomy and choice (Doyle et al., 2011; Hauge & Kristin, 2008; Knight & Mellor, 2007). Social environmental changes may influence residents' pre-existing attributes, such as their attachment style and cognitive capacity, and conversely these personal attributes influence the social environment.

Positive networks were primarily comprised of residents who had regard for a few of their unit coresidents, two or three residents who felt that they had casual friendships with unit coresidents, and one or two residents who pursued casual mutual friendship with people in other units. Residents lived in a social 'cloud' of coresidents rather than a social network. This was particularly true for residents living in the DSU. Residents were aware of the people around them, who contributed to the sensory stimulation and social 'atmosphere' that residents took in day after day, but the weak

relationships that did exist between residents offered little enriching socio-emotional substance. Strong bonds of true friendship were exceptions.

Residents may feel surrounded by other residents that they “don’t know” and many of these other residents may do things that they don’t like—“make a hell of a noise”, soil themselves, misunderstand, and only “worry about themselves”. It is not surprising that residents applying idealised standards of friendship turn to their fellow residents and find them lacking. Despite these barriers, residents, including those with more severe stages of dementia, still needed and sought enriching relationships with others and friendships and positive relationships did occur.

Although proximity to other residents and enriching social activities create opportunities for social interaction and relationship building, simply placing frail residents and those experiencing reduced capacity together in close proximity to one another did not automatically lead to social engagement and positive relationships. Results of previous studies suggest that involving staff and visitors in appropriate social facilitation is essential to converting opportunities for positive social engagement between residents into dynamic positive social engagement that may lead to stronger, supportive relationship bonds (Abbott et al., 2015; Lawrence et al., 2012; Mok & Müller, 2014). Facilitated interventions to improve behavioural synchrony in conversations and actions, and to increase sharing, reciprocity, and interconnectedness between residents could increase residents’ perceptions of social support and reduce feelings of isolation. However, staff may not know how to engage resident-to-resident communication, which is fundamentally different from being the focal point of interaction themselves. Training of staff and visitors is required in order to implement effective interventions.

Clinicians and care staff may need to challenge unhelpful assumptions that residents, particularly those with more severe cognitive functional impairment, no longer understand, need, or seek friendship and supportive relationships. Residents who are quiet and those who isolate themselves from others may be exercising choice and autonomy and/or they may be experiencing profound and debilitating social isolation (Clare et al., 2008; Hauge & Kristin, 2008; Miller et al., 2015). Understanding residents’ history, asking them about their thoughts and feelings, observing their interactions with others, are all necessary for clinicians and care staff to make informed decisions regarding residents’ social health and wellbeing (Bruce et al., 2002; Kitwood, 1993; Stein-Parbury et al., 2012).

Residents’ attachment profiles, the image that they hold of themselves and others in relationships, may affect their actions and interactions with coresidents and

may influence how they respond to social interventions. Residents with greater attachment security may feel more socially supported and respond better to social interventions than residents with dismissing attachment. Residents with less secure attachment profiles may avoid relationships, 'narrow' their social networks, find positive encounters less rewarding, and perceive less social support (English & Carstensen, 2014; Fiori et al., 2011). Residents with different attachment profiles may require distinct approaches to meet their socio-emotional needs.

Test results indicated differences between resident, staff, and observer accounts of interviewed residents' relationships. This is not surprising as discordance between these different perspectives has been reported previously (de Medeiros et al., 2012; Orrell et al., 2008). Staff perceptions of resident needs, actions, and interactions are informed by their training, roles, care routines, current access to the residents, time spent with residents, and access to residents' medical and historical information (de Medeiros et al., 2012). These variables are further influenced by each staff member's personal attributes and the heuristics and biases that they implement in carrying out their professional duties (Cohen-Mansfield et al., 2015; Cohen-Mansfield & Libin, 2004; Edelman et al., 2005).

Previous studies have given precedent to observer report instead of staff report of the unmet social and activity needs of persons with advanced dementia, largely based on the observation that the attention of "overextended nursing staff" is continually divided in this context and therefore it is assumed that staff are unable to assess residents' responses to social/activity opportunities (Cohen-Mansfield et al., 2015). Findings in this and other studies suggest that some care staff may be misinterpreting residents' responses to social engagement opportunities, perceiving meaningful interactions where there are none and missing meaning where it exists (de Medeiros et al., 2012; Knight & Mellor, 2007). Such findings support recent calls for care providers to make residents' social health a person-centred care priority (Theurer et al., 2015; Vernooij-Dassen & Jeon, 2016). This would include providing training in psychosocial and socio-emotional effects of social relationships for care staff and building 'social time' and observation into care routines.

Resident-to-resident aggression is a difficult issue in aged care and negative interactions between residents are common (Ellis, Teresi, et al., 2014; Ferrah et al., 2015; MacAndrew et al., 2015; Pillemer et al., 2012). Aggression and emotion-driven actions and interactions are often viewed by clinicians and care staff as isolated events and noted as part of neuropsychiatric assessments (Casey et al., 2014; Cohen-Mansfield & Libin, 2004). They are even noted and counted under 'agitated behaviour'

as part of the Australian Government mandated Aged Care Funding Instrument (DOHA, 2009). However, clinicians, care staff, and other health professionals appear to overlook or minimise the immediate and longer-term negative implications of these actions and interactions for the residents involved. Care staff trained in dementia care practice and person-centred care may carefully and conscientiously apply valid theory and practice principles that enable them to respond with empathy to individual residents' emotion-driven behaviour in the moment (i.e. 'behaviour is not deliberate', 'blame the disease, not the person'). Yet while doing so, clinicians and staff may misunderstand or overlook the social antecedents and repercussions of residents' actions and interactions in the broader social context.

Daily life for these high-care long-term care residents represented predictable daily care routines and structured 'social' activities punctuated by unpredictable interactions with coresidents. Although interactions were fairly infrequent and brief, residents with dementia consistently reached out to coresidents for conversation, companionship, and reassurance. The majority of interactions began well but a high proportion ended in negative emotional-valence and social disconnection. As has been highlighted by previous researchers, many residents with a range of cognitive capacities are willing social participants, reaching out positively to people in their immediate environment to meet their social needs (Abbott et al., 2015; Burgio et al., 2001; Casey et al., 2014; Cohen-Mansfield et al., 2015; de Medeiros et al., 2012; Mabire et al., 2016). However, when residents are left to alone without assistance to initiate and facilitate positive interaction without assistance, negotiation, or mediation of potentially negative interactions, a high proportion of daily interactions may devolve into disconnection.

Social interactions that end in connection may leave residents with a sense of reciprocity and understanding that promotes their self-identity and feelings of social support. Social interactions that end in disconnection may leave residents feeling excluded, rejected, and over time may lead to residents withdrawing or feeling socially isolated. Better person-centred care can encompass an understanding of the potential socio-emotional consequences of interactions between residents. More emphasis needs to be given to the RACF physical and social environment as a potential variable influencing residents' day-to-day actions and interactions with others. Furthermore, it is essential to be aware that the quality of social relationships with coresidents may influence perceptions of social support or isolation and behavioural markers such as social engagement and withdrawal.

6.4.1 Summary

These findings highlight residents' perceived and objective social isolation and lack of meaningful social engagement with coresidents. The qualitative experience of residents' interactions with coresidents may represent a significant positive and/or detrimental influence on their feelings of support and isolation and may impact their health and wellbeing. The implementation of person-centred care practice should include focused attention to the broad social context in which residents live, including the quality of relationships between residents and the quality of residents' relationships with care staff and visitors. Care staff cannot control affection between residents and care providers cannot create a communal care environment that is devoid of negative social experiences. Care staff and service providers can implement evidence-based strategies to help manage and resolve conflict between residents and potentially mitigate effects of negative interactions that may otherwise lead to social disconnection (see below). Care providers can assess residents' different social needs and preferences and where appropriate promote positive relationships and initiate positive interactions among residents who cannot do so themselves.

6.5 Clinical implications

Forming and maintaining close social relationships requires older adults who reside in aged care to commit socio-emotional resources which may be strained by cognitive-functional impairment and physical frailty. Residents with dementia may experience the world differently than those who do not have dementia (Zwijsen et al., 2016). The findings in this study indicated that residents with varied cognitive-functional capacities had difficulty engaging with one another in ways that led to positive interactions, relationships, and perceptions of support. Rather than expecting most residents to form true friendships, staff could aim to increase feelings of social support and connectedness among residents, which requires a care focus on fostering casual friendship and positive regard between residents (Ayalon & Green, 2013; Perkins et al., 2013). This may be done through interventions to increase perceptions of sharing and reciprocity in interactions (Luttenberger, Donath, Uter, & Graessel, 2012; Mok & Müller, 2014) and interventions that increase interconnectedness based on existing coresident relationships (Sefcik & Abbott, 2014). Gauging individual needs for intervention requires assessing if residents prefer their own company or lack the capacity to seek relationships of their choosing (Bonifas et al., 2014). Moreover, interventions for

residents who have greater capacity to form and maintain close relationships could aim to create 'redundancy' in networks by increasing the average size of personal networks to include multiple people that each resident visits and talks with on a regular basis, discusses private issues with, and can depend on for help (Fuhrer & Stansfeld, 2002).

Recent experimental studies have reported increased liking and positive affect between strangers who mirror one another's verbal and nonverbal behavioural 'rhythm' (synchrony) and decreased liking and negative affect between people whose behaviour is asynchronous, or who are not 'in sync' with one another (Honisch, Quinn, & Cacioppo, 2013; Lumsden, Miles, & Macrae, 2014; Tarr et al., 2016). Further, synchronous behaviour improves the way people feel about themselves and increases empathy and perceptions of closeness and connectedness with interaction partners (Koehne, Hatri, Cacioppo, & Dziobek, 2016; Lumsden et al., 2014). Residents experiencing behavioural asynchrony in the current study may have experienced negative affect and decreased liking for their coresidents. They may subsequently have felt disconnected and 'out of sync' with those around them and may have chosen to distance themselves from coresidents. Encountering these types of experiences consistently and repeatedly over time within the residential aged care environment might lead residents to perceive and report impoverished social networks and feelings of social isolation. Previous research examining the actions and discourse of people with dementia residing in assisted living and special care units indicate that people with dementia actively attempt to co-construct, accommodate, align, and synchronise their conversations and behaviour but repeatedly encounter breakdown and disengagement (Mok & Müller, 2014; Sabat & Lee, 2011; Saunders et al., 2011). Clinicians and care providers seeking to improve interactions and relationships between residents of all cognitive abilities may wish to consider interventions to improve behavioural synchrony in conversations and activities (Mok & Müller, 2014; Robertson-Gillam, 2008; Saunders et al., 2011; Sharp & Hewitt, 2014; Tarr et al., 2016).

It has been suggested that having smaller social networks contributes to frailty and conversely, that frail older people have reduced ability to meet their socio-emotional needs over time (Hoogendijk, Suanet, Dent, Deeg, & Aartsen, 2016). Long-term care residents have said that their greatest challenge to socialisation was overcoming poor health and limited functional capacity (Bonifas et al., 2014). Residents have spoken of reducing social interaction due to being "tired" (Kemp et al., 2012). Forming and maintaining social relationships requires residents to expend limited 'energy reserves'. Although we did not measure frailty as a phenotype or syndrome, study participants could be described as 'frail' based on low Barthel Index scores, high

Global Deterioration Scale scores, and multiple diagnosed physical health conditions (Fried et al., 2001; Xue, 2011). This 'frailty' would manifest as low energy and low physical activity in residents who were primarily immobile. Triangulation of observational data indicating brief infrequent interaction between residents, demographic data indicating high dependence in activities of daily living, and correlational results indicating associations between poorer health and smaller networks all suggest that physical frailty may have been a factor influencing residents' perceptions of limited relationships with coresidents.

These results confirm previous findings that frailty and lack of physical capacity may interfere with residents' ability to meet their socio-emotional needs (Bonifas et al., 2014; Hoogendijk et al., 2016; Taube et al., 2015). It is easy for clinicians and care staff to overlook people who are quiet, sleepy, or those who 'keep to themselves' and assume that these residents are 'content' and not in need of assistance. Social withdrawal may also be a sign of apathy, which increases as dementia worsens (Brodaty & Burns, 2012; Mortby, 2013). It is important to observe and talk with these residents in order to determine if they are indeed making a social choice or if they are lonely and do not have the resources to change their situation.

Residents' attachment styles appeared to be related to their relationships with coresidents. The influence of attachment styles on the size of positive relationship networks and reciprocity in this study is consistent with the influence of self-identified adult attachment styles on the size of non-kin networks and reciprocity in previous research with older adults in the community (Fiori et al., 2011). These results suggest that personality variables represented by adult attachment-style profiles may continue to influence the social choices and behaviour of older adults with dementia after their admission to residential aged care (Magai et al., 1997).

Residents with secure attachment profiles may benefit more from positive relationships with coresidents, they may be more open to growing their social network, may experience more reciprocity and perceive more social support, and may be more responsive to interventions to promote friendship with coresidents. Clinicians and care providers should be aware that residents with dismissing attachment may be more likely to avoid relationships and to 'narrow' their social networks (Rook, 2015). These residents may also be less responsive to interventions attempting to encourage social bonding with coresidents through more positive social engagement, and they may instead require relationships with staff, family, and visitors in order to meet their socio-emotional needs (Fiori et al., 2011; Small, 2013). Interventions that aim to create redundancy and to strengthen the networks of these residents could identify potentially

enriching social relationships with non-residents by asking “Who brightens your day?”, “Who do you help/who helps you?” (Abbott & Pachucki, 2016), “Who do you like to talk and visit with?”, and then facilitate and expand these and similar relationships.

Most relationships between residents were perceived to be either primarily positive or primarily negative, with very little ambivalence. The literature suggests that negative social exchanges may have a disproportionately detrimental influence on older adults’ physical and psychological health, outweighing the benefits of positive exchanges (Fuhrer & Stansfeld, 2002; Meeks et al., 2012; Newsom et al., 2005; Schuster et al., 1990; Sneed & Cohen, 2014; Yanos et al., 2001; Zalli et al., 2014). Further, low levels of negativity in an impoverished social network (small network, few members, low levels of engagement) may have a greater negative effect on mortality than higher levels of negativity in a less impoverished network (Fiori et al., 2008). Results suggesting that residents who experienced the greatest cognitive and functional impairment were most likely to experience negative emotional valence in their social networks were disturbing. Unfortunately, some studies suggest that outside sources of support may be lower for residents who have been in care longer and who experience more severe dementia symptoms (Bruce et al., 2002; Gaugler, 2005; Parmenter et al., 2012). Both current results and evidence from previous research underline the necessity of staff and visitor facilitation to improve social interactions for these residents and also suggest that consistent sources of social support, such as those provided by outside visitors and staff, may be of even greater importance for residents experiencing more advanced stages of dementia.

Triangulation of results from staff- and observer-report and resident self-report suggested that simply initiating or receiving positive relationships with coresidents may not have been enough to influence residents’ feelings of support or isolation. Balanced, reciprocal positive relationships helped residents to feel more socially supported. Residents who felt more socially isolated were perceived by staff to experience a greater number of negative relationships featuring imbalance, such that they may have experienced exclusion, aggression, and ‘bullying’ without responding in kind. Residents reporting higher objective isolation were perceived by staff to have initiated more negative ties that were not reciprocated, suggesting that they may have been more likely to show aggression, to bully, and to exclude others.

Acknowledging and addressing negativity between residents from a socio-emotional perspective is of fundamental importance to clinical practice. Recognising aggression and negativity in resident relationships is neither a judgment of the residents as individuals nor a condemnation of the practice of care staff. It is at its core

a recognition of the 'normality' of residents' actions and interactions when viewed in the context of their social environment and their current biopsychosocial capacity (Zwijnen et al., 2016). Wellness and flourishing are not the product of denying or eliminating all negative and otherwise emotionally challenging interactions between nursing home residents. The empirical evidence suggests that wellness and flourishing are hallmarks of a sense of security, support, and autonomy. Better clinical practice in this context may be a matter of helping residents find and maintain their daily emotional equilibrium (Meeks et al., 2012). The role of staff and visitors in assisting with this process is of particular importance.

Most residents in the current study had multiple roommates and many residents, particularly residents in the DSU, spent most of their daylight hours in close proximity to multiple coresidents in common areas. Previous research has indicated that negative, aggressive interactions between residents are more likely to occur with frequent contact within restricted spaces (Ferrah et al., 2015; Jones, 1975). Positive interactions are more likely to occur when residents have choice and opportunity for both closeness and privacy/distance (Firestone et al., 1980; Fleming, Goodenough, Low, Chenoweth, & Brodaty, 2016; Schafer, 2015). Residents with greater cognitive-functional capacity regulate their exposure to coresidents by withdrawing from common areas to more private spaces (Hauge & Kristin, 2008). Structuring care routines to provide residents with reduced cognitive-functional capacity the choice and opportunity for time 'with others' as well as time 'alone' doing something they enjoy may reduce aggression and increase positive interactions.

Findings from observational data suggest that the mere presence or absence of staff and visitors across the day influenced resident interactions as did staff and visitors' involvement in resident interactions. Care routines created time-activity contexts for resident actions and interactions and cued residents to focus on staff during care or structured activities. The absence of staff and visitors represented temporary breaks in residents' daily care routines and prompted residents to look to one another for social cues and stimulation. The uncertainty and opportunities created by these momentary 'gaps' in supervision led to a range of congenial and aggressive interactions.

In the process of attending to their duties and responsibilities in implementing care routines, staff made choices that influenced residents' social interactions across the day. For instance, how and where staff chose to place residents amongst their coresidents in common areas directly influenced some residents' options of interaction partners, the sensory input they were exposed to, and their disengagement options. In

many cases, the choices that managers and care staff made in regulating the residents' physical/sensory environment (i.e. TV and radio volume, temperature control) constrained the ability of residents to regulate their socio-emotional experiences.

Staff and visitor facilitation of resident interactions did not guarantee that residents interactions ended in 'connected' social states. However, facilitation appeared to mitigate negative effects of confusion that may have otherwise led to aggression. While trajectories described interactions in the moment, some residents experienced 'connection' or 'disconnection' as a superordinate state. Residents in an enduring superordinate state of 'disconnection' were present; they neither 'reached out' to coresidents nor experienced being 'approached' by coresidents. Residents in a superordinate state of 'connection' could be 'approached' and experience disconnection from others in the moment but through having a close relationship with a coresident (family member or true friend) they remained socially 'connected' even in the temporary absence of their friend or partner.

We did not assess behavioural and psychological symptoms of dementia (BPSD) in this study. However, it may be hypothesised that BPSD influenced the quality of social interactions between residents. Apathy and depression are among the most common BPSD (Brodaty et al., 2015). Three-quarters of residents who consented to interview had a charted mood disorder. Lack of initiation makes it difficult to begin conversations and can lead to further misunderstanding or misattribution (she is 'stand-offish', 'he ignores me', 'they can't understand'). Observations suggested that some residents spoke impulsively and without reflection. This may have been hurtful to others and when left to their own devices without moderation or explanation there was misattribution and no room for reappraisal.

6.5.1 Summary

Expecting residents to recognise and maintain multiple close relationships with coresidents may be unrealistic and beyond the capacity of some residents with moderate to severe dementia. Interventions to increase perceptions of sharing, reciprocity, and interconnection between existing relationships may foster feelings of social support and connectedness among residents. Some residents with higher capacity may benefit from more 'redundancy' in their networks. Others may prefer their own company or derive greater benefit from relationships with staff and visitors. Defusing and mitigating negativity in residents' relationships may be as important to promoting their health and wellbeing as nurturing their enriching, supportive

relationships. Appropriate application of interventions to improve residents' relationships requires assessment of individual capacities, social experiences, and preferences.

6.6 Research implications

Recent research investigating how social networks are encoded and stored in memory has suggested that people use 'compression heuristics' to manage their cognitive representations of network information, recalling their relationships in triads (i.e. three mutual friends) or other sub-groups (i.e. 'my family') rather than remembering a network by each individual dyadic tie (Brashears & Quintane, 2015). However, in this study residents were asked to identify their friends with the use of individual photographs prompting recall for dyads over groups. Future research could investigate different approaches to 'name generators' for residents with reduced cognitive capacity in order to test their usefulness and benefit, for example whether asking residents to recall groups of people prompts use of 'compression heuristics' and aids in recall and recognition of network members. Alternatively, researchers could test whether asking residents to identify others through describing them, thus using the residents' own 'best available information', is more or less effective at identifying network members than traditional methods of recalling names and recognising people in still frame photos (Saunders et al., 2011). Moreover, similar research could further explore whether recalling individual relationships or recalling groups using 'compression heuristics' influences subjective perceptions of social support.

SNA allowed visualisation of relational patterns that contributed additional insight into how residents may have viewed and acted upon opportunities within the broader social environment. However, these data offered only a portion of a whole picture and triangulation and interpretation of data in context facilitated greater understanding of the larger picture. For example, interview and assessment data indicated that residents' concepts of friendship were based heavily on schema they had established prior to entering the facility. Yet, findings suggested that residents' attachment styles may have changed since entering care and attachment-style profiles were associated with the size and quality of residents' social networks. These findings highlight multiple implications for future research. Long-term aged care residents may continue to apply the beliefs and expectations of friendship that they have formed across their lifespan when assessing the relationships that they form after entering residential aged care. Concurrently, variables associated with living in the residential

aged care environment may cue or even alter residents' attachment behaviour (Cicirelli, 2010; de Vries & McChrystal, 2010). Longitudinal research commencing at the point when people enter care could identify and track changes in residents' friendship schema and their internal working models of self/other as reflected in dimensional attachment style profiles (Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994). These data could be used along with longitudinal relationship data to study the possible strength and direction of influence between these variables.

How clinicians and direct care staff view the interactions and relationships of residents, particularly residents with dementia and those who have reduced functional capacity, may have long-term ramifications for their wellbeing. Clinicians and care staff need to understand the cumulative effects of residents living in continued states of social disconnection in long-term aged care and the potential impact of repeated asynchronous interactions, asymmetric relationships, and negative socio-emotional imbalance. Care staff and managers should strive to understand the social implications of care routines and the potential social effects of seemingly incidental choices of placement and proximity. Understanding these aspects of care both provides and requires a better understanding of the socio-emotional meaning of social interactions for the residents involved. While we don't know how specifically to improve social care, care staff awareness of the resident's viewpoint and the impact of their own behaviour may help. Longitudinal research could investigate the cumulative effects of the quality of resident interactions on resident wellbeing and the immediate and more long-term social implications of care routines and staff choices.

Future intervention research could study evidence-based psychosocial interventions that promote friendship and positive interaction among residents, as well as investigate the differential influence of negative interactions. In their overview of friendship intervention resources, Adams and Blieszner (2015) note that interventions to improve social relationships need to target specific levels of change. Changing individuals' patterns of behaviour in friendships requires either altering the personality dispositions that influence the way they relate to others or altering the person's structural position in a network that influences their opportunities for forming friendships (Adams & Blieszner, 2015). Future research could investigate the effectiveness of interventions at the level of individuals or small groups that identify residents' beliefs and schemas of friendship and use cognitive therapy techniques to introduce more positive yet practical ways for residents to think about themselves and their expectations of relationships with others in their residential context (Adams & Blieszner, 2015; Clare et al., 2010; van Paasschen et al., 2013). Homophily plays an

integral role in 'liking' new people (Launay & Dunbar, 2015). Research could also investigate whether liking can be increased by focusing resident attention on 'homophily' around salient traits such as similar musical tastes and shared past experiences. Future research could determine whether 1) improving relationships between coresidents leads to improvements in residents' engagement and perceived support and/or 2) whether helping residents to maintain a positively 'balanced' ratio of supportive and less supportive relationships is the key to greater wellbeing. Moreover, research could determine whether individualised person-centred interventions targeting aggression between residents could lead to less withdrawn behaviour and improved perception of social support.

Findings in this study also inform broader friendship and relationship research by highlighting the need to interpret social network data contextually. The case of Unit 1 resident 'Lily' presented an example. 'Lily's' perceptions and position in the network may have provided her with multiple social opportunities and choices, prompting her to feel less constrained and more agentic than other residents in different network positions. In a typical network structure, 'Lily' may have had the power to influence others and strengthen the larger network by bringing together people that she knew (Cornwell, 2009, 2011; Schafer, 2013). However, the objective choices available to 'Lily' within this residential aged care environment (i.e. many of the residents were difficult to introduce to each other), combined with her personal capacities (i.e. immobility, reduced speech), limited her ability to capitalise on potential opportunities to facilitate friendships between others. Future research could identify potential scope for expanding and adapting interpretation of network analyses to accommodate the social context in residential aged care environments.

6.6.1 Summary

Future research could investigate how people with dementia recall their relationships and if the use of group heuristics is beneficial. Longitudinal research commencing at the point when people enter care could identify consistency and change in residents' friendship schema and dimensional attachment-style profiles and associations between these variables and social network characteristics. Moreover, longitudinal research could investigate the cumulative effects of interactions on resident wellbeing and the immediate and long-term social implications of care routines and staff choices. Intervention research could determine whether individualised interventions to reduce aggression lead to less withdrawn behaviour and improved perception of support. Research could further determine whether improving

relationships leads to more engagement and perceived support and/or whether a greater balance of supportive over less supportive relationships is essential.

6.7 Theoretical implications

6.7.1 Social convoy theory and weak ties

Residents in this study had lived in care for an average of 18 months, less than the average length of stay of over three years in Australian aged care facilities (AIHW, 2015). Results from this and previous research indicated that close relationships between residents can form within limited time spans (Kemp et al., 2012). However, residents in this study felt that they lacked sufficient time to know one another “well enough” and form close bonds. Thus, relationships that formed may not have progressed and provided support in a manner similar to those in other settings (Kemp et al., 2012; Perkins et al., 2013). Relationships between residents in care were complex, multi-dimensional and dynamic. They influenced, and were influenced by, broader patterns in the network structure. Cumulative experiences with coresidents over days, weeks, and even years in the long-term residential aged care context may have negatively affected residents’ social functioning and led to withdrawal for some and complete social isolation for others. These findings support the convoy model of social relationships indicating that network characteristics, relationship characteristics, personal characteristics, and cumulative experience are all important to older adults’ experience of relationships (Antonucci et al., 2013).

Previous research that applied the convoy model to interpret cross-sectional associations between the social relationships and health of cognitively capable residents reported similar findings to those of the current study (Perkins et al., 2013). Both studies indicated that residents: had few friendships with coresidents; selectively chose friends; established emotional boundaries between themselves and coresidents; formed relationships based on homophily; and felt that they had insufficient time to establish intimacy and form true friendships. Perkins et al. (2013) reported that residents associated higher wellbeing with having a few weak relationship ties with coresidents. Residents in the current study reported a greater number of weak and moderately strong relationships than friendships and their reports triangulated with staff and observer reports. Although wellbeing was not directly measured in this study, having a greater number of positive relationships was associated with greater perceived social support and thus less feelings of social isolation. The social convoy model is typically applied to sets of relationships that form, develop, and change across

extended time-frames rather than the brief time period described in this study (Antonucci et al., 2013). However, results from this study add to evidence that the convoy model can be applied to interpret associations between social relationships that develop during residents' time in care and the effects that these relationships may have on social cognitions and behaviour.

Results highlighted a small number of spontaneously reported boundary-crossing relationships between residents from different care units. Most of these relationships included residents without a dementia diagnosis and those with dementia who had short-term memory capacity. Weak ties in the current study neither acted as bridges that connected groups of residents and led to a wider 'spread' of social support, nor provided access to more tangible resources for the individuals involved. Evidence suggests that weak ties provide a sense of support and community with limited obligation and less emotional risk than that involved in strong ties (Fingerman, 2009; Wright et al., 2010). In the long-term aged care context, the relationship and the person with whom the resident was connected, the socio-emotional benefit of having someone to talk and visit with, may have been the most valuable resource. Weak reciprocal ties with another resident who acknowledged them as a unique and valuable person may have enabled residents to feel supported with minimal obligation or emotional risk (Fingerman, 2009). This would suggest that these relationships may have been based on a 'communal' expression of shared emotions similar to those outlined in Wright's self-referent model of friendship (Wright, 1984). In accord with this model, and interpreted within the context of impoverished social networks, weaker positive relationships may have become self-sustaining within a brief time period because the relationships were a reward in themselves. Residents with high care needs may have found weaker ties beneficial because weaker relationships provided optimal socio-emotional benefit with limited obligation or risk. Residents with reduced capacities were capable of reciprocity and mutuality at low levels of socio-emotional commitment and therefore were more likely to maintain these relationships.

Staff and observer data indicated that resident networks were interconnected and resident self-report indicated very few shared ties. Results appeared to contradict social network theory predictions that people who were aware of sharing strong bonds of friendship would feel compelled to become friends themselves. Results supported predictions that people who were aware of sharing weak ties would not feel obliged to connect these relationships (Granovetter, 1973). However, residents were not asked to identify relationships between others and at no point during the study did any resident indicate an awareness of relationships between other residents. Data did not confirm

whether or not residents were capable of identifying relationships that were connected beyond one-step distance or one 'degree of separation'. In other words, we do not know if residents knew who their friends were friends with.

Therefore, another explanation for this study's results in relation to social network theory is the level of cognitive and functional capacity of residents. Among younger adults (18-65 years of age), the size of an individual's close friendship network is constrained by their social cognitive capacity in perspective-taking (ToM). The size of the larger network of people that they interact with frequently (i.e. weekly and monthly) is correlated with short-term memory performance (Stiller & Dunbar, 2007). The ability to capitalise on 'bridging' relationships is embedded in the ability to detect shared relationships (Almaatouq et al., 2016; Granovetter, 1973). Greater cognitive impairment has been associated with an inability to detect bridging opportunities and greater functional impairment has been associated with fewer weak ties and less bridging potential (Cornwell, 2009). People who are aware of sharing relationships must also recognise benefit in connecting others. They may feel social obligation to connect others in order to establish emotional symmetry and reduce their own cognitive dissonance (i.e. 'I feel more comfortable when the friend of my friend is my friend too'). Residents with reduced cognitive and functional capacity may have had limited bridging potential, been unable to detect shared relationships, and/or may not have felt obliged to connect others.

6.7.2 Socio-emotional selectivity theory and self-reported relationships

The patterns of selectivity in relationships predicted in socio-emotional selectivity theory were present in residents' approaches to relationships with coresidents. Residents clearly chose relationships with specific coresidents over others. Asymmetry in relationships was common as has been reported for people of other ages and in other social settings (Carley & Krackhardt, 1996; Vaquera & Kao, 2008). However, results suggested that many residents may have actively sought to maintain emotional equilibrium by narrowing their social networks and eliminating relationships with coresidents entirely. Residents' closest, most enriching supportive relationships may have been in their past or with others who lived in the community, and residents were surrounded on a daily basis by unsupportive and even detrimental relationships (English & Carstensen, 2014).

Residents in this study had little control over when and with whom they interacted (Firestone et al., 1980). The emotional valence of networks appeared to contribute to residents' daily emotional experiences as has been reported in previous

research with older adults (English & Carstensen, 2014). Most residents had multiple diagnosed health conditions. They were frail and highly dependent in activities of daily living. A high proportion of residents had mood disorders. The experience of having physical and mental health conditions could have been negative and stressful for residents (Judge et al., 2010). Previous research has indicated that people who are experiencing multiple negative, stressful life events experience higher negative affect associated with negative interactions (August et al., 2007; Ingersoll-Dayton et al., 1997). Results in the current study and others point to implications that aged care residents with reduced capacity may feel vulnerable and emotionally 'stressed' and therefore may experience higher negative affect associated with negative interactions (Barredo & Dudley, 2008; Clare et al., 2008; Meeks et al., 2012; Miller et al., 2015). This makes findings of greater imbalance between negative and positive interactions more concerning. If interactions and relationships with coresidents are predominantly negative, residents may need greater diversity in their social networks, including non-resident relationships, in order to achieve and maintain positive emotional equilibrium (Nakrem, Vinsnes, & Seim, 2011).

6.7.3 Relationship-stage model and network characteristics

In social network analyses 'tie strength' represents behaviours, cognitions, and emotions that contribute to the subjective experience of closeness in relationships. Tie strength is predicted to increase as people spend more time together, experience reciprocity, increase homophily, and increase emotional intensity in their relationship. Conversely, greater diversity is associated with weaker ties between network members (Granovetter, 1973). Residents in the current study came from diverse cultural, linguistic, and religious backgrounds. Although tests indicated no significant associations between cultural and linguistic diversity and network variables, heterogeneity may have made the formation of close relationships more difficult or less likely.

Concurrently, the basic processes of proximity, familiarity, homophily, and physical attractiveness that are traditionally assumed to promote the formation of intimate relationships in typical life contexts (schools, workplaces, neighbourhoods) may not have the same effects on the formation and maintenance of relationship ties for cognitively impaired residents in nursing homes. In the same way that children and adults living in other enforced residential environments (i.e. boarding schools, group homes, prisons) develop new social strategies (Emond, 2014; Greer, 2000; Kreager et al., 2016; Kreager et al., 2015; Larson & Nelson, 1984), residents with dementia

navigating forced social interactions and unfamiliar relationships may develop strategies and social-behavioural patterns that influence and are influenced by their social encounters with coresidents. Residents routinely shared the same living spaces and resources. Yet, interview and observational data suggested that most residents' relationships had not progressed past preliminary stages of superficial engagement. Relationship-stage models linking familiarity and attraction predict that initial encounters at this stage of superficial 'surface contact' may be pleasant and enjoyable as people try to make a good first impression and reveal interesting or attractive aspects of themselves (Finkel et al., 2015; Levinger & Snoek, 1972). This may explain in part why studies report that people with dementia show more interest in one another and engage in predominantly positive actions and interactions in social paradigms with novel social partners and settings (Feyereisen, 1994; Mabire et al., 2016; Wiersma & Pedlar, 2008). However, models predict that relationships may deteriorate when people remain in this superficial stage of 'surface contact' for extended periods of time, perceive more unappealing qualities in one another, and become oversaturated with the same information and experiences to the point of boredom or disgust (Finkel et al., 2015; West et al., 2009). Findings of weak positive relationships, dislike, and disengagement among residents suggest that enforced propinquity and overexposure to others in aged care contexts is not conducive to increased perceptions of homophily and 'liking' that could lead to deeper connections. Rather, these circumstances may promote the negative effects of long-term 'familiarity' breeding disinterest or contempt.

6.7.4 Summary

The relationships that residents perceived resulted in part from opportunities provided by their position within the network structure. As predicted by socio-emotional selectivity theory, residents may have chosen to pursue, ignore, or alter those opportunities and hence enlarge, maintain, or contract their social networks. The presence of many isolated residents, the lack of redundancy in resident networks, and the lack of interconnection between relationships suggest that residents typically chose the latter options. However, it is unclear whether residents were making conscious choices to reduce and limit their social roles and networks in the residential aged care context or whether cognitive and functional impairment limited their ability to detect opportunities and strengthen existing networks. Results imply scope for incorporating relationship-stage models of familiarity and attraction to expand interpretation of the variables influencing social networks of people with cognitive impairment living in long-term aged care contexts.

6.8 Study strengths and limitations

6.8.1 Methodological strengths

6.8.1.1 Including the views of people with moderate to severe dementia

The greatest strength of this study was the significant contribution of the residents who participated. It is widely acknowledged that the involvement of people with dementia is fundamental to quality dementia care research (Beuscher & Grando, 2009; Cotrell & Schulz, 1993; Moore & Hollett, 2003; Nakrem et al., 2011). Residents' views of their own relationships provided the starting point for this study and three quarters of these residents had a diagnosis of dementia.

6.8.1.2 Including residents from diverse backgrounds

The study was strengthened through the inclusion of people from diverse cultural and linguistic backgrounds. The diversity of the residents who participated in this study reflected the diversity of the city and community where they lived. Taking a sociometric approach to analysis meant taking an inclusive approach. Five family members acted as interpreters during interviews for residents who could no longer communicate in English. Consulting and collaborating with these residents and their families facilitated their unique contribution to the research and acknowledged their personhood. Inclusion of residents from heterogeneous cultural and linguistic backgrounds also contributed to qualitative understanding of how linguistic differences may have exacerbated confusion and led to disconnection in interactions, and how reduced homophily promoted the formation of weaker relationship ties.

6.8.1.3 Establishing rapport

Establishing familiarity and rapport with residents, staff, and visiting family was an essential part of the collaborative process. It strengthened the study and facilitated sharing of meaningful personal perspectives. Collecting observational data in the ten days prior to resident interviews allowed time for the residents to become familiar with me and to become desensitised to my appearance in their environment. It provided time for residents to ask questions and decide for themselves if they wished to engage, trust, and share information. It also allowed time for me to become familiar with individual residents' capacities and their manners of expression, and to begin to understand nuances in their individual non-verbal communication strategies (Allan, 2006; Dahlke et al., 2015; Moore & Hollett, 2003). This further enabled me to learn

from residents and to gauge the most appropriate times and places to approach residents for interviews.

6.8.1.4 Using adaptive communication strategies

Residents assented to interviews and provided information as they chose. Once residents chose to engage, adaptive strategies facilitated communication in interviews. The use of visual aids and adaptable strategies enabled greater opportunity for residents to answer questions about their own relationships (Moore & Hollett, 2003). Residents who could not express themselves with speech responded with non-verbal communication including pointing, nodding, and directed gaze. Large-print response cards allowed scope for residents who could read to use non-verbal signals to indicate choices on surveys in semi-structured interviews.

6.8.1.5 Identifying multi-valenced social networks

This is the first study to use social network analysis to demonstrate multiple networks of positive and negative emotionally valenced relationships between people, including those with moderate to severe dementia, residing in a high-care residential aged care environment. The data used in analyses of negative relationships were based on the perceptions of direct care staff and the observer. In previous qualitative studies both staff and residents have identified positive, negative, and ambivalent relationships between people with dementia in residential care (Pillemer et al., 2012; Rosen, Lachs, et al., 2008; Rosen, Pillemer, et al., 2008; Trompetter et al., 2011). This study filled gaps in the literature by using network analysis methods to quantify and illustrate negative relationships between residents with dementia in a high-care setting. Findings that attachment style and pre-existing friendship schema may influence residents' social choices extend the literature on selectivity in friendships and social relationships between residents with dementia (Abbott et al., 2015; de Medeiros et al., 2012; Perkins et al., 2013). Results from observational data extend findings from previous studies in long-term care regarding: the quality of interactions between residents; sequences of events and states in interactions; frequency and patterns of interactions in specific time-activity contexts; and inferred socio-emotional outcomes (Baltes et al., 1987; Carstensen & Erickson, 1986; Casey et al., 2014; Mabire et al., 2016; Pillemer et al., 2012; Rosen, Lachs, et al., 2008).

6.8.1.6 Rigour through triangulation of data

Multiple methods were employed based on their complementarity, each adding methodological strengths and balancing their respective shortcomings. Observational

data collected using participant-observation was triangulated with resident self-report and staff-report of residents' positive relationships from semi-structured interviews. These data were compared and analysed with resident self-report of perceived social support and isolation and staff-report of residents' level of social engagement or withdrawal. Exploration of associations between resident personal attributes and social network variables highlighted potential reflexivity of influence, with resident attributes influencing social interactions and broader patterns in social networks and residents' position in social networks influencing their actions and interactions.

6.8.1.7 Using an iterative holistic process

Interacting with observational transcripts in a highly iterative process added strength and methodological rigour to qualitative data analyses. I fulfilled the role of participant-observer and coded all observational data. Field notes of residents' interactions were transcribed sequentially and combined with daily diarised information and details of the environmental context including maps of room layouts and seating arrangements. Samples of transcripts were read and reviewed by a supervising researcher with experience of qualitative enquiry in dementia care research. Rigour in analyses was enhanced during the analysis process through meetings with experienced dementia care researchers to discuss analytical concepts and the abstraction of data into groups and categories. I repeatedly read the original transcripts to obtain a deeper understanding of the content in context, informed by triangulation of study data and the impressions of supervisory researchers. Repeated interaction and multi-faceted interrogation of data enhanced understanding of meaning and flowed into the development of a novel psychosocial approach for coding observational field note data.

6.8.1.8 Creating a novel psycho-social approach to coding

A novel psychosocial approach for coding and analysing observational field note data enabled identification of consistent and unique patterns of social interactions among residents with dementia. Conceptualising residents' experiences as a series of 'social resting states' emphasised the consistent influence that residents had on one another's socio-emotional status. The psychosocial coding enabled inference of meaning in social interactions between residents in the moment and in the larger social context. Examining the sequence of states and events as an interaction 'trajectory' highlighted how multiple internal and external variables contributed to 'positive' initiation and intentions ending in negative states of disconnection. Viewing resident interactions from these perspectives offered greater understanding of the immediate

socio-emotional effects of interactions and the possible cumulative influence of interactions and relationships on perceptions of social support or isolation.

6.8.2 Methodological limitations

6.8.2.1 Cross-sectional design

Due to the cross-sectional nature of data, causality cannot be inferred. Study results may reflect effects of factors specific to the moment in time. The design allowed a 'snapshot' of resident social networks and did not allow exploration of the dynamic nature of resident networks or the development of relationships. The design also limits theoretical interpretation of results using the convoy model and socio-emotional selectivity theory as both are typically applied to changes in relationships over extended periods of time.

6.8.2.2 Sample size

Small sample sizes within care units and a small sample size overall meant that correlational analyses were powered only to detect strong statistically significant relationships. The location of the study within three care units of one facility limited generalisability of the results. Long-term aged care facilities vary widely in their physical, social, and organisational environments (Fleming et al., 2016; Knight & Mellor, 2007). Results may have reflected effects of factors specific to the site, the individual care units, or to the larger organisation (Jones et al., 2013; Rijnaard et al., 2016). Further research involving multiple site comparison would increase generalisability of results.

6.8.2.3 The built environment

The participating facility was housed within a recently renovated building that had not been built according to dementia design principles (Fleming & Purandare, 2010). The quality of the built environment has been associated with the quality of resident social interactions and self-reported quality of life (Fleming et al., 2016; Jones, 1975; Pillemer et al., 2012; Schafer, 2015). The effects of the quality of the built environment on residents' social interactions and relationships were not addressed in this study. It is possible that characteristics of residents' interactions and relationships were influenced by tangible and intangible aspects of their physical living environment.

6.8.2.4 Participant characteristics and effects

Although descriptive data indicated that residents shared similar characteristics to other Australian residents of aged care facilities, residents who assented to be interviewed in this study may not have been representative of the total facility population. Residents who did not consent to interviews may have represented a more socially withdrawn and isolated segment of the population. Conversely, interviewed residents had higher rates of diagnosed mood disorders (as noted in medical charts) than has been reported previously for Australian residents with dementia living in high-care facilities (AIHW, 2013; Snowden & Fleming, 2008). Higher rates of depression may have meant that interviewed residents were more socially withdrawn than other residents.

6.8.2.5 Context effects

Experiences accrued from living in an institutionalized setting can affect the way that individuals respond to the interview process. Interviewed residents had been in formal care from 3 months to 10 years and hence being asked questions about their feelings and experiences by people resembling staff or medical professionals was routine. However, from the residents' perspective this could mean that information would be shared about them in a way that could affect their treatment or living situation. This may have motivated some residents to censor their own responses in interviews and surveys. However, self-censoring in interviews was unlikely given the level of dementia severity experienced by most residents.

Interviews took place at the residents' convenience and frequently occurred in common areas. Background noise and visual distractions may have made following questions and focusing difficult for residents. Residents also may have been aware of the presence of others in the area at the time of interview, which may have created performance effects during the interview process.

6.8.2.6 Participant and researcher effects

It is possible that the observer's mere presence inadvertently altered social dynamics and that resident, staff, and visitors behaved differently during observational data collection than they would typically. Participants may have felt motivated to behave in socially desirable ways, to make a favourable impression, and to present themselves in the 'best light' (Davis, Couper, Janz, Caldwell, & Resnicow, 2010; McCambridge, Witton, & Elbourne, 2014; Van Tilburg, 1998). Results suggest that some residents may have been susceptible to other forms of response bias including

acquiescence ('no opinion') and satisficing (providing adequate but incomplete information; Krosnick, 1991; Narayan, 1995).

Asking residents to explain what friendship meant to them and what they liked to do with friends before asking them to identify friendships with coresidents may have introduced question-order effects. The first two questions may have cued idealised schema and memories of past relationships. This may have then created cognitive dissonance between their ideals of friendship and the realities of their current relationships, motivating them to downplay or under-report current relationships with coresidents.

Some residents spontaneously identified negative relationships with coresidents during interviews and observations. This provided insight into perceived barriers to friendship. However, residents were not specifically asked to identify negative or ambivalent relationships. Therefore the study did not capture self-report network data for these relationships to compare with standardised measures of social support and engagement.

6.8.2.7 Limited staff involvement

Only six staff were interviewed, providing limited insight into staff perceptions overall. The reasons behind the different perceptions of staff, residents, and the observer in this study were important. However, the methods chosen for this study focused primarily on resident and observer perspectives and did not include assessments to verify exactly what influenced staff perceptions. Staff were asked to identify relationships but not to identify how they arrived at their conclusions.

6.8.3 Limitations of network measures and standardised assessments

6.8.3.1 Identifying people and relationships

Methods used to study social relationships in other age groups and among cognitively capable people may not have worked as efficiently with older adults who experienced reductions in cognitive and physical capacities. Some residents in this study were aphasic and unable to speak clearly and some had limited ability to move their hands and limbs. There were minimal opportunities to clarify responses with residents who experienced reduced speech capacity. Although interview methods included the opportunity for residents to recognise and identify coresidents from recent photographs, some residents were unable to recognise faces from static two-dimensional images. This meant that residents who could neither recall names nor identify photos could only identify others through describing them or through using non-

verbal communication. Although the use of adaptive communications strategies was a strength in this study, non-verbal communication necessarily required attempts to verify and interpret residents' responses in the moment using the best available information in context. Thus residents who experienced significantly reduced capacities may have had limited ability to identify other residents and their responses were subject to interpretation in the moment. It was possible that the meaning and intent of resident responses may not have been translated fully in these instances.

6.8.3.2 Adapting the LSNS-6 Friends subscale for this study

The adapted version of the Lubben Social Network Scale-6 Friends subscale was not pilot tested with RACF residents with dementia to determine the usefulness of multiple time-frame options prior to its application in the study. Although high Cronbach alphas for the monthly and weekly time-frames indicated excellent and acceptable internal validity, respectively, the daily time-frame alpha and the total combined scale alpha indicated poor validity (Lubben et al., 2006). Dunbar and Spoors (1995) determined network size and support cliques by asking community-dwelling adults to name people they contacted daily, twice-weekly, weekly, once a month, and those contacted regularly but less than once a month. Their results suggested that monthly contacts represented the size of individuals' larger network or 'sympathy group' and weekly contacts represented stronger ties in the 'support clique' (Hill & Dunbar, 2003; Roberts, Wilson, Fedurek, & Dunbar, 2008). Items in the original LSNS-6 Friends implicitly addressed residents' larger 'sympathy group' by asking who they contact at least once a month and addressed the smaller 'support clique' by asking who they could call for help or discuss important matters with. Explicit time-frames were added in the current study to align with a facility social context in which immobile residents might have relationships with coresidents that they encountered during weekly or monthly scheduled activities. However, instead of creating greater opportunity for residents to recall more individuals, adding time-frames may have clouded implicit association with support cliques. It is difficult to interpret resident responses with clarity because the adapted scale was not pilot-tested or analysed prior to use. Taken together, these confounds suggest that 1) results of the LSNS-6 in the current study should be interpreted primarily as an indicator of residents' perceptions of support or isolation, and 2) residents in this study may have been at greater risk of isolation than indicated by subscale scores.

6.8.3.3 Using survey measures with long-term care residents

Questions in the Friendship Scale were not brief and descriptions of attachment styles in the Relationship Questionnaire included multiple complex sentences. The number of residents with moderate to moderately severe dementia who were capable of responding to these surveys was impressive. Nonetheless, providing responses to these surveys was beyond the capacity of some residents due to the complexity of questions and descriptions involved. Several residents were capable of responding to the forced choice section of the Relationship Questionnaire (they chose a single attachment 'style' that best described them). However, some were unable to complete the second section and thus provide an attachment 'profile' by identifying how much of the time each of the different attachment styles applied to them.

6.8.3.4 Limitations of observational data collection techniques

Observational data were collected by one participant-observer. The observations of residents' social interactions were transcribed into hand-written field notes without the benefit of video or audio recordings. Therefore the validity of the original data is contingent upon the biases and skills of the participant-observer in accurately documenting and interpreting information at the time (Dahlke et al., 2015; Mulhall, 2003).

Observations excluded weekends, evenings, and interactions in resident bedrooms and private care areas (showers, bathrooms). Social dynamics unique to these times and spaces were not captured, leading to possible under-reporting of interactions and social relationships. Intimate conversations indicative of friendship and close positive relationships may have occurred in private spaces away from public view such as in resident bedrooms. Similarly, more negative or aggressive interactions may have occurred in the evenings or between roommates in their rooms (Pillemer et al., 2012). Residents may have received more visits from family and friends in the evenings and on weekends and different staff may have been rostered on weekends, all of which could have affected social dynamics between residents and within care units.

6.8.4 Limitations of analyses

6.8.4.1 Statistical tests

The research was largely exploratory in nature and therefore the study design did not include hypotheses testing. Among the primary aims of this research were to

explore and describe residents' friendship and social relationship networks. Accordingly, the statistical analyses conducted in this study were heavily descriptive and inferential statistics were limited to group comparisons and correlational analyses. Distributions were highly skewed for many resident attribute variables and social network variables. Data were not transformed and nonparametric tests predominated analyses. Small sample sizes and the exploration of a large number of possible predictor variables made use of higher-order statistical tests problematic. Extensive use of correlational analyses meant that results could not be interpreted as evidence of the causal effects of predictor variables.

6.8.4.2 Social network analyses

Residents' report of their own social networks indicated limited interconnection in networks. Staff- and observer-data indicated greater interconnection between residents. However, observation and staff-report indicated that the location of residents next to others in common rooms was not guided by the residents' choice and preferences. Observation of residents who walked together in corridors indicated that proximity in these instances may have been coincidental or that the residents involved did not appear to be walking together in order to engage in a specific social relationship. Residents' level of awareness of relationships between others, and their awareness of having 'friends' or relationships in common with others, was not explored in this study. Considering these factors, and with a view to presenting the most parsimonious description of residents' relationships and networks, social network analyses purposefully focused on dyads without presenting analyses of triadic formations (involving three residents). It is likely that shared relationships existed between three or more residents who were aware of one another and aware of the associations between others. The presence and extent of these small group relationships were not captured in this study.

Concurrently, the inability to interview all residents living in each care unit created incomplete sociometric data. Low proportions of reciprocity in friendship and positive ties appeared to suggest 'imbalance' in the way residents perceived the network. Only a limited number of residents were interviewed, making it impossible to verify relationship strength and directionality with all relationship partners. Although asymmetry is common in real world friendship data, it is important to acknowledge that asymmetry was a result of methodological issues as well as differences in resident report. Both true non-reciprocity, indicating that a given nomination was not returned (given but not reciprocated, received but not reciprocated), and non-confirmation of

reciprocity, indicating that the resident who was nominated could not provide network data (not consented to interview or unable to complete interview), were both reflected in the data.

Residents were not asked to identify problematic relationships. Therefore, comparisons could not be made between staff- and observer-report of negative and ambivalent relationship networks and residents' perceptions of their own relationships. This also meant that ratios of positive-to-negative relationships were based solely on observation and staff-report and not on resident report of their own experiences.

6.8.4.3 Qualitative and observational analyses

All qualitative and observational data collection and analyses were conducted by one person. I interpreted resident interactions and interview responses through lenses shaped by my training in psychology and behavioural observation and by previous experiences conducting research in aged care environments. Although discussion with experienced supervisors increased rigour and minimised subjectivity, findings reflect my philosophical influences, experiences, and perspectives.

6.9 Future directions and recommendations

Although most residents said that they enjoyed meeting friends for meals and drinks, no one in this study said that they enjoyed meeting friends for tea or lunch in the communal dining room. Neither did any regularly scheduled social activity such as 'Men's Happy Hour' or 'Women's knitting group' receive a mention. None of the structured activities that were observed to take place during the study were named as things that residents 'liked to do with friends' and none were associated with residents naming positive relationships with co-participants.

Staff, family/friends, and service providers can collaborate in order to facilitate residents' individual and collective social goals and better meet their psychosocial needs. Staff behaviours, facility characteristics, the social environment, and resident characteristics all function as facilitators in meeting residents' preferences (Abbott, Heid, & Van Haitsma, 2016). Results in the current study suggest that removing ineffective or counterproductive structured social activities and replacing them with ones that are aligned appropriately with residents' preferences could cue social schema associated with the formation and maintenance of friendships and positive social encounters. Observational data indicated that residents typically did not interact with one another during time-activity contexts when larger groups of residents and staff

were present. Previous research indicates that residents conduct more intimate conversations when visiting one another in private rooms (Kemp et al., 2012). Creating additional 'private' spaces for residents to 'talk and visit' could foster greater intimacy in relationships by providing opportunities for residents to share personal information and feelings, and thus 'get to know' one another. Further research longitudinally could determine whether improvements in coresident interactions translates to more positive and meaningful relationships for residents and ultimately to an improvement in their wellbeing.

Approaches to encouraging friendship and more positive interpersonal relationships between residents should involve the same basic steps that are used to address other important issues in care practice. Appropriate application of evidence-based strategies requires ongoing monitoring and evaluation of outcomes and subsequent reappraisal, adaptation, or cessation as indicated (Adams & Blieszner, 2015; Brownie & Horstmanshof, 2011; Low et al., 2015). Although this may represent a resource-heavy process for resource-stretched staff and care providers, simple and practical steps can lead to achievable positive outcomes (Abbott et al., 2016; Lawrence et al., 2012). Addressing residents' relationships and socio-emotional health requires learning about people, relationships, and contexts from different perspectives. It also requires recording and tracking this information, as is done for other indices of health and wellbeing (Theurer et al., 2015; Vernooij-Dassen & Jeon, 2016).

Critical perspectives are gained through consultation with residents, their family and friends, and direct care staff (Mitchell, Long, Braithwaite, & Brodaty, 2015; Train, Nurock, Manela, Kitchen, & Livingston, 2005; van Zadelhoff, Verbeek, Widdershoven, van Rossum, & Abma, 2011; Wilson, Davies, & Nolan, 2009). Results from this study and others confirm that people living in aged care, including people with moderate to severe dementia, provide invaluable information about their own relationships with others (Abbott et al., 2013; Abbott & Pachucki, 2016; Bitzan & Kruzich, 1990; Cahill & Diaz-Ponce, 2011; Carpenter, 2002; Cheng, 2009; Orrell et al., 2008; Roberts & Bowers, 2015; Schafer, 2011, 2015). This information is complemented by the perceptions of family and friends who regularly visit the person, with their added insight into the person's pre- and post-admission history (van Beek, Wagner, Frijters, Ribbe, & Groenewegen, 2013; Wilson et al., 2009). Perceptions of direct care staff can provide valuable insights into the quality of individual resident interactions in private spaces and areas away from public communal rooms. Staff perspectives also contribute to knowledge of how residents relate to one another within small- to moderate-sized groups and how different groups are connected within whole facilities (Knight & Mellor,

2007; MacAndrew et al., 2015; Retsinas & Garrity, 1985; Rosen, Lachs, et al., 2008). Further, observation of residents' social interactions aids in identifying interaction partners, provides evidence of the full range of residents' capacities for social interaction, and identifies contexts that inhibit expression of these capacities (Allen-Burge et al., 2001; Burgio & Kowalkowski, 2011; Carstensen & Erickson, 1986; Casey et al., 2014; Mabire et al., 2016; Rose & Pruchno, 1999; Vernooij-Dassen & Jeon, 2016).

Information gained through consultation lays the groundwork for collaboration between residents, family/friends, and staff to realise a shared goal of better social relationships for residents. Through collaboration, information from multiple sources can be synthesised to identify opportunities for improvement and to outline appropriate goals and actions. A recent overview of resources for friendship interventions emphasised that the basic tenet of any practice strategy or intervention to alter social interaction must be 'first do no harm' (Adams & Blieszner, 2015). Inadvertently compromising existing relationships (Adams & Blieszner, 2015) or creating forced social contexts to increase rates of interaction for those who perceive no benefit from such experiences is counter-productive and may actively foster social disconnection (Abbott & Pachucki, 2016; Carstensen & Erickson, 1986). Collaboration promotes inclusion, pools diverse resources, and can foster supportive interconnected relationships in the care environment.

Findings from this study add to evidence indicating that residents with a range of cognitive-functional capacities continue to exercise autonomy in their decisions to pursue or avoid friendships with others. Residents' preferences provide the starting points and targets of any changes or interventions. Residents' individual abilities and capacities should provide a framework for implementation strategies to meet their psychosocial needs. People with dementia may experience memory loss, emotional lability, and fluctuations in their levels of energy, attention, and interest influencing their preferences and capacity to engage socially. Residents' key preferences may change depending upon their perceptions and the immediate or larger social context (Abbott et al., 2016). The reality that residents' socio-emotional needs are dynamic underscores the importance of ongoing consultation and assessment. People with dementia may experience the world differently than people without dementia. It is difficult to meet a person's psychosocial needs without understanding how they see the world and what is meaningful to them (Zwijssen et al., 2016).

There is no cure for dementia. Better care practice cannot change the ultimate outcome for people with dementia living in long-term residential aged care. However,

people with dementia and reduced capacities who reside in long-term care are still very much socially alive. Better care practice may become restorative for residents through improving their social experiences, supporting their social identity, improving their wellbeing, and enhancing their quality of life.

6.10 Conclusion

Residents living in high-care residential aged care, including residents with moderate to severe dementia, capably discussed friendship and their social relationships in care. Residents' social networks were small and sparse. Most residents had only one positive relationship and friendships were rare. Many residents were completely socially isolated. Findings highlighted the difficulty that residents' experienced in meeting their expectations of friendship in the facility. Yet, residents who had more reciprocal positive relationships with coresidents felt more supported. Opportunities for social engagement did not necessarily translate into meaningful interactions or relationships with other residents. More residents reached out to engage with one another outside of facilitated activities. However, residents with reduced cognitive-functional capacities frequently encountered communication breakdowns when left to their own devices. Many interactions that began positively ended in rejection and disconnection. For some residents, repeated exposure to negative interactions with coresidents may have fostered dislike and social withdrawal, and thus compromised their socio-emotional functioning.

Results of this study contribute to the growing body of evidence that the perspectives and social needs of residents in care continue to be misunderstood and underappreciated. Despite improvements in research, training, service implementation and interventions, successive cohorts of residents continue to express similar unmet needs including feelings of isolation and loneliness in care. Breaking these patterns requires pushing past conceptual and practical barriers by consulting, collaborating, and facilitating to realise residents' social needs. Better care practice requires attention to the broad social context in which residents live. Care staff cannot control how residents feel about one another. Care staff and care providers can assess residents' social needs and preferences, implement evidence-based strategies to help manage and resolve conflict, and where appropriate promote positive interactions among residents who cannot do so themselves.

Aged care residents, including those with advanced stages of dementia, have unique perspectives and preferences, complex histories, and varied personal attributes

and abilities. They have qualitatively different experiences of their interactions and of their living environment associated with this diversity and they are selective in their social relationships. Whether people who enter residential aged care are cognitively capable or experience reduced cognitive capacities and dementia, they continue to think about and to be influenced by their social relationships past and present. Whether people who enter residential aged care are physically capable and walk through the door or whether they experience reduced physical capacities and are wheeled through the door, they do not leave their social identities at the door. Each person who enters residential aged care brings a lifetime's worth of social experiences and expectations with them into care. Results from this and other studies indicate that both monitoring and cultivating coresident relationships, and providing supportive alternatives to these relationships, may be important to creating a social environment that supports the personhood of residents in care. It is the responsibility of clinicians, care providers, and care staff to consider the meaning of social interactions and relationships for the residents involved, to assess their individual needs, and to tailor evidence-based care practice accordingly to support their social health and wellbeing in long-term care.

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APPENDIX A: SUPPLEMENTAL DATA TABLES

Appendix Table 1

Dementia Diagnoses, Comorbid Psychiatric Diagnoses, and Number of Psychotropic Medications Noted in Residents' Medical Charts

Characteristics	Unit 1 (N = 15)	DSU (N = 9)	Unit 3 (N = 12)	Total (N = 36)
Dementia diagnoses				
Nil, <i>n</i> (%)	5 (33.3)	N/A	4 (33.3)	9 (25)
Alzheimer's Disease, <i>n</i> (%)	3 (20)	4 (44.4)	N/A	7 (19.4)
Dementia with Lewy Bodies, <i>n</i> (%)	N/A	N/A	1 (8.3)	1 (2.8)
Fronto-Temporal, <i>n</i> (%)	1 (6.7)	N/A	N/A	1 (2.8)
Parkinson's Disease, <i>n</i> (%)	N/A	1 (11.1)	N/A	1 (2.8)
Vascular, <i>n</i> (%)	3 (20)	1 (11.1)	2 (16.7)	6 (16.7)
Multiple Sclerosis, <i>n</i> (%)	N/A	1 (11.1)	N/A	1 (2.8)
Mixed, <i>n</i> (%)	1 (6.7)	N/A	1 (8.3)	2 (5.6)
Unspecified, <i>n</i> (%)	1 (6.7)	2 (22.2)	3 (25)	6 (16.7)
Mild Cognitive Impairment, <i>n</i> (%)	1 (6.7)	N/A	1 (8.3)	2 (5.6)
Comorbid psychiatric diagnoses				
Nil, <i>n</i> (%)	5 (33.3)	1 (1.1)	4 (33.3)	6 (16.7)
Anxiety disorder—OCD, <i>n</i> (%)	1 (6.7)	1 (11.1)	N/A	2 (5.6)
Anxiety disorder—unspecified, <i>n</i> (%)	2 (13.3)	2 (22.2)	1 (8.3)	6 (16.7)
Mood disorder—Bipolar, <i>n</i> (%)	N/A	1 (11.1)	N/A	1 (2.8)
Mood disorder—Depression, <i>n</i> (%)	9 (60)	7 (77.8)	7 (58.3)	24 (66.7)
Schizophrenia, <i>n</i> (%)	1 (6.7)	1 (11.1)	N/A	2 (00)
Psychosis—unspecified, <i>n</i> (%)	N/A	N/A	1 (8.3)	1 (2.8)
Number of regular psychotropic medications				
Nil, <i>n</i> (%)	6 (40)	3 (33.3)	3 (25)	12 (33.3)
One, <i>n</i> (%)	3 (20)	2 (22.2)	2 (16.7)	7 (19.4)
Two, <i>n</i> (%)	2 (13.3)	2 (22.2)	6 (50)	10 (27.8)
Three, <i>n</i> (%)	3 (20)	2 (22.2)	N/A	5 (13.9)
Four, <i>n</i> (%)	N/A	N/A	N/A	N/A

Five, <i>n</i> (%)	1 (6.7)	N/A	1 (8.3)	2 (5.6)
Number of p.r.n. benzodiazepines				
Nil, <i>n</i> (%)	13 (86.7)	9 (100)	11 (91.7)	33 (91.7)
One, <i>n</i> (%)	1 (6.7)	N/A	1 (8.3)	2 (5.6)
Two, <i>n</i> (%)	1 (6.7)	N/A	N/A	1 (2.8)
Number of p.r.n. antipsychotics				
Nil, <i>n</i> (%)	13 (86.7)	9 (100)	11 (91.7)	33 (91.7)
One, <i>n</i> (%)	2 (13.3)	N/A	1 (8.3)	3 (8.3)

Note: DSU = Dementia Specific Unit. N/A = not applicable. OCD = Obsessive compulsive disorder. p.r.n. = 'pro re nata', meaning medication that is taken 'as needed'.

Appendix Table 2

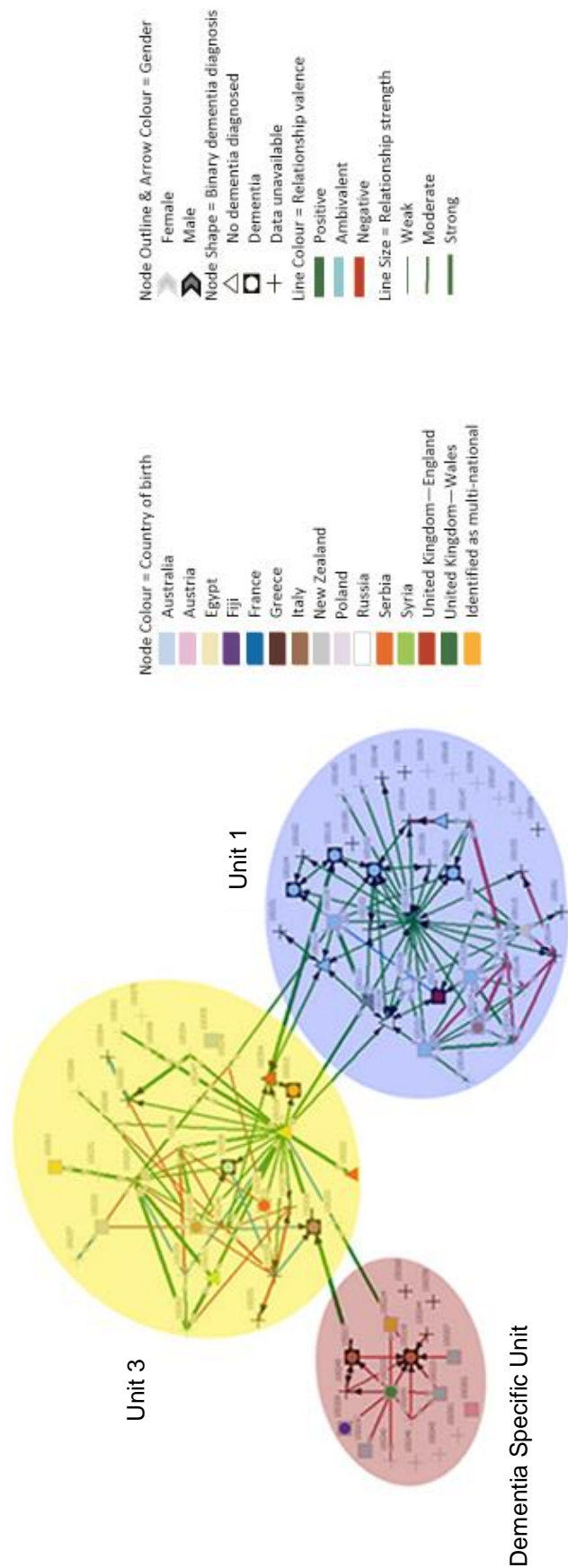
Demographic Characteristics and Current Number of Active Visitors Noted in Residents' Medical Charts

Characteristics	Unit 1 (<i>N</i> = 15)	DSU (<i>N</i> = 9)	Unit 3 (<i>N</i> = 12)	Total (<i>N</i> = 36)
Marital status				
Single, <i>n</i> (%)	2 (13.3%)	1 (11.1%)	1 (8.3%)	4 (11.1%)
Widowed, <i>n</i> (%)	6 (40%)	3 (33.3%)	3 (25%)	12 (33.3%)
Divorced/Separated, <i>n</i> (%)	1 (6.7%)	3 (33.3%)	1 (8.3%)	5 (13.9%)
Married/Partnered, <i>n</i> (%)	6 (40%)	2 (22.2%)	7 (58.3%)	15 (41.7%)
Identified cultural background				
Australian, <i>n</i> (%)	9 (60%)	3 (33.3%)	2 (16.7%)	14 (38.9%)
New Zealander, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
CALD—Austrian, <i>n</i> (%)	N/A	1 (11.1)	N/A	1 (2.8%)
CALD—Egyptian, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
CALD—English, <i>n</i> (%)	N/A	N/A	3 (25%)	3 (8.3%)
CALD—Fijian, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
CALD—French, <i>n</i> (%)	N/A	1 (11.1%)	N/A	1 (2.8%)
CALD—Greek, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
CALD—Italian, <i>n</i> (%)	1 (6.7%)	2 (22.2%)	1 (8.3%)	4 (11.1%)
CALD—Multiple, <i>n</i> (%)	N/A	1 (11.1%)	2 (16.7%)	3 (8.3%)
CALD—Polish, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
CALD—Russian, <i>n</i> (%)	2 (13.3%)	N/A	N/A	2 (5.6%)
CALD—Serbian, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
CALD—Syrian, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
CALD—Welsh, <i>n</i> (%)	N/A	1 (11.1%)	N/A	1 (2.8%)
First language				
English, <i>n</i> (%)	11 (73.3%)	4 (44.4%)	8 (66.7%)	23 (63.9%)
ESL—Farsi, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
ESL—French, <i>n</i> (%)	N/A	1 (11.1%)	N/A	1 (2.8%)
ESL—German, <i>n</i> (%)	N/A	1 (11.1%)	N/A	1 (2.8%)
ESL—Greek, <i>n</i> (%)	N/A	1 (11.1%)	N/A	1 (2.8%)
ESL—Hindi, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)

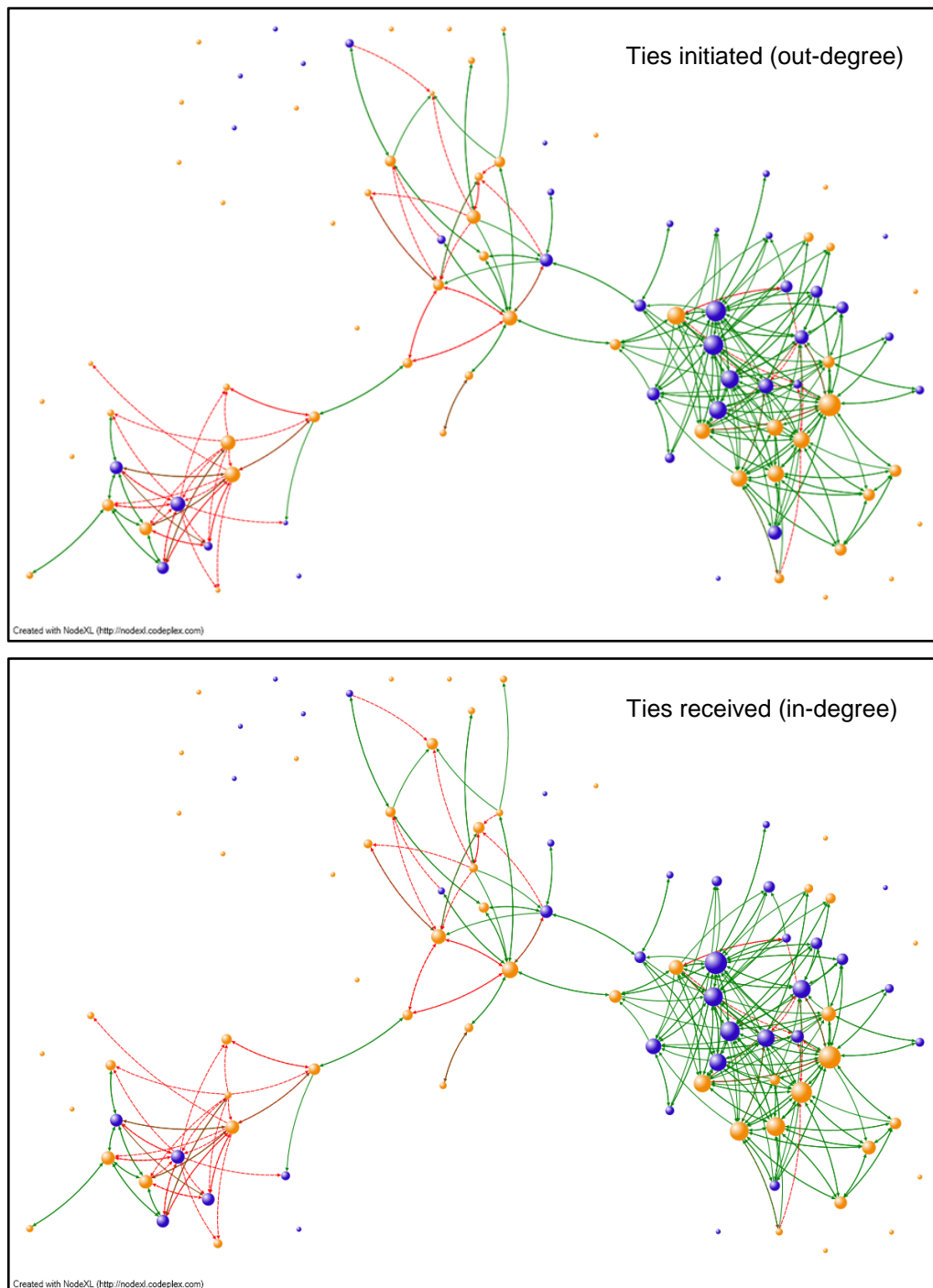
ESL—Italian, <i>n</i> (%)	1 (6.7%)	2 (22.2%)	1 (8.3%)	4 (11.1%)
ESL—Polish, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
ESL—Russian, <i>n</i> (%)	2 (13.3%)	N/A	N/A	2 (5.6%)
ESL—Serbian, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
Religious affiliation				
Agnostic, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
Anglican, <i>n</i> (%)	3 (20%)	2 (22.2%)	2 (16.7%)	7 (19.4%)
Atheist, <i>n</i> (%)	N/A	1 (11.1%)	N/A	1 (2.8%)
Baha'i, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
Catholic, <i>n</i> (%)	7 (46.7%)	6 (66.7%)	5 (41.7%)	18 (50%)
Jehovah's Witness, <i>n</i> (%)	N/A	N/A	2 (16.7%)	2 (5.6%)
Jewish, <i>n</i> (%)	N/A	N/A	2 (16.7%)	2 (5.6%)
Protestant, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
Unknown, <i>n</i> (%)	2 (13.3%)	N/A	1 (8.3%)	3 (8.3%)
Level of education				
Postgraduate, <i>n</i> (%)	N/A	N/A	N/A	N/A
Undergraduate, <i>n</i> (%)	2 (13.3%)	2 (22.2%)	2 (16.7%)	6 (16.7%)
TAFE/Professional college, <i>n</i> (%)	2 (13.3%)	1 (11.1%)	1 (8.3%)	4 (11.1%)
HSC, <i>n</i> (%)	2 (13.3%)	2 (22.2%)	3 (25%)	7 (19.4%)
School Certificate/Leaving				
Certificate, <i>n</i> (%)	6 (40%)	2 (22.2%)	N/A	8 (22.2%)
Primary, <i>n</i> (%)	2 (13.3%)	2 (22.2%)	1 (8.3%)	5 (13.9%)
Unknown, <i>n</i> (%)	1 (6.7%)	N/A	5 (41.7%)	6 (16.7%)
Previous occupation				
Manager or administrator, <i>n</i> (%)	1 (6.7%)	1 (11.1%)	2 (16.7%)	4 (11.1%)
Professional, <i>n</i> (%)	3 (20%)	2 (22.2%)	N/A	5 (13.9%)
Tradesperson or related				
worker, <i>n</i> (%)	3 (20%)	1 (11.1%)	3 (25%)	7 (19.4%)
Advanced clerical or service				
worker, <i>n</i> (%)	1 (6.7%)	1 (11.1%)	2 (16.7%)	4 (11.1%)
Intermediate clerical, sales, or				
service worker, <i>n</i> (%)	N/A	2 (22.2%)	N/A	2 (5.6%)
Intermediate production or				
transport worker, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)

Elementary clerical, sales or service worker, <i>n</i> (%)	2 (13.3%)	1 (11.1%)	N/A	3 (8.3%)
Labourer or related worker, <i>n</i> (%)	1 (6.7%)	1 (11.1%)	N/A	2 (5.6%)
Home duties, <i>n</i> (%)	2 (13.3%)	N/A	1 (8.3%)	3 (8.3%)
Other, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)
Missing, <i>n</i> (%)	N/A	N/A	4 (33.3%)	4 (11.1%)
Military service	2 (13.3%)	2 (22.2%)	1 (8.3%)	5 (13.9%)
Current number of active visitors				
Nil, <i>n</i> (%)	1 (6.7%)	3 (33.3%)	1 (8.3%)	5 (13.9%)
One, <i>n</i> (%)	4 (26.7%)	2 (22.2%)	5 (41.7%)	11 (30.6%)
Two, <i>n</i> (%)	5 (33.3%)	3 (33.3%)	4 (33.3%)	12 (33.3%)
Three, <i>n</i> (%)	4 (26.7%)	1 (11.1%)	N/A	5 (13.9%)
Four, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
Five, <i>n</i> (%)	N/A	N/A	1 (8.3%)	1 (2.8%)
Six, <i>n</i> (%)	1 (6.7%)	N/A	N/A	1 (2.8%)

Note: DSU = Dementia Specific Unit. N/A = not applicable. TAFE = Technical and further education, tertiary education. HSC = Higher School Certificate, awarded to students who successfully complete Years 11 and 12.



Appendix Figure 1. Staff-rated resident social networks including positive, ambivalent, and negative ties. Nodes represent all residents in each care unit (clockwise from lower-right corner): Unit 1= 40, Dementia Specific Unit = 18, Unit 3 = 33. Arrows indicate tie direction.



Appendix Figure 2. Graphs of observer-rated resident relationships initiated and received. Spheres represent all residents in each unit (clockwise from lower-right): Unit 1 = 40, Dementia Specific Unit = 18, Unit 3 = 33. Orange spheres represent women. Purple spheres represent men. Larger spheres indicate residents with more relationships. Line colour signifies relationship valence: green = positive, brown = ambivalent, red = negative. Solid lines indicate strong ties. Dashed and dotted lines indicate weaker ties. Arrows indicate tie direction.

APPENDIX B: PUBLISHED MANUSCRIPTS

Appendix Manuscript 1: Residents' perceptions of friendship and positive social networks within a nursing home (Casey et al., 2015)

Abstract

Purpose of the study: 1) describe nursing home residents' perceptions of their friendship networks using Social Network Analysis (SNA) and 2) contribute to theory regarding resident friendship schema, network structure, and connections between network ties and social support. Design and Methods: Cross-sectional interviews, standardized assessments and observational data were collected in three care units, including a Dementia Specific Unit (DSU), of a 94-bed Sydney nursing home. Full participation consent was obtained for 36 residents aged 63-94 years. Able residents answered open-ended questions about friendship, identified friendship ties, and completed measures of nonfamily social support. Results: Residents retained clear concepts of friendship and reported small, sparse networks. Nonparametric pairwise comparisons indicated DSU residents reported less perceived social support ($Mdn = 7$) than residents from the other units [$(Mdn = 17)$, $U = 10.0$, $p = .034$, $r = -.51$], [$(Mdn = 14)$, $U = 0.0$, $p = .003$, $r = -.82$]. Greater perceived social support was moderately associated with higher number of reciprocated ties [$\rho(25) = .49$, $p = .013$]. Implications: Though some residents had friendships, many reported that nursing home social opportunities did not align with their expectations of friendship. Relationships with coresidents were associated with perceptions of social support. SNA's relational perspective elucidated network size, tie direction, and density, advancing understanding of the structure of residents' networks and flow of subjective social support through that structure. Understanding resident expectations and perceptions of their social networks is important for care providers wishing to improve quality of life in nursing homes.

Keywords: dementia; long-term care; social isolation; social network analysis; social relationships

Introduction

Friendship is a unique social relationship (Hall, 2012) that facilitates healthy aging (Adams & Blieszner, 1995), and contributes to healthy socio-emotional functioning across the lifespan (Takahashi, 2005). Recent studies have demonstrated the continued importance of friendship and positive relationship networks for nursing home residents without cognitive impairment (Bergland & Kirkevold, 2008), and for residents with mild cognitive impairment (MCI) and dementia (Clare, Rowlands, Bruce, Surr, & Downs, 2008; de Medeiros, Saunders, Doyle, Mosby, & Van Haitsma, 2011; Leedahl, Chapin, & Little, 2015). Subjective and objective social support (i.e. friendship and social connectedness) are associated with psychological well-being (Ashida & Heaney, 2008; Carpenter, 2002). Conversely, subjective and objective social isolation are associated with poorer mental health and reduced cognitive performance (S. Cacioppo, Capitanio, & Cacioppo, 2014; Cornwell & Waite, 2009). Older adults in residential care, particularly those with dementia, are at risk of both subjective (Hawthorne, 2006; Nikmat, Hawthorne, & Al-Mashoor, 2015) and objective social isolation (Phillips, Dobbs, Burholt, & Marston, 2015). Among cognitively capable nursing home residents peer relationships (i.e. relationships with other residents) provide a unique contribution to perceived social support (Roberts & Bowers, 2015). Positive social engagement amongst residents most often occurs through staff-facilitated social activities (Casey, Low, Goodenough, Fletcher, & Brodaty, 2014).

The meaning and importance of friendship remains salient for people with mild (Harris, 2011) to moderate (Sabat & Lee, 2011) dementia. Investigating friendship and positive relationship networks can provide vital insights into the lived experience (Cotrell & Schulz, 1993), social strengths (Mok & Müller, 2014), and unmet social needs of nursing home residents with dementia (Cadieux, Garcia, & Patrick, 2013). Very few studies have used Social Network Analysis (SNA) to investigate the friendship and positive relationship networks of nursing home residents with dementia (Abbott, Bettger, Hampton, & Kohler, 2013).

Social Network Analysis

SNA methodology emphasizes the importance of the connections ('ties') between people ('nodes') and the possible benefits and / or detriments that people experience from their position within a network (Carrington, Scott, & Wasserman, 2005). Relational variables (tie strength and direction) and structural variables (network size, density, and distance) influence the flow and accessibility of tangible and intangible resources to network members (Wasserman & Faust, 1994). Close important

relationships are described as 'strong' ties and more distant less important relationships are described as 'weak' ties (Granovetter, 1973). The number of ties that an individual has with others indicates how connected or isolated that person is. A person with many ties is described as more 'central' to the network than a person with fewer ties. The direction of ties indicates whether relationships are one-sided (asymmetrical) or mutual (reciprocated). The number of relationship ties that a person reports as having with others is described as 'out-degree', whereas the number of relationship tie nominations that a person receives from others is described as 'in-degree'.

A network with interconnected relationships between many of its members has high density. In a dense network people have many ties in common and the length of a 'path' linking one person to any other person is short, involving only one or two steps (Hanneman & Riddle, 2005). For example, to reach a friend involves one step and to reach the friend of a friend involves two steps. In most circumstances people are socially engaged with others within two-step distance, or two degrees of separation (Friedkin, 1983). However persons' feelings may be influenced by others up to three steps removed in their social networks (J. T. Cacioppo, Fowler, & Christakis, 2009).

Different methodological approaches are used to collect individual-level (egocentric) network data and group-level whole (sociocentric) network data. The egocentric approach asks individuals to name people in their personal network, identifying relationships with people from different groups. The sociocentric approach asks members of a defined (bounded) group to identify relationships they have with others within that group (Carrington et al., 2005). Group membership is defined by network 'boundaries' based on location, position, activity, or events in time. When all group members are known, they comprise a network 'roster' used in interviews and surveys to investigate in-group relationships. Identifying relationships from a roster reduces recall burden and provides respondents equal opportunity to name and be named by other network members (Marin, 2004).

Nursing home care units are examples of bounded networks of residents living in defined locations within a larger facility. Methodological challenges to investigating nursing home residents' social networks include the validity and reliability of self-report and observer-report of resident relationships (de Medeiros et al., 2011), and impairments in expressive and receptive communication, cognition and perception of residents with dementia (Lloyd, Gatherer, & Kalsy, 2006; Shany-Ur & Rankin, 2011). A multiple methods strategy is required to assemble an accurate and informative representation of resident social networks (Hirdes & Scott, 1998; Wald, 2014).

This study investigated the friendships and social relationships of people with and without dementia living in a nursing home. The research aims were to: 1) describe nursing home resident perceptions of their friendship networks using Social Network Analysis and 2) contribute to theory regarding resident friendship schema, network structure, and connections between peer network ties and perceived social support.

Design and Methods

The study used purposive sampling and multiple SNA methods including interview, standardized assessment, observation, and network analyses. The setting was a 94-bed nursing home in Sydney, Australia. Cross-sectional data were collected within each of the facility's three care areas including a 42-bed unit (Unit 1), an 18-bed Dementia Specific Unit (DSU), and a 34-bed unit (Unit 3). Residents were permanently placed, in predominantly shared rooms (see Table 1). The study was approved by the University of New South Wales (UNSW Australia) Human Research Ethics Committee (HREC), Ref# HC 12208.

Participants and Consent

All facility residents without acute physical illness were invited to participate ($n = 91$). Explicit consent was obtained for residents' interview participation and collection of background information. An 'opt-out' approach applied to participation in observational data collection (National Health and Medical Research Council, 2014). Notices were displayed explaining the study and notifying residents, family, visitors, and staff of observational data collection and the right to 'opt-out'. Explicit informed signed consent was obtained from residents with capacity to consent as confirmed by the facility's Care Manager who had current knowledge of residents' cognitive status. Otherwise, verbal assent was obtained together with the informed signed consent of a legal guardian. Thirty-two residents provided assent with consent from a legal guardian to fully participate. Four residents confirmed by the care manager as cognitively capable provided consent. I met with these residents individually, explained the study purpose in simple language and confirmed with residents that they understood what they were consenting to. I continued to confirm assent through the questions and discussions exchanged with residents throughout the study. No resident opted out of observations and 91 residents were observed, three residents were acutely ill and excluded.

Data Collection

Background data. Resident demographic data (age, place of birth, spoken languages, gender, marital status and time in care) were collected from facility files. Clinical background data including dementia diagnoses, psychological comorbidities, general functional ability in sight / hearing / speech, and ability in Activities of Daily Living (ADL) using the 17-item Barthel Index (Mahoney, 1965), were collected from files and by interview. Copies of recent resident facility ID photos were obtained for use during interviews (Abbott et al., 2013).

Dementia staging. Residents' cognitive-functional ability was rated using the Global Deterioration Scale (GDS). The GDS staging instrument rates dementia severity based upon a person's deficits in cognition and function in activities of daily living. Seven stages rate level of impairment from 1 "Subjectively and objectively normal"—No memory deficit evident on clinical interview." to 7 "Severe dementia"—All verbal abilities and basic psychomotor skills are lost with the progression of this stage. Requires assistance with toileting and feeding." (Reisberg, 1982). The GDS has been shown to be a valid and reliable measure of functional and cognitive impairment across multiple dementia subtypes (Paul et al., 2002; Reisberg, 1982).

Observations. Observational data on resident social interactions were transcribed into hand-written field notes Monday – Friday typically between 10am and 5pm when residents were in common areas (i.e. dining room, TV lounge) for an average of 71 hours per care unit (213 total hours). Descriptive data regarding type, duration, frequency and staff-facilitation of structured social activities and occurrence of residents' participation in each type of activity were extracted for analysis. Participation in structured social activities was defined as residents' deliberate (not coincidental) presence at staff-facilitated activities involving at least one other resident, not including personal care or routine daily meals (Casey et al., 2014).

Resident self-report. Residents were asked "What does friendship mean to you?", "What do you like to do with friends?", and "Who are your friends here?" (de Medeiros et al., 2011). Five residents with ethnically diverse backgrounds who were no longer able to communicate in English were assisted by family members who interpreted in their native language during interviews. Social network boundaries were defined by the roster of residents who lived within each care unit. These boundaries were established to include residents with whom participants had the greatest opportunity for interaction (Carley & Krackhardt, 1996) and to reduce recall burden

during interviews (Marin, 2004). Network tie data were collected by showing residents photos of the other residents within their unit and asking residents to identify their friends (Abbott et al., 2013). Verbal responses were hand-transcribed verbatim into response booklets and descriptions written of non-verbal responses. For example, one resident answered the question “Who are your friends here?” verbally and with hand gestures. The response was written “That guy over there (points to bed of ‘resident ID’)”. Friendship strength was assessed with follow-up questions asking if the person was a ‘true friend’ (+3) or a ‘casual friend’ (+2). Positive relationships not identified as ‘friendship’ were rated as ‘positive regard’ (+1). The absence of a relationship between two residents was rated ‘0’. Self-report data on personal friendship networks were not recorded for residents who were non-responsive due to cognitive impairment, or whose responses were uninterpretable by family members and the researcher.

Residents reported nonfamily objective social support on a version of the 3-item Lubben Social Network Scale-6 (LSNS-6) Friends subscale (Lubben et al., 2006) adapted for use in the nursing home context. Residents’ subjective perceptions of social isolation were measured with The Friendship Scale (Hawthorne, 2006). Internal consistency was good for the LSNS-6 (Cronbach’s $\alpha = 0.89$, $n = 20$) and acceptable for The Friendship Scale (Cronbach’s $\alpha = 0.76$, $n = 21$).

Analysis

All personal attribute ‘node data’ (Hanneman & Riddle, 2005), including background and standardized assessment data, and field note activity participation data, were compiled and analyzed using IBM SPSS Statistics vers. 22.0 (IBM Corp., 2013). Responses from the three open-ended questions were imported into NVivo 10 (QSR International Pty Ltd., 2012) for analysis of key word frequency and descriptive themes (Neergaard, Olesen, Andersen, & Sondergaard, 2009). Due to their restricted cognitive capacity, participants tended to use short and fragmented words in answering questions and were limited in their ability to explain or tell stories. Identifying descriptive patterns of key words was the main focus of qualitative analysis given the nature of the answers.

Network ‘tie data’ were compiled and analyzed using Microsoft Excel 2013, IBM SPSS Statistics, and UCINET 6 for Windows vers. 6.523 (Borgatti, Everett, & Freeman, 2002). Resident relationship dyads were analyzed using UCINET and Excel to produce data for each resident on the total number of relationships that they described

themselves as having (out-degree) and relationships that others described as having with them (in-degree). These relationships were further categorized as 'reciprocated', 'given non-reciprocated', and 'received non-reciprocated' (Abbott et al., 2013). The number of out-degree relationships that a resident described themselves as having was used as the key indicator of personal network size. Residents without any ties to other residents were categorized as social 'isolates' (Wasserman & Faust, 1994).

Data were analyzed at the care unit level. 'Reciprocity' was calculated as the percentage of reciprocal relationships relative to the total number of reported relationships (arc-based reciprocity). 'Density' was calculated as the proportion of all possible dyadic relationships that were reported by residents (Hanneman & Riddle, 2005). 'Path length' was based upon reported ties only and calculated as the number of ties in the shortest path between two residents (geodesic distance). Networks were sparse with several isolates, low density and few relationships in common. Therefore, the path length 'distance' between residents was calculated within network 'components'—smaller groups of residents connected to people within their group but disconnected from people in other groups (Hanneman & Riddle, 2005). Sociocentric data from the three care units were combined with spontaneously reported boundary-crossing ties between residents from different units to visually represent the resident network as reported by interviewed residents. NodeXL Excel Template 2014 (Smith et al., 2010) was used to generate directed network graphs (digraphs) based upon this combined data with directed ties represented as 'arcs'.

Results of Shapiro-Wilk normality tests indicated normal distributions for adapted LSNS-6 Friends subscale and The Friendship Scale total scores. SNA data, activity participation data, and GDS ratings were not normally distributed. Care unit groups were unequal in size and results of Levene's test of homogeneity of error variances indicated unequal variances between care units on Friendship Scale scores and number of social network ties. Pairwise differences between care units on activity participation and standardized assessment measures were explored using one-way Analysis of Variance (ANOVA) tests and Mann-Whitney *U* tests as appropriate. Spearman's Rank Order tests were used for correlational analyses between standardized assessment scores and number of social network ties.

Results

Participants ranged in age from 63-94 years ($m = 81.8$) and were ethnically diverse (see Table 1). Just under 40% of participants were born in Australia ($n = 14$). Nearly all participants could communicate in English ($n = 32$, 88.9%). A higher

percentage of women participated than men ($n = 22$, 61.1%) and fewer than 42% of residents ($n = 15$) were married. Length of time spent in care ranged from 3 months to 10.75 years ($Mdn = 1.5$ years). Three-quarters of residents ($n = 27$) had a dementia diagnosis on file. Nearly 67% of residents ($n = 24$) had a diagnosed mood disorder on file and 19.4% ($n = 7$) a diagnosed anxiety disorder.

According to GDS stages 94.4% of residents ($n = 34$) were cognitively impaired to the level of MCI or dementia. A fifth of residents were rated as stage '3' MCI ($n = 4$, 11.1%) or '4' early dementia ($n = 3$, 8.3%), half of residents rated as '5' moderate dementia ($n = 4$, 11.1%) or '6' moderately severe dementia ($n = 14$, 38.9%), and 25% ($n = 9$) were rated as '7' severe dementia. Though Barthel Index scores ranged from 0 to 75 points (out of 100), consistently low Barthel Index scores across all three care units ($Mdn = 10$) reflected residents' high dependency in activities of daily living. Just under 14% of residents ($n = 5$) were independently mobile and 22.2% ($n = 8$) transferred or walked short distances assisted. Most residents required staff assistance to mobilise in wheelchairs ($n = 14$, 38.9%) or water chairs ($n = 9$, 25%).

Participation in Structured Activities

Thirty-two residents (88.9%) participated in at least one ($M = 3.4$) type of structured social activity (see Table 1). Twenty-eight (87.5%) residents required staff assistance to participate. Activity types included scheduled monthly celebratory events, bi-monthly (every two weeks) Men's and Women's social groups, weekly therapeutic programs, multiple weekday scheduled DVD and television entertainment, and impromptu games. Activities were typically 60 minutes in length. Unit 1 had the largest common areas and access to an outdoor courtyard. Hence, most group activities took place in and around Unit 1 except for weekly therapeutic programs that took place in individual units. Two Recreational Activities Officers (RAOs) covered the three care units. More residents attended large celebratory events ($n = 29$, 80.6%) and DVD / television entertainment ($n = 21$, 58.3%) than participated in social groups ($n = 8$, 22.2%) and therapeutic programs ($n = 13$, 36.1%). Unit 1 residents participated in a significantly greater number of activity types than did Unit 3 residents [$F(1,25) = 19.95$, $p = .0001$, $\eta^2 = .444$]. There was no such difference in activity participation between Unit 1 and DSU residents [$F(1,22) = 1.47$, $p = .238$, $\eta^2 = .065$] or between DSU and Unit 3 residents [$F(1,19) = 3.17$, $p = .091$, $\eta^2 = .143$].

Concepts of Friendship

As shown in Table 2, the majority of residents ($n = 23$) could answer open-ended questions on friendship. Fifteen residents with a dementia diagnosis (55.6%) answered the questions “What does friendship mean to you?”, and “What do you like to do with friends?” (see Table 2), 16 (59.3%) answered the question “Who are your friends here?”, and two (7.4%) answered ‘I don’t know’ to each question.

In describing what friendship meant to them, residents most frequently ($n = 5$) used the word “share” in the context of sharing about oneself (intimacy) or sharing resources (altruism). They also used the words “trust” ($n = 4$) and “honesty” ($n = 3$). Two residents each used the words “agreement”, “sincerity / sincere”, “caring” and “love” and the phrases “shared experience” or “shared background”. Only one resident mentioned “shared activities”.

Residents used words to denote actions toward or qualities of a friend such as “compassion”, “kind”, “understanding”, “ease”, “listen”, “relate”, “help” and “clever”. Other residents described attributes of the friendship such as “choice”, “satisfaction”, “proximity”, “reciprocity”, “takes time (in the moment)”, “takes time (to develop)” and qualities of the relationship such as “deep”, “good”, “important” and “means a lot”. Residents also indicated uncertainty and ambiguity in close relationships, describing friendship as “difficult” in the nursing home context and noting barriers to friendship such language and the fact that others “have dementia” (see Table 2). One younger resident noted the “age gap” between herself and older residents as a barrier to friendship while another resident alluded to sex/gender as a barrier, stating that he didn’t have any male friends and didn’t have many friends because he “fell in love with the ladies”, who had partners.

In describing activities they liked doing with friends, residents frequently used the word “talk” ($n = 9$) followed by the word “visit” ($n = 4$). Active communication and contact were a common theme with residents saying they liked to “ring (phone)”, “correspond” or “spend time with” friends. Being friends meant that they could share thoughts, ideas, and memories with each other, e.g. “learn together”, “share beliefs”, or “talk about the old days”. Residents also reported expectations of behavior and social exchange linked with activities beyond their immediate nursing home environment (see Table 2). For example, they spoke of enjoying shared local activities with friends such as “go to the theatre”, “go to the beach”, one-to-one or small group activities such as “playing golf”, or attending organized social events with friends such as “going dancing” at a local community club. Collectively, residents mentioned friends sharing meals and drinks. These included going out together—“meet at a café”, “go to restaurants”, or having friends to their home to “BBQ”, “drink wine, beer”, or just “eat”.

Friendship and Positive Social Relationship Networks

Of the 29 residents who reported on their relationships, eight (27.6%) identified having friendships with other residents (see Table 3). Nine (31%) identified one or more casual positive relationships, two (6.9%) reported positive regard for other residents. Six residents (20.7%) spontaneously identified positive relationships with one or more peers living in other units (Unit 1, $n = 2$; DSU, $n = 1$; Unit 3, $n = 3$). No Unit 1 or Unit 3 resident spontaneously identified a relationship with a DSU resident. Three Unit 1 residents (20%) spontaneously identified staff members ($n = 2$) and / or daily visitors ($n = 2$) as friends or casual friends. Seven Unit 1 residents (46.7%) reported friendships with unit coresidents while only one Unit 3 resident and no DSU residents reported friendship within their unit.

Residents' reported relationships with unit coresidents formed sparse networks (see Figure 1). When all potential relationships within care units were included in analyses, the median size of relationship networks was 'zero'. When only reported relationships were included in analyses, tests indicated a significant difference between the median size of DSU residents' social networks ($Mdn = 0$, $IQR = 0 - 1$) and those of Unit 1 residents ($Mdn = 1$, $IQR = 1 - 2$) $U = 19.0$, $p = .031$, $r = -.47$. Tests indicated no significant difference between the size of DSU and Unit 3 resident networks ($Mdn = 0$, $IQR = 0 - 3$) $U = 21.0$, $p = .649$, $r = -.12$ or between networks of Unit 1 and Unit 3 residents ($U = 38.0$, $p = .138$, $r = -.31$).

Reported relationships represented a small proportion of all potential relationships between residents in each unit, resulting in few interconnected social ties and low network 'densities' (see Table 3). Ten (34.5%) of 29 residents reporting network data, and 17 (47.2%) of the 36 interviewed residents, were 'isolates' for whom no positive relationship was reported. A low proportion of reported ties were reciprocated (22.2%), indicating imbalance in social exchanges and differing perceptions of relationships. Though care unit network components featured short 'path lengths' with few steps separating residents with network connections from one another ($Mdn = 1$ to 2), path lengths ranged from 1 to 5 steps in Unit 1.

Social Isolation

Low scores on the adapted LSNS-6 subscale indicated that residents were at risk for social isolation as they had few nonfamily network members ($M = 6.1$, $SD = 5.3$) with whom they could visit or talk on a regular basis, discuss private issues, and/or on whom they could depend for help (Lubben et al., 2006). Friendship Scale total scores

(*Mdn* = 14, *IQR* = 9 – 17) reflected similar social isolation (see Table 1). There were no significant differences in adapted LSNS-6 subscale scores between Unit 1 and DSU residents [$F(1,12) = 2.26, p = .159, \eta^2 = .188$], DSU and Unit 3 residents [$F(1,10) = 1.77, p = .213, \eta^2 = .176$], or Unit 3 and Unit 1 residents [$F(1,10) = 0.07, p = .799, \eta^2 = .004$]. There were significant differences between units on Friendship Scale scores with DSU residents reporting the lowest scores indicating more subjective social isolation (*Mdn* = 7, *IQR* = 6 – 9) than that reported by Unit 1 (*Mdn* = 17, *IQR* = 10 – 20), $U = 10.0, p = .034, r = -.51$ or Unit 3 residents [*Mdn* = 14, *IQR* = 11 – 16), $U = 0.0, p = .003, r = -.82$]. There was no significant difference on Friendship Scale scores between Unit 1 and Unit 3 residents ($U = 33.5, p = .260, r = -.25$).

SNA Variables and Standardized Measures

Higher cognitive impairment as measured using the GDS was weakly negatively associated with network size [$\rho(29) = -0.37, p = .046$] and number of reciprocated ties [$\rho(29) = -0.39, p = .037$]. Higher Friendship Scale scores were moderately positively associated with higher number of reciprocated ties [$\rho(25) = .49, p = .013$]—residents with more reciprocated relationships reported more perceived social support. No significant associations were found between the adapted LSNS-6 subscale and any of the tie categories examined (see Table 4).

Discussion

Nursing home residents, including those with moderate to severe dementia, were able to express what friendship meant to them and provide insight into the expectations and standards upon which they judged their relationships with others. Their responses reflected multiple reasons for friendship including personal benefit, altruism and pragmatism and barriers to friendship such as age differences and others' cognitive impairment. Some residents differentiated between experiences of strong friendship ties and more casual weaker relationships. These results are consistent with friendship schema, motivations and barriers for friendship (Kemp, Ball, Hollingsworth, & Perkins, 2012; Sefcik & Abbott, 2014), and differentiation of strong and weaker relationship ties reported by cognitively capable residents in independent living (Schafer, 2011) and assisted living settings (Sandhu, Kemp, Ball, Burgess, & Perkins, 2013).

There was a disconnect between residents' views on friendship and their current social situation. Though study questions addressed present beliefs and perceptions, residents' responses often referenced past relationships and experiences

and may have incorporated idealized standards (Carstensen & Mikels, 2005; Hall, 2012). Residents with dementia in each care unit who were able to talk about friendship in appropriate and meaningful ways also expressed difficulty in establishing friendships with others in their own unit. Participants identified small sparse networks of positive relationships with coresidents. Path lengths greater than '2' indicated that some residents were connected only by distant, indirect paths that did not represent practical opportunities for social engagement. Over a third of residents who discussed their social ties did not have positive relationships with other residents living in their care unit, consistent with previous studies (Abbott et al., 2013; de Medeiros et al., 2011). This lack of social connectedness was reflected in scarce mutually reinforcing social ties and low proportions of reciprocity. However only a limited number of residents were interviewed, making it impossible to verify relationship strength and directionality with all residents nominated by unit coresidents. Though asymmetry is common in friendship network data (Schafer, 2015), asymmetry in this study was a result of both true non-reciprocity (nomination given—not reciprocated, received—not reciprocated), and non-confirmation of reciprocity (resident did not provide assent / consent to interview or unable to complete interview) (Carley & Krackhardt, 1996).

Low scores on both the adapted LSNS-6 Friendships subscale and The Friendship Scale were consistent with results of previous studies with residential care populations (Hawthorne, 2006; Nikmat et al., 2015). In this study DSU residents reported the most perceived social isolation, the least social ties, and no reciprocity compared to Unit 1 and Unit 3. Only two DSU residents reported positive relationships, one within their unit and one with a resident of another unit. In many ways these results may be expected. Although it is common to name few friends in response to free-recall name-generating questions (Marin, 2004), residents with impaired memory may have had greater difficulty recalling names freely or identifying faces in photographs. In a similar study, residents of a Dementia Special Care Unit named no coresidents when asked with whom “they discussed important matters” (Abbott et al., 2013).

Diagnosed rates of depression were higher than those reported previously (40.5%) for residents with dementia living in high-care facilities (Snowdon & Fleming, 2008). DSU participants had higher proportions of diagnosed mood disorders than did residents in Units 1 and 3. Depression is a neuropsychiatric symptom of dementia associated with decreased social functioning (Brodaty, Connors, Xu, Woodward, & Ames, 2015). Though causation cannot be inferred, depressed DSU residents may have been more socially withdrawn than residents in other units. Conversely, greater

perceived social isolation and relative lack of opportunity for social connectedness may have led to higher rates of depression amongst DSU residents (Cornwell & Waite, 2009).

Most residents attended social activities with staff assistance. The importance of staff facilitation has been highlighted in assisting residents with limited mobility and impaired communication ability to approach or avoid others, and in helping residents with decreased social functioning to engage in casual conversations and positive interactions that may lead to relationship building (Ferdous & Moore, 2015; Mok & Müller, 2014). DSU residents primarily attended large events and therapeutic programs. These activity types did not focus on facilitation of between-resident interactions and therefore may not have provided sufficient opportunity for residents with decreased social functioning to form relationships.

Perceived social support was associated with peer relational reciprocity in this study, consistent with previous qualitative research (Roberts & Bowers, 2015), and larger-scale studies (Amieva et al., 2010; Fyrand, 2010). Socioemotional Selectivity Theory (SST) posits that age-related changes motivate people to focus cognitive-emotional resources on maintaining emotional equilibrium. This creates bias for positive over negative information and prioritization of emotionally supportive relationships over others less emotionally satisfying (Carstensen & Mikels, 2005). Residents in independent living facilities are less likely to name or reciprocate social ties with others perceived to be of a lower functional health status than themselves, with this effect increasing with closer physical proximity (Schafer, 2015). Most DSU residents were immobile or had limited mobility and experienced greater physical proximity to one-another throughout their days than did residents of the other two units. These factors explain why DSU residents lacking awareness of their own functional health status (Clare, 2010) and viewing coresidents as more impaired than themselves (Zank & Leipold, 2001) were less likely to name or reciprocate social ties with other residents (Sandhu et al., 2013).

Strengths and Limitations

Study strengths such as a comprehensive approach and triangulation of interview, questionnaire and observational data enhance the credibility of findings. Consistent with rates (76.9%) in Australian high-care residential facilities (Access Economics, 2010) two-thirds of study participants had a dementia diagnosis. The use of visual aids and adaptable communication strategies during interviews enabled

greater opportunity for residents with cognitive-functional impairment to answer questions about their own relationships.

Limitations are that the research was cross-sectional within one facility. Though data were collected within three different units, results may reflect effects of care practice culture or other factors specific to the moment in time and the facility. Small participant numbers limited the power of correlational analyses to detect strong statistically significant relationships between SNA variables and social isolation measures.

Implications

Residents reported clear concepts of what friendship meant to them and what they liked to do with friends but reported few friendships and high levels of isolation. This suggests that social opportunities within residential care did not fulfill their expectations of friendship. The composition of residents' friendship and relationship networks may have been a function of their perceived choices and the opportunities afforded to them in terms of the characteristics of other residents and the social activities offered. Residents clearly still made relationship choices but lacked the freedom and independence to develop friendships of their choice.

Social relationships with others are an important component of quality of life of nursing home residents. While not all residents seek close relationships with coresidents, friendships do occur. Care providers need to be mindful of the social environment in nursing homes, consult with residents about social experiences and expectations, and actively facilitate opportunities for development of positive relationships. Social network analysis offers a way of monitoring resident friendships and social relationships within facilities.

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Table 1

Characteristics of Participating Care Units and Participants Consented to Interviews

Care units	Unit 1	DSU	Unit 3	Total
Number of residents	42	18	34	94
Number of women, <i>n</i> (%)	20 (47.6)	12 (66.7)	23 (67.6)	55 (58.5)
Average number of care staff per shift ^a	7	4	6	17 ^b
Interview participants	Unit 1, <i>N</i> = 15	DSU, <i>N</i> = 9	Unit 3, <i>N</i> = 12	Total, <i>N</i> = 36
Demographics				
Average age in years, <i>M</i> ± <i>SD</i>	82.9 ± 7.7	83.2 ± 5.5	79.3 ± 9	81.8 ± 7.7
Years lived in care, <i>Mdn</i> 1 st – 3 rd quartile	1, .5 – 1.9	2, .7 – 5.8	2, .4 – 2.9	1.5, .5 – 2.7
Women, <i>n</i> (%)	7 (46.7)	7 (77.8)	8 (66.7)	22 (61.1)
Born outside Australia, <i>n</i> (%)	6 (40)	6 (66.7)	10 (83.3)	22 (61.1)
English as a first language, <i>n</i> (%)	11 (73.3)	4 (44.4)	8 (66.7)	23 (63.9)
Married / Partnered, <i>n</i> (%)	6 (40)	2 (22.2)	7 (58.3)	15 (41.7)
Years of education, <i>M</i> ± <i>SD</i>	11.1 (3.1)	11.3 (3.7)	12.6 (3.4)	11.5 (3.3)
Number of roommates				
None—private room, <i>n</i> (%)	0 (0)	0 (0)	1 (8.3)	1 (2.8)
One—two-bed room, <i>n</i> (%)	0 (0)	8 (88.9)	8 (66.7)	16 (44.4)
Two—three-bed room, <i>n</i> (%)	7 (46.7)	0 (0)	2 (16.7)	9 (25)
Three—four-bed room, <i>n</i> (%)	8 (53.3)	1 (11.1)	1 (8.3)	10 (27.8)
Ability in communication				
Speech—no impairment, <i>n</i> (%)	5 (33.3)	2 (22.2)	5 (41.7)	12 (33.3)
Vision—no impairment, <i>n</i> (%)	9 (60)	5 (55.6)	7 (58.3)	21 (58.3)
Hearing—no impairment, <i>n</i> (%)	12 (80)	7 (77.8)	9 (75)	28 (77.8)
Charted psychiatric diagnoses				
Dementia, <i>n</i> (%)	10 (66.7)	9 (100)	8 (66.7)	27 (75)
Mood disorder, <i>n</i> (%)	9 (60)	8 (88.1)	7 (58.3)	24 (66.7)
Anxiety disorder, <i>n</i> (%)	3 (20)	3 (33.3)	1 (8.3)	7 (19.4)
Number of comorbid medical diagnoses, <i>M</i> ± <i>SD</i>	3.6 (1.9)	4.1 (2.6)	6 (2.1)	4.5 (2.3)
Gerontological assessment				
Global Deterioration Scale, ^c <i>Mdn</i> 1 st – 3 rd quartile	5, 4 – 6	7, 6 – 7	6, 3 – 7	6, 4 – 6
Barthel Index total score, ^d <i>Mdn</i> 1 st – 3 rd quartile	15, 5 – 35	5, 0 – 17	10, 1 – 18	10, 5 – 25
Barthel Index—independent mobility, <i>n</i> (%)	4 (26.7)	0 (0)	1 (8.3)	5 (13.9)
Observational data—activity participation				
Number of activity types attended,				

<i>M ± SD</i>	4.6 ± 1.4	3.6 ± 2.6	1.8 ± 1.8	3.4 ± 2.3
Monthly celebratory event /performances, <i>n</i> (%)	15 (100)	6 (66.7)	8 (66.7)	29 (80.6)
Bi-weekly social groups, <i>n</i> (%)	6 (40)	2 (22.2)	0 (0)	8 (22.2)
Weekly therapeutic programs, <i>n</i> (%)	4 (26.7)	6 (66.7)	3 (25)	13 (36.1)
Multi-weekday DVD/TV viewing, <i>n</i> (%)	12 (80)	5 (55.5)	4 (33.3)	21 (58.3)
Impromptu activities, <i>n</i> (%)	1 (6.7)	3 (33.3)	0 (0)	4 (11.1)
Psychosocial assessment				
Lubben Social Network Scale-6				
Friends subscale, ^e <i>M ± SD</i>	6.6 ± 4.5	2.5 ± 5	7.3 ± 6.2	6.1 ± 5.3
Friendship Scale total, ^f	17, 10 – 20	7, 6 – 9	14, 11 – 16	14, 9 – 17
<i>Mdn</i> 1 st – 3 rd quartile				

Note: DSU = Dementia Specific Unit. ^a Included one registered nurse (RN) plus *n* assistants in nursing (AINs) per shift. ^b The total number of care staff employed by the facility including full-time, part-time and casual was 90+. ^c Stages: 1, subjectively and objectively normal; 2, subjective complaints of mild memory loss; 3, Mild Cognitive Impairment (MCI); 4, early dementia; 5, moderate dementia; 6, moderately severe dementia; 7, severe dementia. ^d Range from 0 to 100 with higher scores indicating greater impairment. ^e Range from 0 to 45 with a clinical cut-point ≤ 6 suggesting risk of social isolation through limited nonfamily ties. ^f Range from 0 to 24 with higher scores representing greater social connectedness.

Table 7
Exemplars of Resident Friendship Schema

Questions	Primary themes	Secondary themes	Resident study ID	Dementia diagnosis	GDS	Care unit	Exemplars
What does friendship mean to you?	Reasons for friendship	Pragmatism	213	F	Yes	7	DSU “Being good (fair) with people. Paying (your) bills.”
		Personal benefit	113	F	No	6	Unit 1 “(Friendship) gives you confidence. It’s nice to make friends. I find it easy to make friends, enjoy sharing things about yourself.”
		Altruism	115	F	No	4	Unit 1 “I love them. They are important to me. I have to be

								sincere with them, honest. I want good things for them."
		Relational attributes	216	F	Yes	6	DSU	"It means quite a lot. You have to know people's names. You need five minutes wherever, take five or ten minutes."
			304	M	No	3	Unit 3	"Someone you can tell your deep thoughts about. Shared experience. Reciprocity."
			112	M	No	3	Unit 1	"A lot of satisfaction, proximity, mutual interests."
		Personal attributes	214	F	Yes	6	DSU	"They are alright with you. Sincerity."
			111	M	Yes	6	Unit 1	"Well that depends, how honest he is with you. Honesty."
			106	F	Yes	6	Unit 1	"Compassion."
What do you like to do with friends?	Behavior and social exchange	Communication and contact	320	F	Yes	4	Unit 3	"Talk, ring on (the) phone, correspond, meet at (a) café."
			102	M	Yes	5	Unit 1	"Talk and visit. Have a smoke."
			103	M	No	5	Unit 1	"Just talk, visit, play cards. Too old to do much else."
		Local activities	215	F	Yes	6	DSU	"Go to the theatre. Visiting certain areas."
			322	F	No	1	Unit 3	"(Go to) films, shopping, go to the beach, have tea together, but I was always busy

									looking after my family as well."
			116	M	Yes	4	Unit 1	"Go out for lunch, go to the beach, go to (large public) Park."	
	Community clubs		214	F	Yes	6	DSU	"Go dancing— (nationality specific) club."	
			105	F	Yes	6	Unit 1	"Go to the RSL (Returned & Services League of Australia Limited) club, play the (slot) machines. We like to go to different ones but it's best if you go in your own area."	
			113	F	No	6	Unit 1	"(I) love my (horse) racing! 'Am a member of all the clubs."	
	Providing hospitality or being hosted		308	M	Yes	6	Unit 3	"BBQ, play golf."	
			309	M	Yes	6	Unit 3	"Go to party together, swing by and see your friends... plenty (of) things."	
			115	F	No	4	Unit 1	"Invite them for dinner, coffee. Do nice things for them. Make them happy, not upset them."	
Who are your friends here?	Barriers to building friendship	Uncertainty and ambiguity	213	F	Yes	7	DSU	"None. Everyone is worrying about themselves."	
			320	F	Yes	4	Unit 3	"It's difficult nowadays to say 'she is my friend' or 'he is my friend'. I know them but not to say 'friend'. Friendship is something deep. It takes time. Nowadays people	

						have no patience to sit and listen to what you think or how you feel. Everyone has their own problems. I don't trust others not to say 'she said this or that'."
	115	F	No	4	Unit 1	"It is difficult to be friends, difficult to say who is or is not a friend. It is difficult to communicate. I don't know them enough. (There is a) language barrier. Some (residents) have dementia."
Age or gender	216	F	Yes	6	DSU	"I had friends when we were younger."
	322	F	No	1	Unit 3	"(The) age gap is a barrier. I'm in my 60's and most of the other people here are in their 80's."
	104	M	Yes	6	Unit 1	"Not too many (friends) because I fall in love with the ladies too quickly and all of the ladies are married. No male friends here."

Note. ID = identification. Dementia diagnosis = dementia diagnosis noted in medical chart. GDS = Global Deterioration Scale stage. F = female. M = male. DSU = Dementia Specific Unit. (Casey et al., 2015).

Table 5
Basic Structural Parameters of Residents' Positive Social Networks within Care Units

	No. of residents			Isolates ^a	Self-reported relationships				Reciprocity ^b	Density ^c	Path length ^d			
	T	I	R		Total	Max	Mdn ^e	1 st –3 rd Q ^e			Min	Max	Mdn	1 st –3 rd Q
Unit 1 ^f	23	10	23	17	32	18	1	1–2	18.8%	.021	1	5	2	1–3
Friends	10	7	8	30	8	2	0	0–1	50.0%	.005	1	2	1	1–1
Casual friends	8	3	7	32	7	3	0	0–1	28.6%	.005	1	2	1	1–2
Positive regard	18	1	17	22	17	17	0	0–0	0.0%	.011	1	1	1	1–1
DSU ^{f, g}	2	1	1	16	1	1	0	0–1	0.0%	.003	1	1	1	1–1
Positive regard	2	1	1	16	1	1	0	0–0	0.0%	.003	1	1	1	1–1
Unit 3 ^h	7	2	5	26	5	3	0	0–3	0.0%	.005	1	1	1	1–1
Friends	3	1	2	30	2	2	0	0–0	0.0%	.002	1	1	1	1–1
Casual friends	4	1	3	29	3	3	0	0–1	0.0%	.003	1	1	1	1–1

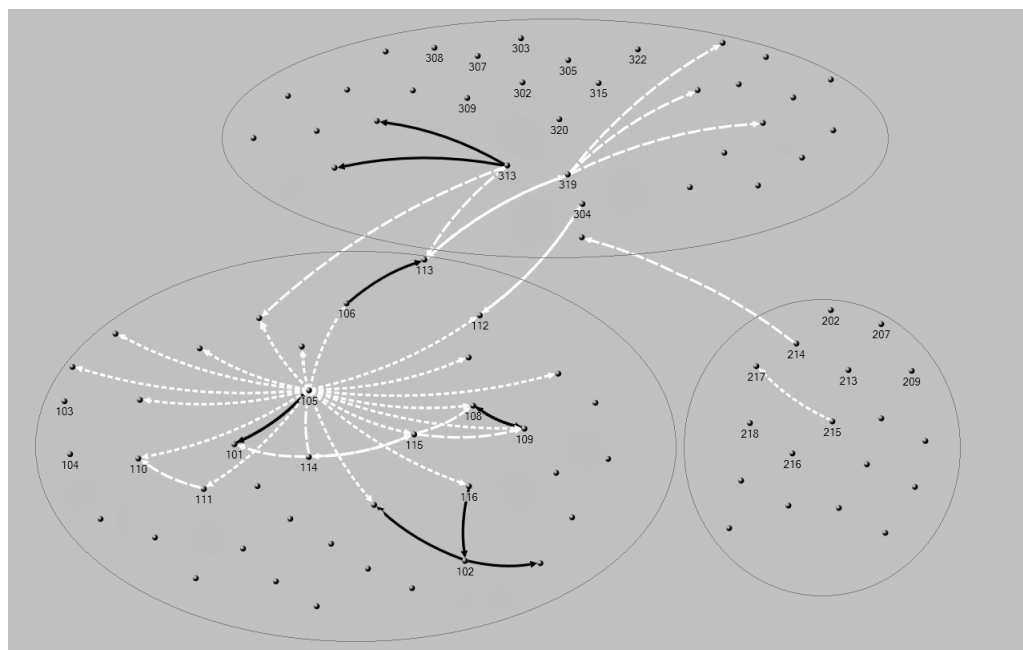
Note. No. = number. T = total number of residents involved in dyadic ties. I = number of residents initiating reports of relationship ties with others. R = number of residents receiving reported relationship ties. Max = maximum. Mdn = median. 1st–3rd Q = quartile 1–quartile 3. Min = minimum. DSU = Dementia Specific Unit. ^a Isolates indicating number of residents for whom no dyadic relationship was reported during interviews. ^b Arc-based reciprocity, total number of reciprocal ties as a proportion of actual ties. ^c Density calculated as the proportion of all possible dyadic relationships actually reported by residents. ^d Path length based on actual ties only and calculated within components. Path length for isolates = maximum path length + 1. ^e Medians and quartiles based on number of relationships reported by residents. Minimum number for all groups = 0. ^f Including sociocentric network data only (no between-unit ties). ^g No 'friends' or 'casual friends' reported. ^h No 'positive regard' reported. (Casey et al., 2015).

Table 4

Spearman's Rank-Order Correlations of Resident Positive Relationship Ties with Scores on Social Isolation Measures

Measure	Positive relationship ties							
	Total nominated		Reciprocated		Nominated not reciprocated		Received not reciprocated	
	Rho	P	Rho	P	Rho	P	Rho	P
Global Deterioration Scale ^a	- 0.37	.046	- 0.39	.037	- 0.21	.283	- 0.04	.849
Adapted Lubben Social Network Scale-6 Friends subscale ^b	0.16	.485	0.23	.312	0.04	.871	0.29	.188
Friendship Scale total score ^c	0.15	.477	0.49	.013	- 0.01	.952	0.21	.308

Note: ^a $n = 29$. ^b $n = 22$. ^c $n = 25$.



Created with NodeXL (<http://nodexl.codeplex.com>)

Figure 1. Interviewed residents' self-reported positive peer relationship networks. Spherical nodes represent (clockwise from lower left): 40 possible members of the Unit 1 network, 33 possible members of the Unit 3 network, and 18 possible members of the Dementia Specific Unit (DSU) network. Numbers represent randomly assigned participant ID numbers. Dark solid lines represent strong friendship ties. White lines represent weaker relationships. Dashed white lines indicate casual friendship ties and dotted white lines indicate positive regard. Solid white lines indicate reciprocal weak ties. Lines crossing network boundaries indicate spontaneously nominated relationships between residents from different units (egocentric data). Unnumbered unconnected nodes represent non-interviewed unit members not named in resident interviews. Peripheral placement implies lack of nomination only and does not imply network position based on graph-drawing algorithms.

Appendix Manuscript 2: Residents' positive and negative relationship networks in a nursing home (Casey et al., 2016)

Abstract

Person-centered care involves consideration of long-term care residents' lived experience, including social relationships. This cross-sectional study investigated coresident social networks in three units of a 94-bed Australian nursing home, including an 18-bed dementia specific unit (DSU). Six care staff were interviewed. Chart, self-reported social isolation, staff-reported social engagement data were collected for 36 residents aged 63-94 years who consented to full participation. Fifty-five additional residents were included in observations. Median positive-to-negative network size ratios within units were 1.5:1, 0.7:1, 0:1 (DSU). Moderate positive correlations existed between: perceived social support and initiated positive relationships [$\rho(25) = .44$, $P = .030$]; social withdrawal and initiated negative relationships [$\rho(36) = .51$, $P = .002$]; objective social isolation and initiated negative relationships [$\rho(22) = -.44$, $P = .042$]. Number and quality of relationships were associated with resident social withdrawal, perceived support, and isolation. High prevalence of isolation and negative relationships demonstrate need for interventions.

Key words: dementia; long-term care; engagement; social isolation; social network analysis; social relationships

Introduction

Friendships and supportive relationships promote bio-psycho-social health and are associated with cognitive reserves that may protect against neurodegenerative processes including Alzheimer's disease (Bennett, Schneider, Tang, Arnold, & Wilson, 2006). Lack of relationships (objective isolation) and loneliness (subjective isolation) are associated with chronic illness, mortality, and reduced cognitive performance (Cacioppo, Capitanio, & Cacioppo, 2014). Social engagement is associated with better cognition, health and quality of life in older people (Golden, Conroy, & Lawlor, 2009). Greater number and interconnectedness of relationships is associated with more opportunity for engagement (Ashida & Heaney, 2008).

Kitwood (1993) emphasized that personhood is the concurrence of internal and external relationships (Kitwood, 1993). Nursing home (NH) residents' relationships with coresidents contribute uniquely to perceived support, yet our research indicated residents had few relationships and found forming relationships difficult (Casey, Low, Jeon, & Brodaty, 2015). Residents may seek emotional equilibrium through selecting emotionally rewarding relationships over less rewarding ones (Scheibe & Carstensen, 2010). Maintaining a 'balanced' ratio of 2.9 positive emotions for every negative emotion was associated with 'flourishing' in NH residents (Meeks, Van Haitsma, Kostiwa, & Murrell, 2012).

Social Network Analysis (SNA) investigates relationships (ties) between people and the effects associated with these relationships (Borgatti, Everett, & Freeman, 2002). SNA can inform person-centered care, offering insights into social strengths and vulnerabilities influencing residents' engagement and perceived support (Abbott, Bettger, Hampton, & Kohler, 2013). Our aim was to use SNA to describe care staff perceptions of NH residents' social networks and explore associations between network characteristics and resident engagement and social isolation.

Methods

Study design and protocol were approved by the UNSW Australia Human Research Ethics Committee (Ref# HC 12208). The cross-sectional multiple-method design used purposive sampling in a Sydney nursing home. Care units were: 42-bed Unit 1, 18-bed dementia specific unit (DSU), and 34-bed Unit 3. All residents not acutely ill were invited to participate ($n = 91$). Study consent protocols are explained in detail elsewhere (Casey et al., 2015). Thirty-six residents provided either informed signed consent ($n = 4$) or verbal assent with legal guardian's informed signed consent ($n = 32$) to full study participation. Fifty-five additional residents were included in

network data only (Casey et al., 2015). Six permanent care staff (2 x 3 care units) who knew the residents well served as informants.

Background data were transcribed from facility files. Ability in Activities of Daily Living (ADL) was assessed using the 17-item Barthel Index (Mahoney, 1965). Staff reported on resident social engagement using the Multidimensional Observation Scale for Elderly Subjects (MOSES)—Withdrawn Behavior subscale (Helmes, Csapo, & Short, 1987). Internal consistency was good with Cronbach's alpha 0.80 ($n = 36$). Residents reported objective social support using the 3-item Lubben Social Network Scale-6 (LSNS-6) Friendships subscale (Lubben et al., 2006) and subjective social support using The Friendship Scale (Hawthorne, 2006). Internal consistencies were good ($\alpha = 0.89$, $n = 20$) and acceptable ($\alpha = 0.76$, $n = 21$) respectively.

Staff reported positive relationships of residents by answering "Does (resident) have friendships with other residents and if so with whom?" and rating relationship strength as 'true' (+3) or 'casual' (+2) friendship. Positive relationships not identified as 'friendship' were rated 'positive regard' (+1). Negative relationships were reported by answering "Which residents are in conflict with each other?" (de Medeiros, Saunders, Doyle, Mosby, & Van Haitsma, 2011) and rating relationship strength as 'mild disregard' (-1), 'moderate dislike' (-2), or 'strong dislike' (-3).

Analyses

Network data were analyzed using UCINET 6 (Borgatti et al., 2002) and IBM SPSS. Staff-report of relationships were compared within care units. In case of discrepancy in reported relationship and strength, relationship presence (versus absence) and / or weaker strength were selected. There were no discrepancies in relationship quality (positive or negative). Relationship dyads were separated into positive and negative, classified by strength (true friend, casual friend, positive regard; disregard, moderate dislike, strong dislike), and categorized by 'direction' (i.e. was the relationship 'reciprocal'; if not, who 'initiated' the relationship / who 'received' their overtures). Data were analyzed at care unit and facility level. 'Density' was calculated as the proportion of dyadic relationships reported divided by the number of possible dyadic relationships. Residents' personal network size was calculated as the number of coresidents with whom the resident had direct relationships (Borgatti et al., 2002). Graphs were generated in NodeXL (Smith et al., 2010). Data were checked for normality in SPSS. Shapiro-Wilk test statistics indicated non-normal distributions for SNA data; nonparametric tests were used for analyses.

Results

Characteristics of the 36 interviewed residents are summarized here and reported in detail elsewhere (Casey et al., 2015). Participants ranged from 63-94 years ($M = 81.8$) in age, more were women ($n = 22$, 61.1%), 41.7% ($n = 15$) were married. Time in care ranged from 3 months to 10.75 years ($Mdn = 1.5$ years). Twenty-seven residents had a dementia diagnosis. Barthel Index scores ranged from 0-75 points ($Mdn = 10$, $IQR = 5 - 25$). MOSES subscale ($M = 18.9$, $SD = 5.9$), LSNS-6 subscale ($M = 6.1$, $SD = 5.3$), and Friendship Scale ($M = 13.2$, $SD = 5.4$) scores respectively indicated residents were moderately engaged but self-reported moderate to high levels of objective and subjective social isolation (see Table 1).

Relationships between coresidents formed positive and negative networks (see Figure 1). Of 91 residents, staff identified 52 (57.1%) initiating positive relationships and 24 (26.4%) initiating negative relationships. Approximately one-third of residents initiated ($n = 30$, 33%) or received ($n = 34$, 37.4%) 'friendship' (true and casual), and one-third ($n = 30$, 33%) were 'isolates' having no relationships. The median size of reported positive relationship networks was '2' ($IQR = 1 - 4$) and the median size of reported negative networks was '2' ($IQR = 1 - 3$). Friendship network densities were low (.01) and densities for positive and negative networks were low overall (.02 and .01, respectively). Residents' positive-to-negative network size ratios indicated median ratios of 1.5:1 for Unit 1 ($n = 11$, $IQR = 1 - 5$), 0:1 for DSU ($n = 15$, $IQR = 0 - .5$), and .7:1 for Unit 3 ($n = 12$, $IQR = .2 - 2.3$) residents.

Number of positive and negative relationships and 'isolate' status were correlated with social engagement (MOSES subscale; $N = 36$), subjective social support (Friendship Scale; $N = 25$), and subjective social isolation (LSNS-6 subscale; $N = 22$) scores as follows. Higher MOSES Withdrawn Behavior subscale scores were strongly associated with fewer reciprocated positive relationships ($\rho = -0.71$, $p < .001$), moderately associated with initiated negative relationships ($\rho = .51$, $p = .002$) and received not reciprocated negative relationships ($\rho = .41$, $p = .012$), and moderately with 'isolate' status ($\rho = .54$, $P = .001$). Higher Friendship Scale scores were moderately associated with higher number of initiated and reciprocated positive relationships, respectively ($\rho = .44$, $p = .030$; $\rho = .41$, $p = .044$). Residents reporting higher objective isolation initiated more negative relationships ($\rho = -.44$, $p = .042$) and residents reporting higher subjective social isolation received negativity in relationships with more coresidents without reciprocating ($\rho = -.41$, $p = .041$). Higher subjective and objective social isolation were moderately and strongly associated with 'isolate' status, respectively ($\rho = -.42$, $p = .038$; $\rho = -.60$, $P = .003$).

Discussion

Roughly one-third of residents had positive relationships with other residents, including some friendships. One-third of residents had no positive relationships. Previous research has reported similar proportions of 'close' relationships and 'loners' amongst NH residents (Abbott et al., 2013; Retsinas & Garrity, 1985). Nearly one-third of residents had negative relationships. Negative SNA data have not been reported previously for NH residents, but results are consistent with studies suggesting resident-to-resident aggression and negative relationships amongst NH residents are common (Ferrah et al., 2015). We did not measure affect, however low positive-to-negative network ratios may have reflected residents' vulnerability to relationship-based negative affect (Meeks et al., 2012). Residents' moderate levels of social engagement were similar to those reported in previous research (Helses et al., 1987). Residents reported by staff as having a greater number of positive coresident relationships were also seen to be more socially engaged generally and those residents perceived being more supported.

Study limitations included a cross-sectional design within one facility; results may reflect effects of factors specific to the moment or facility. Correlational analyses were powered only to detect strong statistically significant relationships. Few staff members were interviewed, providing limited insight into staff perceptions overall. Residents who agreed to be interviewed may not represent the total facility population; those who did not participate may have been even more isolated.

Nursing implications

Findings highlight the continued isolation and lack of engagement of nursing home residents. Given the few friendships, relatively common negative relationships, and low positive-to-negative social network ratios, monitoring and cultivating coresident relationships may be important in promoting residents' wellbeing. Greater attention should be made by staff to alleviate negative social interactions. Staff cannot control affection between residents but staff should be able to initiate and promote positive social interactions among those who cannot do themselves.

Conclusion

This is the first study to demonstrate NH residents' negative social networks using SNA data. Residents' level of social engagement and experiences of support or isolation were associated with the quantity and quality of their relationships with coresidents. Further research could determine whether improvements in relationships

translates to improvement for residents' social engagement and perceptions of isolation or support.

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Table 1
Participant Characteristics

Interviewed participants	Unit 1 (<i>N</i> = 15)	DSU (<i>N</i> = 9)	Unit 3 (<i>N</i> = 12)	Total (<i>N</i> = 36)
Average age in years, <i>M</i> ± <i>SD</i>	82.9 ± 7.7	83.2 ± 5.5	79.3 ± 9	81.8 ± 7.7
Years lived in care, <i>Mdn</i> 1 st – 3 rd quartile	1, .5 – 1.9	2, .7 – 5.8	2, .4 – 2.9	1.5, .5 – 2.7
Women, <i>n</i> (%)	7 (46.7)	7 (77.8)	8 (66.7)	22 (61.1)
Married/Partnered, <i>n</i> (%)	6 (40)	2 (22.2)	7 (58.3)	15 (41.7)
Dementia, <i>n</i> (%)	10 (66.7)	9 (100)	8 (66.7)	27 (75)
Barthel Index total score, ^a <i>Mdn</i> 1 st – 3 rd quartile	15, 5 – 35	5, 0 – 17	10, 1 – 18	10, 5 – 25
MOSES Withdrawn behaviour subscale, ^b <i>M</i> ± <i>SD</i>	15.3 ± 3.9	23.6 ± 5.2	19.8 ± 6.1	18.9 ± 5.9
Lubben Social Network Scale-6 Friends subscale, ^c <i>M</i> ± <i>SD</i>	6.6 ± 4.5	2.5 ± 5	7.3 ± 6.2	6.1 ± 5.3
Friendship Scale total, ^d <i>Mdn</i> 1 st – 3 rd quartile	17, 10 – 20	7, 6 – 9	14, 11 – 16	14, 9 – 17

Note: DSU = Dementia Specific Unit. MOSES = Multidimensional Observation Scale for Elderly Subjects. ^a Range from 0 to 100 with higher scores indicating greater impairment. ^b Range from 0 to 34 with higher scores indicating lower social engagement. ^c Range from 0 to 45 with a clinical cut-point ≤6 suggesting risk of social isolation through limited nonfamily ties. ^d Range from 0 to 24 with higher scores representing social connectedness.

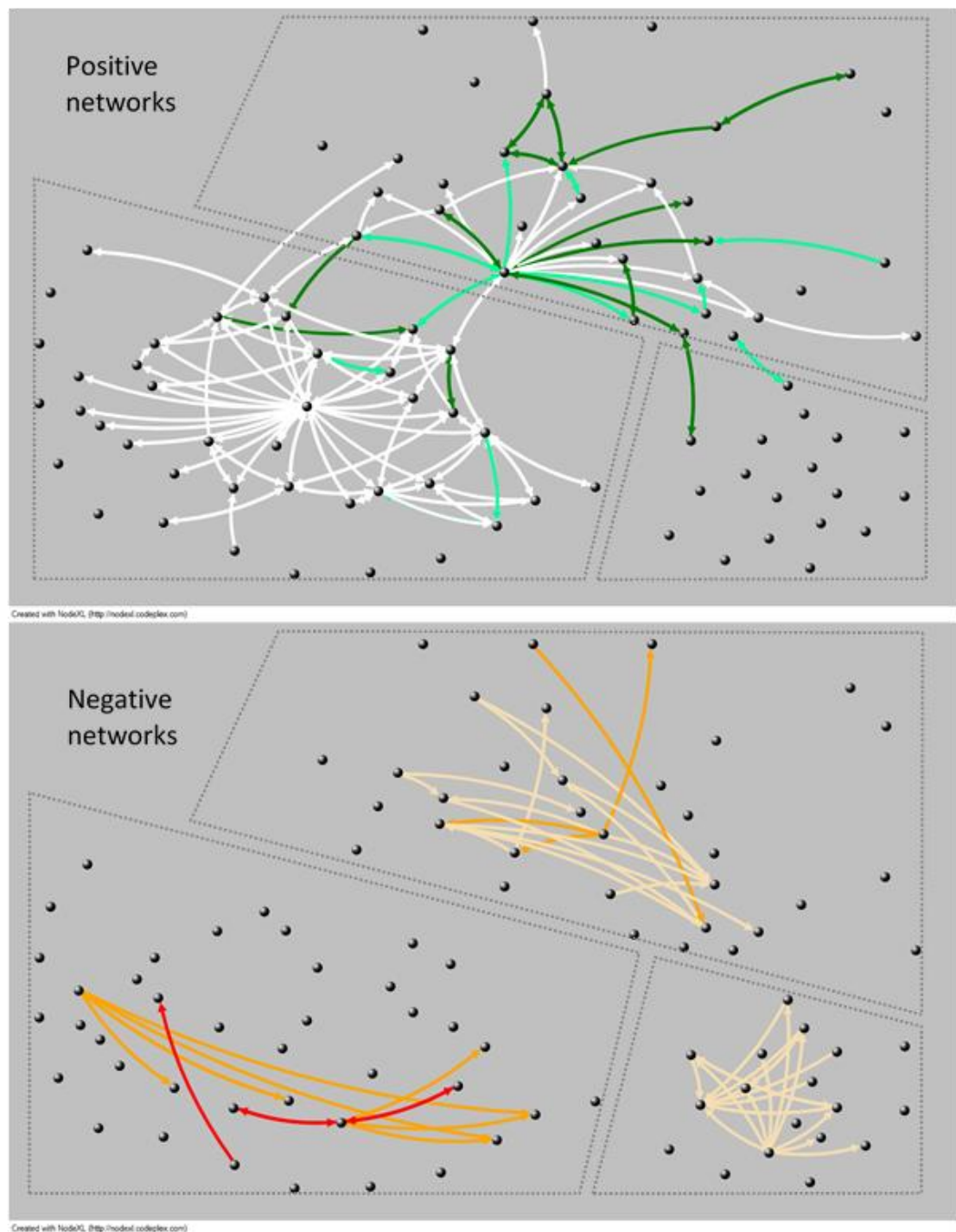


Figure 1. Staff-rated resident positive (top) and negative (bottom) social networks. Spheres represent all residents in each care unit (clockwise from lower-left corner of each graph): Unit 1 $n = 40$, Unit 3 $n = 33$, Dementia Specific Unit $n = 18$. Arrows indicate tie direction. Line colors indicate relationship rating: dark green = true friend, light green = casual friend, white = positive regard; yellow = mild disregard, orange = moderate dislike, red = strong dislike.

Appendix Manuscript 3: Connections in care count: Residential aged care-based networks and people with dementia (Casey & Mitchell, 2016)

Maintaining positive social connections and feeling socially supported are associated with better mental and physical health and well-being for older adults living in the community (Ashida & Heaney, 2008; National Seniors Productive Ageing Centre, 2013). Many older adults who move into residential aged care (RAC) report that changes in their social relationship networks are among the most challenging aspects of their relocation (Bonifas, Simons, Biel, & Kramer, 2014; Bradshaw, Playford, & Riazi, 2012). Over 52% of people living in RAC in Australia have a dementia diagnosis noted (AIHW, 2015). Adapting to new social relationships in a residential aged care setting is particularly challenging for people with dementia who may have impaired memory and reduced functional capacity (Doyle, de Medeiros, & Saunders, 2011).

In Australia, people with dementia live in residential care for an average of 3.25 years (AIHW, 2015). Residents necessarily form new networks of diverse relationships including those with other residents, care staff, visiting therapists, and even other residents' family members (Kovach & Robinson, 1996; Wilson, Davies, & Nolan, 2009). While current principles and policies in care favour a holistic approach that addresses the physical, psychological and social needs of people with dementia (AHMAC Care of Older Australians Working Group, 2005), their social connections within RAC are rarely considered or documented (Reed & Payton, 1997; Theurer et al., 2015).

Two PhD candidates from the Dementia Collaborative Research Centre—Assessment and Better Care, UNSW, are conducting separate studies using social network analysis to investigate ways in which the networks of people with dementia in RAC are associated with their care, well-being and their perceptions of support or isolation. The first study, which is researching the social-professional networks of selected residents with dementia in four residential care settings, aims to identify possible associations between each resident's in-house connections and their care, neuropsychiatric symptoms, and use of psychotropics. The second study explores the structure, meaning and influence of social relationships between residents living in three high-care units of a Sydney Residential Aged Care Facility (RACF), including a dementia specific unit (DSU) (Casey, Low, Jeon, & Brodaty, 2015). This article provides a brief explanation of social network analysis, an overview of results from the studies to date, and implications for the care of people with dementia in RAC.

New South Wales, where over half the residents had dementia. It found that a person's network (excluding staff) consisted of two women—the person's daughters or friends—who visited once per month (Parmenter, 2012). Additional findings included that the longer a person lived in care the less frequent were the visits; people with more cognitive and physical problems had fewer social relationships; and people who lived at the care home longer were more likely to have severe dementia. Similarly, a Hong Kong study discovered that on average, care home residents had a network of 2.6 people (including staff), most of whom were women. Frequency of visiting for non-staff network members was less than once a month (Cheng, 2009). In both studies, some people residing in the care homes did not have anyone in their network.

Dutch researchers discovered that when nursing staff had a connection to a resident's family member, friend, or acquaintance, staff treated other people residing in the home with greater respect, felt more comfortable with them, and began friendly conversations more frequently with them (van Beek, Wagner, Frijters, Ribbe, & Groenewegen, 2013). Where an external connection existed, a staff member was more likely to treat all people residing in the unit better, not just the person with whom the external connection existed. Authors proposed that improvements in care may have been due to these outside social contacts providing information, enhancing trust and providing opportunities for better control of the person's care.

Social relationships between residents

The second study used SNA to explore friendships and positive relationships between residents in a Sydney RACF. These residents were asked to identify the people in their care unit with whom they had friendships and to rate how strong these relationships were. Residents also completed surveys assessing how socially supported they felt (Casey et al., 2015).

The size of residents' networks varied, ranging from 0 to 18 other residents. However, these relationships were rarely 'interconnected' (shared in common). The average size of a resident's care unit 'network' was one person, or nil. Less than a third of interviewed residents identified other residents as their friend and over a third of residents were 'isolates', i.e. they said they had no relationships and they were not named by anyone else. Residents felt socially isolated generally, but those who had mutual friendships with other residents felt more socially supported (Casey et al., 2015).

Discussion

A systematic review of SNA research that involved people with dementia in care identified that residents in these studies formed connections with other residents, staff and visitors during their time in care. These connections were part of a larger care home network that offered support and benefit to residents and staff, or created constraints. However, residents' minimal social connections placed them at risk of social isolation, and some residents had no social connections. On the other hand, connections between staff and residents' family and friends, and the flow of information and trust through their network, were suggested to have improved care outcomes.

Results of network analyses of between-resident relationships in a Sydney RACF indicated that residents felt they had few positive relationships with other residents and true friendships were rare. Many residents had no positive connections with the people they lived with every day. Yet, friendships and positive relationships did exist and residents who had mutual relationships benefitted through feeling more socially supported (Casey et al., 2015).

Implications

Analyses of social networks in RAC can inform dementia care practice. Since maintaining positive social connections and feeling socially supported are associated with better mental and physical health, the findings of people with dementia's limited networks and social isolation are concerning. Implications for dementia care practice include fostering positive social interactions among people with dementia and promoting staff interactions with residents' visitors so that staff may know more about the person in their care.

Conclusion

Results from research to date, reviewing residents' social-professional networks in LTC and investigating relationships between residents, indicate that residential care-based social networks are associated with multiple aspects of the care experience of people with dementia. SNA methods can uniquely inform relationship-focused dementia care practice.

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