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Social Networks: An Examination of Social Network Measurement, and the  
Relationship between Social Networks and Health among Older Adults in  
New Zealand.

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## Abstract

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The initial aim of this study was to explore the relationship between social network types derived from Wenger's PANT and health among adults aged 55-70 years old in New Zealand. More specifically, it tested the "Mezzo" level of the Conceptual Model of health derived by Berkman et al. (2000), where it was postulated that social contextual factors (gender, education, socioeconomic status and ethnicity) shape the type of social network an individual is embedded in, and these social contextual factors contribute to the relationship between social networks and health. This study used data obtained from the second wave of the New Zealand Longitudinal study of Health, Work and Retirement, which used responses to a questionnaire survey from a representative sample (N=2430). Bivariate correlations and multiple regression analyses were run to test these associations. However the initial results showed theoretically incorrect correlations between social network types, and a large proportion of the population sample were allocated into "inconclusive" and "borderline" categories. Furthermore, although the social contextual factors clearly influenced the variation in health, the relationship between social network types and health were rather weak, especially in comparison to those found in other studies. Therefore, the study took a turn to examine and rescore Wenger's PANT. The modification of the measure ameliorated the peculiar relationships between network types, reduced the number of participants in the "inconclusive" and "borderline" categories, but did not significantly improve the relationship between social networks and health. The only network types that contributed significantly to the multiple regression equation were the Locally Integrated and Wider Community Focused network types. Therefore it was speculated that the possible "active ingredient" of social networks may be the aspect of social engagement, where those who have more ties to their friends and community are in better health than those in restricted and family focused networks. This study only showed moderate support for the Conceptual Model. However it did provide evidence towards the need to explore the notion of social engagement and integration, as well as the development of a social network measure that includes perception of network ties, and the functional roles within social networks, not just the structural aspects.

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# 1. Introduction: Ageing in New Zealand

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Those aged 65 years and over currently make up 12% of the total population in New Zealand, and this percentage is expected to increase to more than 25% by 2051. The greatest increase will be after 2011 as the baby boomers enter the older age groups (Ministry of Social Policy, 2001).

New Zealand's ageing population has instigated an uprise of concern about the possible burden this may place on the economy and on the health system. The Ministry of Social Policy (2001) has adopted the "New Zealand Positive Ageing Strategy", which is designed to meet the changing needs of older adults and to develop appropriate policies and services for this emergent section of the population.

The impact of ageing on a person's life will depend on their attitudes towards the inevitable changes in their lifestyles, the circumstances in which the change takes place and the coping skills and support that they have (House, Landis & Umberson, 1988). It is crucial to distinguish the aspects that can enable this population to continue to live in their preferred location within the community. At present, there is very little knowledge about how individuals in New Zealand can remain living comfortably and with satisfaction inside their community, despite differences in personal characteristics and levels of support (Ministry of Social Development, 2009).

Due to the increase in the ageing population, the availability of family caretakers will inevitably decrease (Shanas, 1979). As families become less able to fulfil the needs of their ageing kin, bureaucratic configurations will need to be modified so that they operate in a way which accommodates both older people and their kin (Shanas, 1980). Therefore health and support services for older adults must achieve the best fit with the informal, natural networks of support and care (Keating et al., 2004). Both formal and informal social networks need to be robust, and the necessities of those who provide care also need to be taken into consideration. Phillipson et al. (2001) clearly express that if the processes and problems of ageing are to be understood, the elderly must be studied as members of a broader network. Therefore those studying aspects of



health of an ageing population must treat them as inseparable from their social relations.

This thesis used data from the second wave of the New Zealand Longitudinal Study of Health, Work and Retirement (HWR) and sought to examine the relationship between social networks and health among ageing adults. It specifically tested Berkman's (2000) Conceptual Model of Health, which takes into account the influences of socio-economic status, gender, and ethnicity upon social networks, as well as the effects of these upon social support and health. Wenger's Practitioner's Assessment of Network Types (PANT) (1994) was employed to assess and categorise participants into network typologies, which helped explicate the varying relationships between different social network types and health.

Due to the turn of events in this study, it was necessary to structure this thesis differently from traditional theses so that it made sense to the reader. This study started off with the intention of testing the "mezzo" (social networks) level of Berkman's (2000) Conceptual Model of Health (see p.17), using Wenger's PANT (1994) as a measure of social networks. However, the results from testing this model on the second wave of HWR data proved to be concerning. Therefore the thesis took a turn and investigated Wenger's PANT (1994), in attempt to find a resolution, and to see if this restructured measure improved the relationship with health. Consequently, three stories will unfold: the testing of the Conceptual Model (2000) model; the examination and rescoring of Wenger's PANT (1994); and the testing of the Conceptual Model (2000) using the adapted PANT (1994).

## **2. Theoretical Orientations to Social Networks**

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Social network theories focus on the characteristic patterns of ties between individuals in a social system rather than on characteristics of the individuals themselves. It is based on the understanding that individuals are embedded in a web of social relations and interactions, which are the basis of social structures (Barnes, 1954, as cited in Berkman & Kawachi, 2000 p. 140).

Berkman et al. (2000) note that the structure of networks may not always conform to preconceived notions of what constitutes community, defined on the basis of geographic or kinship criteria as “the essence of community is its social structure, not its spatial structure” (Wellman, 1988 as cited in Berkman et al., 2000, p. 845). Investigators of social networks postulate that what is most important about networks are the support functions they provide. However this inclination detracts from the need to focus on other structural layers such as social context that can also significantly influence the types as well as the degree of social support provided.

The foundation of social network theory is based on the notion that individuals and organisations shape their day-to-day lives and experiences through dialogue, resource sharing, propositions and support. It offers a way to think about abstract influences such as society and the community by looking to the set of social interactions that occur within them (Wellman, 1981).

### **2.1 The Beginnings of Social Network Theory**

Theories of Social Networks can be traced back over 100 years ago to one of the most influential intellectuals of sociology, Emile Durkheim (Berkman, 2000). Durkheim contributed to the understanding of how social integration and cohesion influence mortality. Social integration consists of attachment and regulation. Attachment is the degree to which a person is capable of sustaining ties with network members of society and regulation entails the extent to which an individual is held in the structure of society by its values, beliefs and norms (Jones, 1986). Durkheim’s objective was to

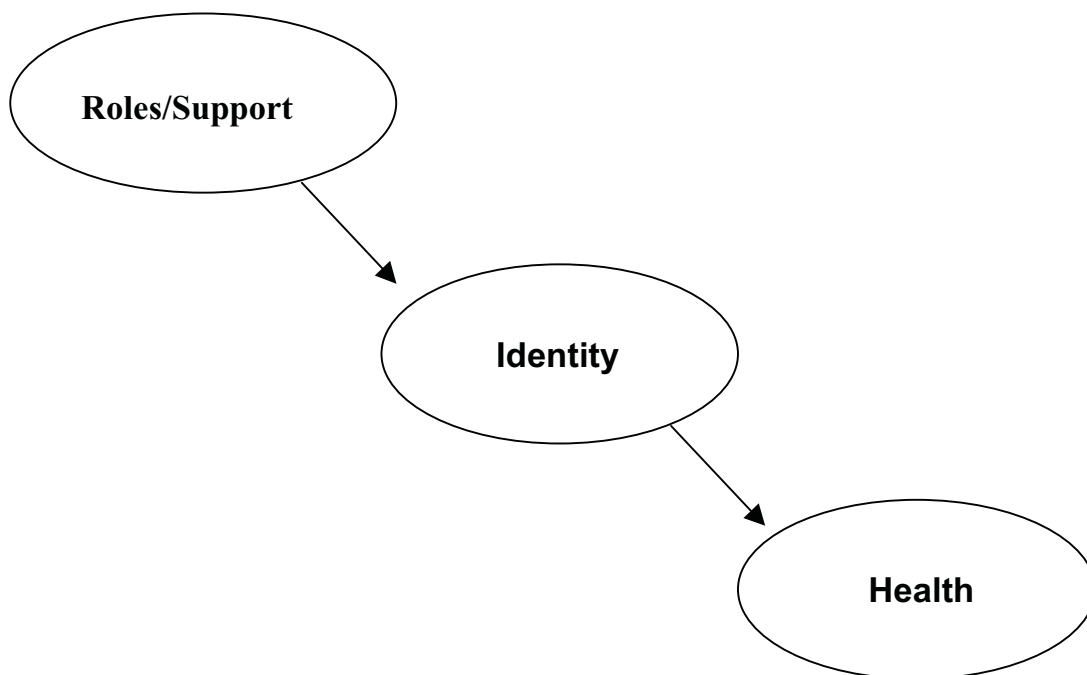
explain how individual pathology was a function of social dynamics, and how the patternings of personal and individual acts depend upon the configuration of social facts rather than their thoughts. He proposed that the underlying motives for suicide relate for the most part, to the level of social integration within the group, therefore suicide is triggered by the erosion of society's capacity for integration (House, Landis & Umberson, 1988; Pescosolido & Levy, 2002). Durkheim illustrates further that "no alternative exists but to leave mortality hanging unexplained in the air or make it a system of collective states of conscience. Mortality either springs from nothing given in the world of experience or it springs from society" (Jones, 1986, p. 104).

Berkman and Kawachi (2000) have highlighted how psychoanalyst, John Bowlby's attachment theory has also contributed significantly to the understanding of social networks. Bowlby (1980) believed that separation in infants from their mothers was unhealthy. The intimate bonds created in childhood have the power to shape social relationships later in life, where secure attachment as opposed to avoidant or disorganised attachment manifests in affectional mature bonds and security (Berkman & Kawachi, 2000). This primary attachment endorses a sense of security and self-esteem that in return provides the basis for which people can create long lasting, fulfilling relationships in adulthood (Bowlby, 1980).

Durkheim's (1951; Jones, 1986) standpoint on suicide, showed that the lack of social integration and support from friends, family and community can lead to feelings of alienation and anomie, therefore those with limited social networks are more likely to attract poorer health. In other words, without a perceived adequate social network, an individual may lose or weaken their will to live. Bowlby's theory endorses the importance of social relationships and the need for affection, social integration and interaction as a function of cognitive, emotional and physical wellbeing in adulthood. Taken together, being devoid of healthy relationships, and increases in loneliness throughout adulthood, an individual may show a rise in depressive symptomatology (as shown by a number of studies, for example Wenger, 1997; Suomi, 1997). Berkman (1988) also hypothesised that social isolation is a chronically stressful condition to which the organism responds to by ageing faster, and thus accelerating their journey towards death.

Durkheim and Bowlby's theories are also interrelated with symbolic interactionism. Herbert Blumer (1986), who established symbolic interactionism, set out three basic premises of the perspective:

1. An individual behaves towards his/her environment based on the meanings ascribed to specific aspects of his/her surroundings.
2. The meanings of the specific aspects of the environment are derived from the social interaction in which individuals have with others in society.
3. These meanings are managed/controlled, and adapted through an interpretive process employed by the individual in dealing with the experiences he/she encounters.



**Figure 2.1.** The symbolic interactionist perspective predicts that social identity leads to health outcomes (Cohen, Underwood & Gottlieb, 2000, pp. 40).

Symbolic interactionism (see figure 2.1.) postulates that social interaction is a necessity for the development of a health personality, which can predict behaviour and connects the person to society (Helsin & Fowler, 2010; Faris, 1934 as cited in

Cohen, Underwood &Gottlieb, 2000, p. 40). Furthermore, in an existential sense, the individual can extract self-conceptions from social interaction (Blumer, 1986; Cohen, Underwood & Gottlieb, 2000), for instance whether or not they are a significant social entity or what their life purpose is, and this provides opportunities to enhance self-esteem (Thoits, 1983).

A sense of meaning in life is an integral component of psychological wellbeing, as well as increasing self-worth and control over one's environment (Cohen, 1988) and facilitating health promoting behaviours (Sauer & Coward, 1985). These self-concepts are bound to change throughout the life span, where in old age a person is more likely to lose important roles in which they previously had. This in effect may reshape their identity, self-worth and belongingness (Thoits, 1983), which can in turn influence their health and ability to interact within their community.

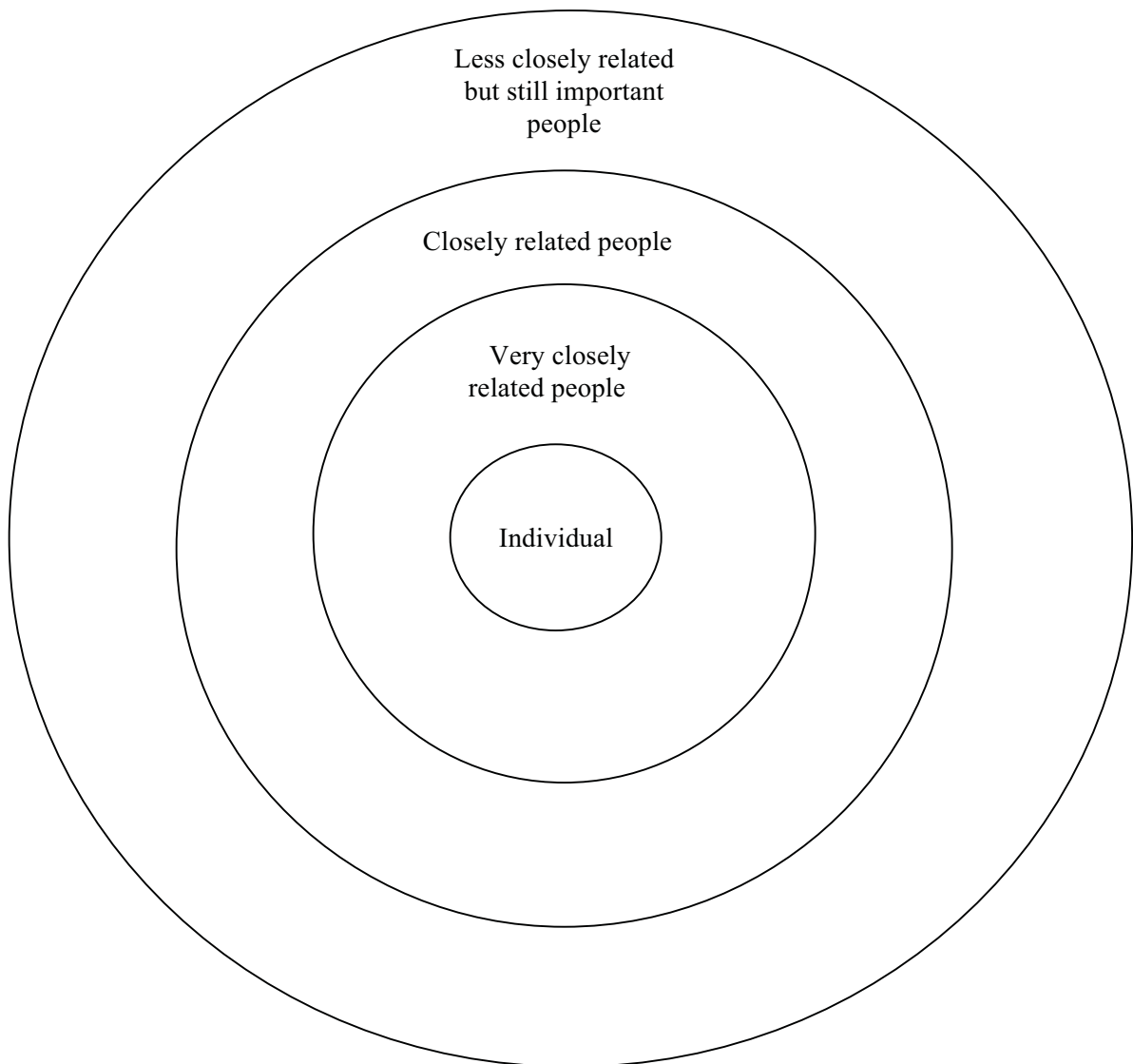
## **2.2 Modern Theories of Social Networks**

Kurt Lewin observed that “the greatest handicap of applied psychology has been the fact that without proper theoretical help, it had to follow the costly inefficient and limited method of trial and error” (1951, p. 169). This observation has been of particular relevance to the study of social networks, as investigators in the past have found that there is no single coherent framework to explain the diversity of research findings in the literature (Gottlieb, 1992). Although this paucity in the research exists, there are a number of theories that have been developed to aid in the understanding of how social networks may affect health. This section will briefly describe the most prominent theories before presenting the Conceptual Model of Health and Social Networks, which is the basis of this thesis.

### **Convoy Model**

Each person can be viewed as progressing through the life cycle surrounded by a set of people to whom the individual is connected, by the giving or receiving of social support (Ingersoll-Dayton, Morgan & Antonucci, 1997). Those who comprise the social network of an individual can be referred to as the convoy, and this convoy can vary at different points in time across the life span. Throughout a person's life, their convoy is expected to supply them with a foundation that has positive effects on

psychological and physical health outcomes. The convoy can be seen as the protective layer of family and friends who encase the individual and help in times of need (Antonucci & Akiyama, 1987; Antonucci, Akiyama & Lansfor, 1998).



**Figure 2.2.** Convoy Model by Antonucci & Akiyama (1987)

The convoy model is presented as a diagram of concentric circles (figure 2.2.) that demonstrate the relationships that surround a person (Antonucci & Akiyama, 1987). Every circle represents a different level of closeness to the focal person, and the nature and amount of support offered by people in each of the layers or circles of the convoy differs. The inner circle may provide and obtain a number of different forms of social support; where as those in the outer circles may be close to the focal individual only in specific ways (for instance they may only offer informational support) (Fiori, Smith & Antonucci, 2007).

The structure and quality of the network is shaped over time by factors that are personal (for instance differing demographics) and situational (role expectations, resources and demands). Therefore the most favourable degree of social embeddedness varies by the individual particularly among heterotypic elderly populations (Adams & Blieszner, 1995; Fiori, Antonucci & Cortina, 2006). This theory is unique in that it allows for the recognition of older adults who have less social connections, but have always preferred such smaller networks.

### **Quality of Relations**

Theoretical and empirical evidence show that perceived quality of relations mediates the association between network type and wellbeing (Glass & Maddox, 1992). Based on role theory, it is speculated that only those roles that provide social support are important facilitators of health, not the total number of roles. The idea is that the quality of relationships may be the influential effect of social networks upon health. Having many sources of support or performing many roles in terms of both the individual's family and the surrounding community are associated with improved mental health (Fiori, Antonucci & Cortina, 2006; Orth-Gomer & Uden, 1987) and those who have more restricted networks have markedly higher depressive symptoms. Furthermore, individuals who have more diverse or friend-focused networks are assumed to have better health (Forster & Stoller, 1992). This is due to the belief that individuals in these networks perceive themselves as being more loved and cared for by their network members than do individuals in more restricted networks (Lakey, & Cassidy, 1990).

### **Socio-Emotional selectivity theory**

Carstensen (1991; 1995) put forward this theory, which also adopts a life span perspective of social relationships. Socio-emotional selectivity theory is based on the notion that as people age, they become more selective about the people whom they sustain close social relationships with. This reduced rate of social interaction among the elderly is viewed as the strategic selection over the life span that allows the individual to maximise social and emotional gains and limit exposure to social and emotional risks. In a sense this model is in line with the Convoy model by Antonucci and Akiyama (1987), as it insinuates that an individual's social network transforms throughout the life span, therefore socio-emotional theory can be seen as an alteration to social networks as people age.

### **Hierarchical-compensatory model**

This model was put forward by Cantor (1979) to depict the way in which the elderly turn to family and others for social support. Social support is provided according to the relationship of the support provider to the recipient. The primary providers of support are children living close by, followed by other relatives. Cantor (1979) stipulated that the elderly view nearby children and relatives as the most appropriate providers of social support. If the primary support is unavailable then friends and neighbours are classed as secondary social support providers. In this regard, if the originally favoured support provider is unavailable then other groups attempt to compensate as a replacement.

### **Task Specificity model**

This model looks at the match between the nature of the task and the characteristics of a particular relationship or individual (Cohen, 1988). For instance, instrumental support is more likely to be carried out by a proximal member of the social network, while emotional support would entail someone who is both physically and personally close to the individual. The task specificity model postulates that specific types of social support needs are suited better to some particular type of social relationships than others. This model reinforces the importance of a theoretical basis for categorising networks into typologies.



## **2.3 Conclusion**

These theories of social networks reveal the importance of ties between an individual and their social system. However, what modern theories suggest is that the most salient feature of a person's social network, is the degree of support received and available to them, however this may not be the only important aspect. These later theories digress somewhat from Durkheim and Bowlby's conceptualisations, which focused on social interaction and construction of meaning from relational social ties. This shift away from social integration is for the basis of the next chapter, which focuses on the relationship between social networks and social support, and proceeds to discuss a more integrated model of social networks and health.

### **3.The Relationship between Social Networks and Social Support and Health**

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It is important to clarify the relationship between social networks and social support. These two concepts have been amalgamated and used interchangeably within social network and social support research, and thus caused much confusion as to their definite meanings (Berkman, 1984; Pescosolido & Levy, 2002). To add to the opacity, within social support literature there is also extensive variation as to the definition and measurement of social support (a problem also familiar to the study of social networks). Lyyra and Heikkinen (2006) stress that determining exactly which aspects of social support are responsible for the effects of health and wellbeing is exceptionally difficult. This segment is particularly important for the purpose of deterring confusion when arriving at the literature review of the present thesis. This thesis includes a review of both social network and social support research, due to the very fact that investigators have used these concepts interchangeably.

#### **3.1 Definition of Social Support**

Social support can be distinguished as the emotional, instrumental and financial aid that is obtained from ones social network (Cobb, 1976; Dean, et al. 1994). Support involves a transaction of emotional concern, instrumental aid, information and appraisal (Bowling, 1994; Uchino, 1996; 2004). Researchers have found that simply because an older adult lives in close proximity to family members, does not mean that they will necessarily obtain adequate support (Berkman, 2000). Depending on the nature of the elderly person's circumstances, support may come from various sources. Be it a close friend or confidant, from a child living in another town, or from no one at all.

Within social support, there are subdivisions of functional and structural support. The different types of functional support range from emotional to belongingness (described in more detail in Table 3.1). Structural support focuses on the existence of interconnections between social ties, whereas functional support focuses on the

specific functions that these relationships serve (Uchino, 2002). Barrera (1986) also identified a variety of support types: social embeddedness, received support and perceived support. The first is related to indicators that help assess the frequency of contact between individuals within a network. Received support is the actual amount of tangible help received, whereas perceived support is associated with the subjective evaluations of supportive exchanges, such as adequacy of or satisfaction with social support.

**Table 3.1.** Definition and examples of different support functions (Uchino, 2004, p.17)

<b>Type of Support</b>	<b>Definition</b>	<b>Example</b>
<b>Emotional</b>	Expressions of comfort and caring	Someone who makes you feel better because they listen to your problems
<b>Informational</b>	Provision of advice and guidance	A person who can give you trusted advice and guidance on an issue
<b>Tangible</b>	Provision of material aid	A family member who could give you a personal financial loan
<b>Belonging</b>	Shared social activities, sense of social belonging	A friend with whom you enjoy just “hanging out” with.

### **3.2 Network Approach to Social Support**

The network approach to social support investigations is imperative to the understanding of both the theoretical facets of social support and its relevance in various practical contexts (Faber & Wasserman, 2002). Contemporary studies on social support observe how much social support is a result of the individual or their surroundings (Levy & Pescosolido, 2002). In this sense, the relationships that one participates in can be thought to be the focal aspect of a person’s environment and network.

Early research defined social support as the resources available from friends, family and acquaintances that surround individuals (Barrera, 1986). This also includes implicit resources, which are those that people perceive as being available, not necessarily those that they receive. Wellman (1981) proposed that investigating social support in the context of networks and then quantified using network analysis would allow for a more focused understanding on how the “composition, content and configuration of ties affects the flow of resources to the focal individual” (Faber & Wasserman, 2002, p. 34). Furthermore it allows researchers to see social support as a property not existing between two people, but among several interconnected individuals. Social network analysis has enabled a perceptual shift from the individual to collections of individuals (Emirbayer & Goodwin, 1994). Associations through which various resources may be provided or shared tie these individuals together.

By considering social support as a variable that may arise, and not as a given, its analytical power increases (Cohen, Underwood & Gottlieb, 2000). It is possible to analyse the circumstances under which a social connection will or will not provide support for an individual. For instance, investigating how the diffusion of support is linked to the characteristics of people, the ties that connect them, and the networks that these ties are enclosed in (Faber & Wasserman, 2002). In this sense, social support is kept as an object of study, and social networks is utilised as the subject of study (Wellman, 1981).

Pescosolido and Levy (2002) also note that when looking at human connections, social networks can be conceptualised as the structure of the connections, where as social support can be viewed as the content of human relations. The concept of social support is something that might occur in a network (through a social tie) and by using techniques appropriate to the lack of independence among ties, show that a substantial amount of variance in personal support can be explained by the individual’s network and personality characteristics (Uchino, 2004).

### **3.3. The Conceptual Model: An integrated Model of Social Networks and Health**

The theories described in Chapter 2 all share the assumption that social support plays the most important role in social networks. Nevertheless there may be other critical pathways by which social networks may influence health. Berkman and Kawachi (2000) have formulated a conceptual model of social networks, which presents the relationships as a cascading causal process beginning with the macro-social, and progresses to the micro-psychobiological processes (upstream to downstream forces). These are dynamically interrelated with one another, and form the processes by which social networks affect health (Figure 3.3.). This model encompasses a focus on the social context and the structural underpinnings in which social support is provided.

#### **Upstream Macro-level Forces**

The *upstream* macrosocial forces refer to political economy, where it is possible to examine how culture/ethnicity, labour markets, economic pressures and organisational relations influence the structure of social networks (Berkman & Kawachi, 2000; Berkman, 2000) and consequently the effects upon health.

#### **Mezzo Level: Network Structure and Characteristics of Network Ties**

Figure 3.3. displays the multiple dimensions of social networks. Social networks are heterogeneous, and therefore can vary from one individual or group to another. The different characteristics in which social networks encompass, influences the downstream factors. The following range of network structure characteristics (Mezzo level) have been identified by Berkman & Kawachi (2000; p. 145):

1. Range or size: the number of network members
2. Density: the extent to which the members are connected to each other.
3. Boundedness: the degree to which they are defined on the basis of traditional group structures such as work or neighbourhood
4. Homogeneity: the extent to which individuals are similar to each other in a network

5. Frequency of contact: the number of face-to-face contacts and or contacts by phone or mail
6. Multiplexity: the number of types of transactions or support flowing through a set of ties.
7. Duration: the length of time an individual knows another
8. Reciprocity: the extent to which exchanges or transactions are even or reciprocal.

### **Downstream Forces**

The *downstream* forces consider how network structure and function affect social and interpersonal behaviour (Berkman, 2000). These forces operate at the behavioural level, through the provision of:

1. Social Support: Social support is typically divided into subtypes of emotional, belonging, tangible, and informational support (see table 3.1 for definitions). There is also a distinction between perceived and received social support, where the amount of support perceived to be available may not be equivalent to the actual provision of support. A number of researchers have found that the perception of support has more of an effect upon health than received support (Idler & Benyamini, 1997; Lakey & Cassady, 1990).
2. Social Influence: Individuals may obtain direction by comparing their attitudes with those of a reference group of comparable others. Individual attitudes are verified and strengthened when they are shared with the comparison group but altered when they are discrepant.
3. Social Engagement: social networks may affect health and wellbeing by encouraging social participation and social engagement. This includes getting together with friends, attending social functions, participating in social roles and group recreation, as well as attending church.

Through social engagement, the individual's social network can elucidate significant social roles such as parental, familial, and community roles. These consequently endow people with a sense of value, belonging, companionship and attachment within the network context. Social engagement has been connected to the maintenance of

cognitive function in old age, as well as to decreases in mortality regardless of the degree of support received (Glass et al, 1997). This may trigger physiologic systems which work directly to enhance health as well as indirectly by supplementing social coherence and identity.

4. Access to material resources: Berkman & Kawachi (2000) conjectured this mechanism, where shared work experiences, health experiences or religious affiliation provide access to resources and services which may explicitly influence health. For instance social networks that have access to support groups for individuals who are recovering from illness may have a direct bearing upon health outcomes.

5. Berkman (2000) notes that these micro-psychosocial processes influence immediate pathways to health status, that comprise of immediate physiological stress responses, psychological states and traits (encompassing self esteem, efficacy, security, health damaging and promoting behaviours). Cognitive and emotional states such as self-esteem, coping, depression and sense of well-being are psychological factors that may be influenced by social support. However, this relationship can be reciprocal where psychological factors can also influence social support and in turn health.

### **3.4. Conclusion**

Social support and social networks are not one and the same. Research on these topics has continuously used the terms interchangeably, and thus caused confusion as to what they actually convey. Although modern theories corroborate the notion that social support is the main influence upon health, the Conceptual Model (Berkman & Kawachi, 2000) removes this focus and provides a means towards looking more widely, into Macro-societal impacts upon social networks, which have a cascading causal influence upon the micro-psychological factors and health. This model is significant, as Macro-social factors may significantly influence the structure and characteristics of a person's social network.

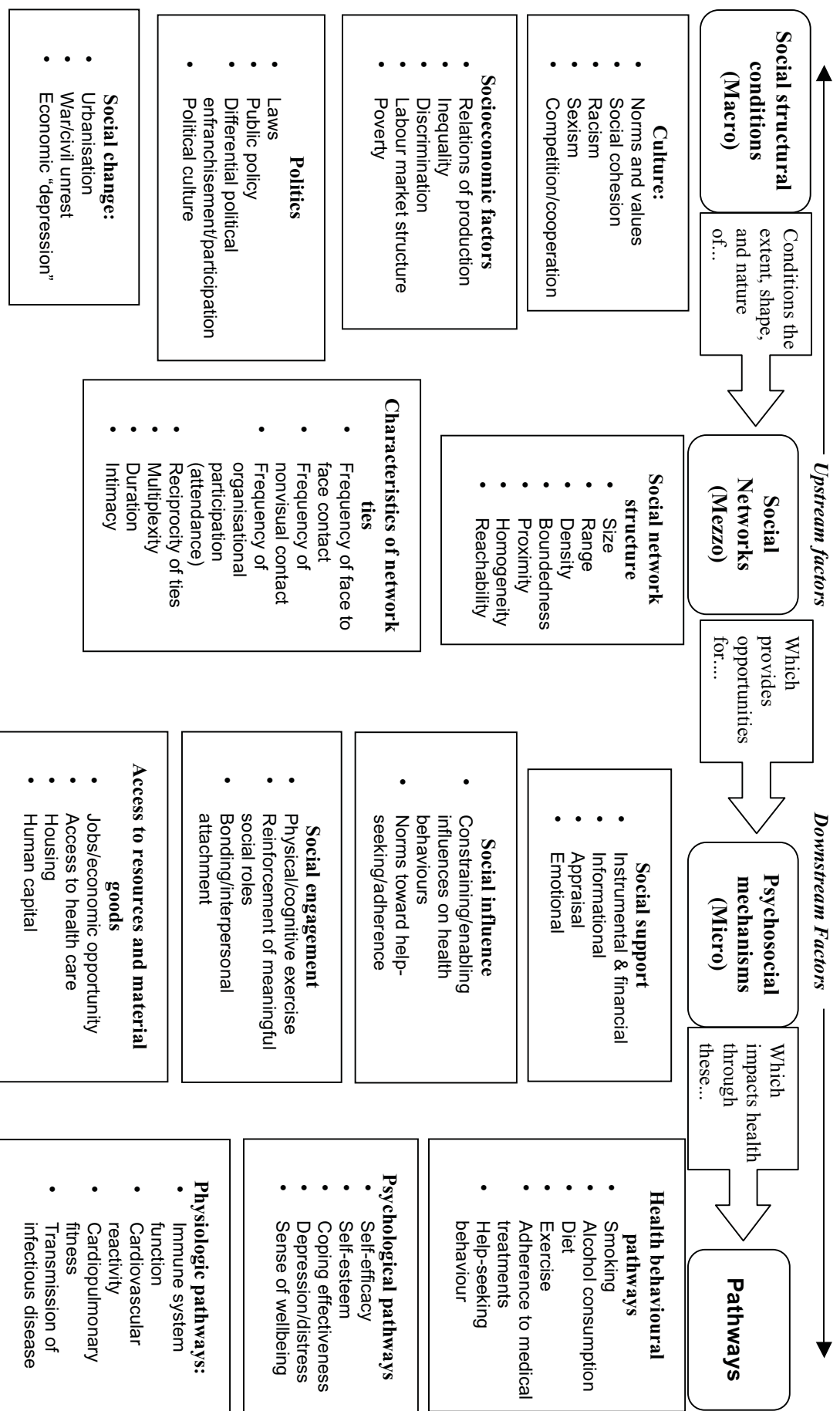


Figure 3.3. Conceptual model of how social networks impact health (Berkman & Kawachi, 2000)



## **4. Literature Review: Support for the Conceptual Model of Social Networks and Health**

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### **4.1. Introduction**

Humans are social beings and therefore the need to belong is a fundamental aspect of existence across the lifespan (Golden, et al., 2009). Pescosolido (2006) notes that it is real human contact which is the underlying engine of action when it comes to analysing how abstract structures in a complex environment affect an individual's health. Social relationships influence several aspects of people's lives, including achievement and maintenance of good mental and physical health (Ashida & Heaney, 2008).

Social relationships are thought to be especially important for older adults' health, where those who are capable of sustaining independence and reside in a community setting for longer have better health (Fiori, Antonucci & Cortina, 2006). Gottlieb (1992) mentions that for social interactions to take on supportive meaning, the intended support recipient must be reassured about the provider's motives for helping and should not experience ego-relevant costs, feelings of indebtedness, or threats to autonomy from the interactional process.

The importance of social relationships in the treatment and maintenance of health and well-being has engrossed the attention of scientists and practitioners across a number of behavioural, social, and medical sciences (Cohen, Gottlieb & Underwood, 2000). Wellman (1981) argues that networks are more than bundles of two person exchanges and that the structural form of a network influences the flow of resources through specific ties.

The capability of older people to cope with life and the problems that arise is related to the structure and contact of their social networks, as well as access to resources that assist them on a daily basis (Adams & Blieszner, 1995; House et al, 1988; Litwin, 2001; Pescosolido, 2006; Shahtahmasebi et al., 1992). Network size, number of face-

to-face contact, and the number of local ties are connected to an increase in the availability of instrumental and emotional support (Wenger, 2000). The elderly who have strong social networks are happier and more likely to perceive themselves as healthy (Ashida & Heaney, 2008; Baumeister & Leary, 1995; Cornwell & Waite, 2009; Golden, et al., 2009; Hyman, 1971; Idler & Benyamini, 1997; Litwin, 2006; Lyyra & Heikkinen, 2006; Schuster, Kessler & Aseltine, 1990).

This chapter is organised around the conceptual model of social networks and health. There are two aims of this chapter. First and foremost is to present to the reader an overview of the literature and evidence for the effects of social networks upon the health of the elderly. Secondly, it aims to show the usefulness of implementing the conceptual model for a more holistic approach to the understanding of the relationship between social networks and health.

## **4.2. Early Research: Indicators of a Relationship between Social Networks and Health**

Early research displayed pragmatic evidence for the connection between social support, network structure and health status and mortality (Berkman & Syme, 1979; Sabin, 1993; Seeman et al, 1987; Shahtahmasebi et al., 1992; Stephens et al., 1978). Social participation and social support aspects of networks were shown to have the most impact on mortality, and were consistently linked with physical illness recovery (Berkman & Syme, 1979; Berkman, 1984; Cassel, 1976; Cobb, 1976; Glass & Maddox, 1992; Hays et al, 1997; Kawachi et al., 1996; Seeman et al, 1994; Uchino et al., 1996; Unger et al, 1999).

Epidemiologists Cassel (1976) and Cobb (1976) first suggested that a link existed between social resources, support, and disease risk. Cassel (1976) conducted a comprehensive review of the literature around social support and wellbeing and found a strong association between the social environment and resistance of individuals to disease. Cassel (1976) was concerned with the effect on health of the presence or absence of other individuals. He found that social subgroups act as buffers against stress and illness by providing the information necessary to deal with adverse conditions. In this regard, a number of researchers over the past few decades have

postulated that each person needs a set of relationships that over the life course will socially integrate them into a “helping network” that can be relied upon during times of difficulty and stress (Antonucci et al., 1998; Baumeister & Leary, 1995; Berkman & Syme, 1979; Uchino, 2004).

Berkman and Syme (1979) were among the first initiators of research specifically into the effects of social networks upon health. Their influential study analysed data on 4725 participants in the Alameda County Study, aged from 30 to 69 (at baseline) and the number of deaths were followed over a nine-year period. The authors created the Social Network Index that included indicators of marital status, contact with close friends and relatives, church membership, and group membership. This study uncovered an increased risk of death for those who lacked social and community ties. Berkman and Syme’s (1979) study was groundbreaking at the time, however their results may have been confounded with physical disability status and cognitive health status, which were not controlled for. Although this study controlled for an array of health status variables, and these were analysed independently for the distinct age groups and genders, it did not present any understanding of which characteristics of social relationships can buffer against mortality.

Seeman et al (1987) lengthened Berkman and Syme’s (1979) study by implementing a 17-year follow-up of mortality information. Furthermore, they extended the age group to include participants aged from 74 to 94. The authors made adjustments for variables relating to demographic characteristics, health status, lifestyle and depression. The results of this study illustrated that those over the age of 60, with stronger social networks with friends and relatives had a reduction in mortality risk. Furthermore, participants aged 60 years and older who scored in the highest quartile of the Social Network Index had a mortality risk of 30% less than those in the lowest quartile.

The results reported by House et al (1982; 1988) also supported Berkman and Syme (1979), where those with less social ties were at a heightened risk of death. In the 1982 study, House and colleagues looked at the effects of a fusion of social networks and social engagement measures on death over a decade among 2754 Americans aged 35 to 69. Their results revealed that there was a significant protective effect of group

membership for men and similar effects were shown with church attendance for women.

The power of these former measures to predict health is irrefutable; however the interpretation of what they actually measure has been open to deliberation. The term “social networks” were criticised as merely being used metaphorically (Hall & Wellman, 1985, as cited in Berkman & Kawachi, 2000, p. 142). For instance weak ties were only inferred from membership to community organisations and were not measured directly. This critique initiated social scientists to narrow their focus from the structural elements of social networks to social support (Antonucci & Akiyama, 1987; Stephens et al., 1978), which was assumed to be the most important aspect of social networks.

Research has also shown favourability towards social support as the most powerful aspect of networks. For example, Berkman and colleagues (1992) examined the effects of social networks on 194 community dwelling adults in New Haven, 35% of which had myocardial infarction. The results of this study were overwhelming, as 53% of those who had no sources of support died within the first six months of the study compared to 23% of the participants who had more than two sources of support. Those who lacked emotional support were more than twice as likely to die within 6months of myocardial infarction. Moreover the significance of the relationship between emotional support and mortality grew to three times greater once the authors controlled for covariates (for instance age, gender, health).

It is important to note that prior investigations were predominantly atheoretical and did not take into account the context and structural foundations for which social support and resources were provided. Thus, they did not reveal how social networks influence health and the focus on social support severely hindered the growth of understanding how other pathways can affect health. Berkman (2000) stresses the importance of considering multiple pathways by which social networks influence health, such as the larger social and cultural contexts, as these will inevitably influence the shape and structure of network systems.

### **4.3. Macro-Level: Social-Structural Conditions**

In order to have a more comprehensive framework within which to explain how different networks affect health, it is imperative to look at upstream factors and assess the network structure. Through this method, more adequate pathways through which social networks influence health can be understood. Social networks are lodged within larger social and cultural contexts, which shape the structure of networks. Research into this macro level of the conceptual model has been lacking, and up until recently, has been almost completely absent in studies of social networks and influences on health (Berkman & Kawachi, 2000).

Various researchers have emphasised the need for more execution of socioeconomic and cross-cultural studies. There are a number of group differences for instance; collectivist and individualist cultures have different views of social cohesion, as well as norms and values. These can consequently affect their preference for size, density and proximity of their social network structure (Grundy & Slogett, 2003; Kumar & Oakly Browne, 2008; Litwin, 2006; Litwin & Shiovitz-Ezra, 2006). Socioeconomic factors may increase discrimination and perceptions of inequality as well as limit an individual's ability to obtain certain types of support (Zunzunegui et al., 2004).

A number of investigators have found that relationships with friends and confidants are considerably more important for health than relationships with family (Uchino, 2004; Wenger, 1997; Zunzunegui et al., 2004). However when socioeconomic status is taken into account, the relationship may be the opposite. For example Zuckerman et al (1984) examined the effects of social networks on individuals aged 62 years old and over with low socioeconomic status in Connecticut. Social networks were evaluated through questions relating to the existence of, and connections with confidants, friends and children. The investigation found that those with more children were protected against mortality. The outcome of friends and confidants were however, not found to be significant.

The results of this study are considerably different from more current research (for example, Fiori, Antonucci & Cortina, 2006; Wenger, 1997), which have shown that

the relationships with friends and confidants are important for health. However, it is important to take into account the sample population, as those of low socio-economic status may in fact rely more on family than friends. Seeman et al (1993) conducted a comparative study, looking at the effects of a hybrid of social networks (spouse and friends/relatives) and social engagement (church attendance and group membership) on mortality over five years among older female participants in three sites (New Haven, Iowa and East Boston). Results of this study portrayed an overall protective effect against mortality for females who had more social networks and social engagement in New Haven and Iowa. The lack of significant effects of social engagement and social networks on mortality for women in East Boston was attributed to socio-cultural differences that existed in this area.

Ethnicity is another significant dimension of the social structural conditions, which alters the structure and characteristics of social networks. Litwin (2006) conducted research on three different ethnic groups of older adults in Israel. This study examined the relationship of social networks and self rated health among different cultural group-structures, interaction, support, social engagement, as well as self rated health. Results indicated that sociodemographic background was negatively associated with self-rated health, and socio-economic status was positively related. Moreover, health-promoting behaviour was positively associated with self-rated health but psychological and physiological adversities were negatively related. Litwin (2006) also found that older Arab Israelis who are still largely embedded in extended family networks (where family are their primary caregivers) had better perceived health. This was not replicated in the Soviet or Jewish Israel older adults. It appears that the receipt of support may enhance subjective health within cultural context.

Zunzunegui et al (2004) drew similar conclusions in their study of health status, social integration, and social networks in two Canadian sub-populations: Hochelage-Maisonnieuve and Moncton. The authors found that those with more extensive social networks reported better self rated health. The participants, who received poor support from children and lack of interaction with friends, also reported poor self-rated health. While both the populations' studied appeared to enjoy beneficial effects from social activity, interaction with children was more influential on improved health in the Hochelage-Maisonnieuve than in Moncton. The relationship with children seems to be

more significant in the former group as this population is more socially and materially deprived, than the more affluent and cohesive area of the latter. Therefore, economic and social differences as well as cultural differences are shown to be highly influential on the associations between social networks and health.

Similarly, Cohen (1988) notes that the access to, and the meaning of social support may vary across other social and psychological dimensions. Therefore, sources and forms of support may differ among cultures or social classes and between genders. Early literature (for instance Bengtson, Cuellar & Ragen, 1977) also noted that higher social class is strongly associated with improved health and higher morale as well as more effective coping strategies in times of adversity.

The subjective perceptions of support and loneliness have been shown to differ in non-Caucasian populations. Research by Tomaka, Thompson and Palacios (2006) discovered that Hispanic and Caucasian adults (60 years old and over) differ in subjective loneliness, where predicted increases in disease and mortality were more consistent in their Hispanic sample even though they were less likely to be living alone. Therefore negative effects may be more powerful in certain cultures (as substantiated by research by Litwin, 2001; Zunzunegui et al., 2004). Additionally, emotional responses that may appear to be highly personalised may be conditioned by external social factors. For instance, previous research has shown that those from lower socioeconomic status groups generally report higher levels of negative emotions (for instance depression and anxiety) than do individuals in other groups (Kessler & Neighbors, 1986; Thoits, 1982). These individuals are also more likely to be susceptible to disease and illness (coronary heart disease, cancer, depression and stressful responses (Berkman, Leo-Summers, & Horiwitz, 1992; Sorensen et al., 2003).

However, some network groups may be harmful for health regardless of socioeconomic status and culture. Evidence for this was presented by Litwin and Shiovitz-Ezra (2006), who examined the effect of their network typology on seven-year mortality risk between two ethnic groups. Participants from both cultural groups

who were more socially integrated and engaged within their families and communities had significantly higher protective effects against mortality than participants who were in the restricted networks, who have very limited social and community ties.

#### **4.4. Psychosocial Mechanisms**

As we move downstream, we begin to unfold the mediating pathways by which network influences health status. It should be noted that these psychosocial mechanisms are not mutually exclusive, and are more likely than not to work simultaneously.

##### **Social Support**

Not all ties are supportive and there is variation in the type, frequency, intensity, and extent of support provided. Some ties are specialised and provide only one type of support. Furthermore, social support has been shown to operate in a variety of forms from promoting coping, influencing evaluations of self and others, and by providing identity. Social support is transactional in nature, where the process of giving and receiving support resources occurs within a normative framework of exchange and behaviour is guided by norms of interdependence, solidarity and reciprocity (Antonucci, Akiyama, & Lansfor, 1998).

In the absence of social support, the risk of loneliness (the subjective feeling of being alone, separated or apart from others) and isolation (objective physical separation from other people, such as living alone or residing in a rural geographic area) increases. Both of which have been shown to be associated with mental health risks (Tomaka et al., 2006; Thoits, 1983; Wenger et al., 1996). A number of researchers (for instance Finch & Zautra, 1992; Wenger et al., 1997) have shown that the risk factors of loneliness, isolation and depression are interlinked, where loneliness is a risk factor for depression and recurrent or persistent depression has been linked with loneliness and dissatisfaction in life. Researchers have been critical of previous research on social isolation and health effects, as isolation has merely been depicted using one or two measures (Cornwell & Waite, 2009). Upon this basis, it has been difficult to determine whether various components of social isolation merge together or work independently to impact health.



Low levels of loneliness and increasing amounts of support from family, friends and social groups are the most favourable social conditions for maintenance of disease symptomatology and disease outcomes (Tomaka, Thompson & Palacios, 2006). Deteriorating health and increasing isolation may be due to individuals being unable to maintain optimal levels of belongingness. This aspect is in line with cognitive tradition and the stress buffering hypothesis, where those with strong social ties are more likely to be protected from the detrimental effects of stressful circumstances like disease (Berkman, 2000). Furthermore, the effects of perceived isolation and disconnectedness upon physical and mental health has been shown to be particularly severe for the elderly, as they are more prone to being threatened by stressful life course transitions, health problems and disabilities (Cornwell & Waite, 2009).

Scholars have enquired about whether it is the quality of the relationships in the networks or rather the quantity or residential proximity of family members that is most important for fostering wellbeing (Bushman & Holt-Lunstad, 2009). Research that has aimed at assessing the influence of adult children on parental health and wellbeing, has deliberated upon the presence and the number of offspring and the frequency and the nature of contact between them (Ryan & Willitis, 2007). It has been argued that the more children there are, and the closer they live to their parent(s), the greater the source of support and levels of physical and psychological health (Ryan & Willitis, 2007). However it is becoming clearer that it is not the frequency of contact between older adults and their adult children, but the nature of the interactions and the perception of support as well as being a burden upon others (Sabatelli & Waldron, 1995).

Ashida and Heaney (2008) explored the extent to which the constructs of social support and connectedness differed in terms of their associations with the structural characteristics of social networks (number of network members, density of network, homogeneity of the network members, frequency of contact, and geographic proximity of members) and the health status. They found frequent contact with network members to be positively associated with social support and that network density and having network members living in close proximity was positively associated with perceived social connectedness. Consequentially, social

connectedness showed a significant positive association with health status, however social support did not. Individuals with denser social network structures and those who had more members from their networks in close proximity reported higher perceived levels of social connectedness. Interestingly, structural network characteristics (for example, network size and proportions of kin) were not found to have a substantial association with social support.

Perceived social support and connectedness may operate similarly to a cognitive schema (Lakey & Cassady, 1990). Individuals have stable and structured beliefs about the degree and quality of their interpersonal relationships. These viewpoints leave room for biased perception of social interactions, as well as skewed recall of past interpersonal events. Therefore people have predisposed perceptions of others as unsupportive or supportive (Idler & Benyamini, 1997). Faber and Wasserman (2002), also add that emotional bonds that form attachment style is associated with perceived support, where secure adults perceive more support from family and friends and fearful adults will perceive less.

Investigators have benefited from including measures of the individuals own perception of the quality of their social ties, as social networks are liable for both positive and negative effects upon health and wellbeing (Bushman & Holt-Lunstad, 2009). Antonucci et al. (1998) as well as Ingersoll et al. (1997) examined the issue of positive and negative influences of social relationships upon health. Personal characteristics such as mood and self-esteem, as well as life context (for instance the experience of stressful events) have significant consequences for older people's vulnerability to negative social exchanges. Moreover, negative social ties have been shown to have stronger associations with depression than positive social ties, which have been shown to have minimum to no effects of wellbeing (Finch and Zautra, 1992; Rook, 1992).

Gender also appears to have an effect, whereby women who perceive more personal and psychological resources benefit more and experience less stress from their social ties (Korten et al., 1998). However, they were also more distressed by negative exchanges within their networks than men. Males are more sensitive to the stresses of

significant others, however they do not necessarily take these stresses personally like their females counterparts. It should be noted that at the same time, other studies have not uncovered any differences between men and women in the ways that quality and quantity of family ties related to either physical health or psychological wellbeing (Ryan & Willitis, 2007). Such differences may have arisen due to methodological variations and how concepts of support and perception have been measured and conceptualised.

Gender differences have been found in regards to the types of social support provided and preferred (Wenger, 1997). Wenger (1997) found that men are more likely to provide instrumental support, and women are more likely to receive and supply emotional support to their network members. West and Simmons (1983) proposed that differences occur due to the two sexes being conditioned differently towards family and friends as well as towards dealing with major life events. Emotional and social differences together with disparities of instrumental skills have emerged out of the social structuring of life investments (Weitz, 1977, as cited in Kendig, 1986, p. 51). Forster and Stoller (1992) found that instrumental support, as well as smaller social networks were more detrimental to the health of women. The authors construed that this may be due to losing autonomy, where the women have lost their role as domestic caretakers. This attrition in their network size may negatively affect their feelings of belongingness and self-efficacy (Ajrouch et al., 2005; Shye et al., 1995).

Hays et al. (1997) examined the effects of social network size (the number of friends and family members that live within short driving distance); the frequency of social interaction (the number of social contacts both individual and in group meetings); the amount of instrumental social support given and received; satisfaction with the amount of social interaction and the availability of confidant or someone to provide support in difficult times. Those who presented with depressive symptoms had a lack of social support, an increased risk of functional impairment, and receiving assistance from friends and family also showed marked declines in functioning. These findings are consistent with a number of other studies on the effects of social support on stroke and heart attack patients (Glass & Maddox, 1992; Hyman, 1971). These negative effects may arise do to consistent assistance with tasks, which leads to the perception

of being unable to execute everyday tasks. In other words they may succumb to learned helplessness. Elders who contribute support to others may sense that they are needed and therefore be more encouraged to maintain functional competence for others and themselves. This study emphasised the predictive importance of psychosocial variables, as an individual's social environment can place elders at risk of declining physical function and loss of autonomy. Older adults who have conditions which reassure their self-worth and nurturance may have direct positive changes in their physical health (Cutrona Russell & Rose, 1986). Thus based of Weiss's (1974) theoretical framework of the different conceptualisations of social support as well as the Berkman et al's (2000) downstream pathway of the conceptual model, elderly whose relationships enhance their self-esteem are less susceptible to abating health.

Other researchers have discovered that social networks which have higher interaction with friends in comparison to family, result in better mental and physical health among the elderly (Golden, et al., 2009; Kawachi et al., 1996; Litwin, 2001; Uchino, 2004; Yasuda et al., 1997; Zunzunegui et al., 2004). Cantor (1979) suggests that this is because relationships with friends are voluntary, and more interaction with friends increases feelings of belongingness and self-worth as these individuals choose to maintain the bond. However with family, the relationship is involuntary and thus indicates that these individuals will preserve their association with the older adult as they may feel an obligation to do so (Uchino, 1999).

### **Social Engagement and Social Influence**

Networks may influence health by promoting social participant and engagement. For instance, attending social functions, participating in occupational or social roles, group recreation, and church attendance. Social engagement can reinforce social roles such as familial and community roles, which in turn provide a sense of value, identity, belonging and attachment (Rook, 1987).

Furthermore, engagement with certain groups and community provides for social influence where older adults attitudes may be confirmed, dismissed, conditioned and/or strengthened depending on the norms of the group. Social influence can assist

in understanding older adults' acceptance of health care utilisation, treatment and adherence as well as dietary patterns. Carpentier and White (2002) examined social network cohesion and took into account the structure and content of social ties. They found that those who resided in more cohesive networks were more likely to seek psychiatric services and maintain clinical follow up. Conversely, the onset and development of illness and problematic behaviours were less easily recognised for those in less cohesive networks.

Sabin (1993) measured social engagement by looking at phone and personal contact with friends, church attendance, volunteer work, someone to help (availability of someone to assist with care if required), and kin and kin contact (the number of children and relatives, in addition to frequency of contact with relatives). Sabin's (1993) results showed that socio-expressive and kin and kin contact interactions had protective effects against mortality. The author also included measures of social support and found that instrumental support was a risk factor for mortality during the four year follow up period. As described previously, this risk factor may arise due to loss of autonomy, which leads to low self-efficacy, self-esteem, and coping behaviours.

An increase in social engagement has been shown to have protective effect against mortality and morbidity. Dalgard and Haheim (1998) measured social networks by the number of close relationships with family, friends and neighbours, the amount of contact, and the quality of relationships. At the same time, social engagement was measured based on the total of organisational memberships, frequency of meeting attendance, and self-assessed significance of the group associations. Those who were more socially engaged had closer relationships with their friends, family and neighbours, and were also less likely to have health problems. Others have found that perceived emotional support, number of living children or involvement in solitary leisure activity was not able to foretell risk of mortality. However, social engagement in-group leisure activity may be more significantly protective against mortality (Walter-Ginzberg et al., 2002).

Social engagement has been shown to be influenced by gender, where women who have less engagement are affected more than men (Ajrouch et al., 2005; Shye et al.,

1995). This is thought to arise because women generally have more diverse social networks and changes to their network structures (for instance reduction in size or scarcity of network resources) may have considerable negative effects upon their health and wellbeing.

### **Access to Material Resources**

Very few investigations have sought to study differential access to material goods, resources and services as a mechanism through which social networks might operate, particularly among older adults (Derose & Varda, 2009). Participation in networks on the basis of shared work experiences, health experiences, or religious membership provides access to resources and services that are shown to directly affect health (Berkman & Kawachi, 2000). Although this aspect has vast parallels with instrumental support, further research is still required to determine whether this linkage between networks and health exists independently from support mechanisms.

A number of authors have demonstrated that the provision of access to information about health and healthcare services, encouragement of healthy behaviours, and health care utilization all assist in the coping of life stress, enhancement of feelings of self esteem and buffer against negative responses of neuroendocrine or immune functioning (Seeman et al., 1994; Uchino et al., 1996; Unger et al., 1999).

An individual's place of residence (for instance city or rural areas) significantly influences physician use (Law et al., 2005). More rural and underprivileged areas are more likely to have unmet needs for care (Wenger, 1994). Neighbourhood and socioeconomic disadvantage has been found to be negatively related to having a usual source of care and receiving preventive care (Kirby & Kaneda, 2005). Individuals residing in neighbourhoods where people are perceived to be willing to help, are more likely to report having a regular source of care and preventive check up (Prentice, 2006).

Individuals who express less trust and social participation are more likely to think that health care workers are not responsive to their needs and requirements, and that they do not receive adequate information concerning their health status (Lindstrom & Axen, 2004). Furthermore, these individuals are shown to be less likely to obtain

healthcare services (Seeman et al., 1994). On the other hand, those who express more trust in others generally describe that they have better access to a regular doctor (Linstrom et al., 2006; Prentice, 2006).

Findings concerning social network type have also revealed several significant differences in accessing material resources. Those who have more interaction with their neighbours, or are in more restricted networks (with few social ties) are more likely to seek formal health and homecare (Litwin, 2004; Wenger, 1993). It is possible that older adults within these networks are accustomed to relying on formal support and care, as family members within their network types are sparse and/or unavailable for extended periods (Wenger, 1997). Ethnic differences have also been suggested based on network type composition, where the existence of specific cultural behaviours, such as the mutual exchange relationships, that predict the extent of formal home-care assistance. Litwin (2004) notes that people in more traditional and cohesive communities and family focused networks make less use of formal care services than those in the friend focused or diverse social network types.

#### **4.5. Conclusion**

This chapter presented a wide range of literature around social networks and health of older adults. What is clear is that it is not just the support aspects of social networks that provide a pathway towards health status. Social engagement, such as participation within social clubs and social influence that promotes healthy behaviour as well as increased access to material resources may also have a significant effect. Furthermore, research has indicated that different genders and ethnicities can also alter the form of an individual's network. Social relationships may influence several aspects of an individual's life, but the individual's macrosocial level must also be taken into account. By communicating the upstream contextual influences of network structure as well as the downstream pathways that allow for the measurement of more direct and proximate influences of health, researchers will make significant process. Here, there is a perceptual shift from looking at health from an individual level to a community and socioecological level.

## 5. Social Network Measurements

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### 5.1. Introduction

Cohen, Gottlieb and Underwood (2000) argue that apposite conceptualisation of relationships and a social interaction is fundamental to the development and testing of theories of how interpersonal lives influence health. A major problem with social network measures and research is that there is little direct evidence for why social participation promotes health. The concept of social network connectedness encompasses many structural features, making it particularly difficult to measure comprehensively. Additionally, diverse ranges of social network measures have been employed (see table 5.1.), thus making it increasingly difficult to compare the results of data obtained from different research studies (Bowling, 1994).

A number of researchers have developed methods for measuring or assessing social support and networks. Earlier assessment methods were based on subjective responses of subjects to a series of unrelated questions about the perceived availability of others to provide companionship and emotional support (Golden et al., 2009). Succeeding methods of measurement involved the aggregation of factors to approximate measurement of the network as such, rather than aspects of the network.

Indices used to measure social support and networks should be consistent with the conceptual descriptions in order to differentiate the multidimensionality of support, specify the perceived adequacy of support and where appropriate, identify general supportive behaviours and interactions that are presumed to affect the health outcomes being measured (O'Reilly, 1988). Dean et al. (1994) assessed measurement issues in network analysis, and concluded that it is crucial to use measures of social support that tap the theoretical domains of network composition, how the network functions to provide support and of psychosocial functioning.



Table 5.1. *Approaches to measuring Social Integration and Networks (Cohen, Underwood & Gottlieb, 2000, p. 57)*

<b>Role-Based Measures</b>	Assess the number of different types of social relationships in which individuals participate
<b>Participation-Based measures</b>	Assess the frequency with which individuals engage in various activities
<b>Perceived Integration Measures</b>	Assess the extent to which individuals believe they are embedded in a stable social structure and identify with their fellow community members and social positions
<b>Complex Indicators</b>	Combine information regarding social ties, community involvement, and frequency of contact with friends and relatives into a single summary index.

In the past, social network participation (i.e. social integration) was measured in terms of the diversity of relationships one participated in. Relationships assessed in a typical social integration measure included spouse, close family member, friend, neighbour and social and religious group members. The more types of relationships persons reported, the greater their level of social integration (Bell, LeRoy & Stephenson, 1982). Cornwell et al (2009) note that, a frequently used method is to simply count the number of people occupying a set of preidentified roles (for example family, friends, and community care workers). This approach confines awareness to individuals with whom the individual interacts with most frequently face-to-face (Berkman & Kawachi, 2000), and therefore it does not leave room for the relations that are most important for the individual. Therefore it is necessary to include components that acknowledge those network members that are relevant for the respondents under study.

Berkman (1984) found that measures used in social network research have been developed post hoc, from a limited number of items included in questionnaires for unrelated reasons. Consequently, the majority of studies purporting to measure social

networks and support are not able to adequately measure the concept at all. Furthermore, measures that integrate social networks and support with other social conditions into one measure of social resources or psychosocial assets are unable to sort out the specific factors that predict health outcomes and wellbeing (Uchino, 2004).

In regards to concept validity, there are differences in opinion as to whether it is the structure of the social network, its function, or the amount of social contact that is important for health. This results in problems that interfere with the validity of the scales as a measure of any of the social support concepts that need to be tested (Dean et al., 1994).

There are a number of methodological reasons as to why inconsistencies exist among social network research. Firstly, the different dimensions of social networks relevant for specific subgroups may not have been measured. This issue has impelled researchers to seek solutions for clarifying the inconsistencies in demographic variables by developing social network measures that are specific to groups (Dean, et al., 1994). For instance, measures of social relationships may be less valid in rural and small town environments and for women, and accordingly reduce the statistical effects on mortality. O'Reilly (1988) points out that researchers using social network analysis must appreciate the fact that individuals particularly in urban settings have affiliations with individuals in different groups. Consequently, some members of that network may be called upon to be supportive in some situations but not in others. Another reason may be that the social network measures, and the way they are used in the analysis of population data result in distortions in the findings (Dean et al., 1994).

Significant advances in our understanding of the people and conditions that are most and least hospitable to the expression and beneficial effects of support depend on the collection of more detailed information about the participants and about the supportive processes hypothesised to affect their health and wellbeing (House & Landis, 1988). In this light, Wasserman and Faust (1994) proposed that successful; social network analysis needs to:

1. Examine actors and their actions as independent concepts.
2. Accept that relational ties between actors are channels for the transfer of resources.

3. Focus on the individual's view of the network's structural environment as providing opportunities for constraints upon individual action.
4. Conceptualise structure as lasting patterns of relations among actors.

## **5.2. Social Network Typologies**

Specific factors found to correlate with social networks have been seen to vary according to the definition of social network adopted, and the method of network analysis (Litwin, 2001). Most of the research on the impact of social networks upon health tests the effects of isolated aspects of social relations, such as total network size (Fiori, Antonucci & Cortina, 2006). However, this approach can fail to acknowledge the theoretical and empirical reasons, which speculate that adding up individual aspects of networks (for instance network size) does not liken to the effect of being embedded in a network with a particular array of attributes.

Social network types differentiate people, and categorise them into typologies based on the availability of local kin; frequency of contact with family, friends and neighbours, as well as social integration within ones community. Network types embody different lifestyles, have different strengths and weaknesses and encompass different ramifications of risk (Wenger, 1997). Because the idea of a network highlights relationships between people rather than groups or organisations, the use of a network typology can be an exceptionally useful tool to employ to gain an understanding of the social ageing process, as relationships are essential to this subject (Wenger, 1993). It can also assist by emulating a diagnostic tool to help improve the responsiveness and appropriateness of intervention (Wenger, 1993). This may be a more adequate means of measuring social networks, as assesses the different dimensions of networks and helps identify what aspects are beneficial and what aspects hinder wellbeing.

There has been very little research examining the influence of network types upon wellbeing (Fiori, Antonucci & Cortina, 2006). Those studies that have been conducted vary extensively in their definitions of social network and the mode of network analysis, thus creating an impediment in the power to obtain robust conclusions about

network types and their mental health implications. However drawing from research, it has been shown that differences in the type of network, rather than network size are related to both physical and mental health outcomes (Litwin, & Shiovitz-Ezra, 2006, Wenger, 1997). Wenger and Tucker (2002) report that different networks have diverse strengths and weaknesses when it comes to health care provision for, and the mental health of the elderly.

### **5.3. Social Network Research Using Network Typologies**

Litwin (1997) used a network typology to research a large portion of community-dwelling older Jewish Israeli's. In order to establish different network types, Litwin (1997) employed the use of cluster analysis. The author took into consideration current marital status, number of proximate children and frequency of contact with friends, contact with neighbours, attendance at synagogue, and attendance at a social club. Similarly to Wenger (1997), a typology of five network types evolved: diverse; friends; neighbours; family and restricted. Those in the diverse and friends networks were shown to have the highest morale. His findings were consistent with theoretical suppositions where having a variety of people in one's network enhances health, and that interaction with friends is more beneficial than interaction with relatives (Adams & Blieszner, 1995).

A similar network typology was constructed by Fiori, Antonucci and Cortina (2006). These authors researched the relationship between social networks and the quality of social support and their effects on health among older adults (60 years old and over) in United States of America. From their data they fashioned five network typologies: non-family, restricted, non-friends, family, diverse and friends. Their person-centred typology approach offered a means towards studying social relationships in their naturally complex and cumulative form (based upon convoy theory and social relations theory). Their results indicated that those individuals in the diverse network had the best outcomes in terms of depressive symptomatology and those in the restricted network had very poor mental health. In contrast to Wenger (1994; 1997) and Litwin (1997; 2001), these authors uncovered two restricted network types: the non-family (less likely to have children or spouse) and the non-friends (minimal contact with friends and community). Those who were in the non-friends restricted

network had higher depressive symptomatology than those in the non-family network. Similarly to findings by Adams and Blieszner (1995), this research suggests that friendships may be more influential on health and wellbeing than family. Antonucci and Akiyama (1998) note that, friendships may be important for feelings of autonomy, integration and reaffirmation of self-worth, as well as providing familial support such as emotional intimacy and companionship.

Reflecting back upon Durkheim's perspective on the importance of social integration, those in the non-friends restricted type may be susceptible to ill-health due to a lack of integration, as they are the least likely (out of all the network typologies identified) to meet with friends, and attend community functions and religious services. On the whole, these authors (2006) provide further evidence and support towards the use of network typologies in the study of how social environments can influence health.

Fiori, Smith and Antonucci (2007) used data from the Berlin ageing study, where they derived network types that reflected information about the structure, function and quality of social networks to examine their association with wellbeing. A cluster analysis of the data was conducted, where the authors uncovered six network types: diverse supported, family focused, friend focused-supported, friend focused unsupported, restricted non-friends unsatisfied and restricted nonfamily unsupported. The study was specifically interested in whether the distribution of network types would differ between the young-old (those aged from 70 to 84) and the oldest-old (those who were 85 year old and over), and the extent to which the different types would be associated with concurrent indicators of successful ageing. A multivariate analysis of variance on the association of network types with wellbeing showed that the oldest-old individuals had more depressive symptoms and lower subjective wellbeing than the younger-old. Fiori et al's (2007) analysis revealed that individuals within a structurally diverse network reported receiving relatively high levels of instrumental and emotional support. Restricted networks varied in structure, function and quality. Those in the restricted network type had very low levels of emotional support and those in the nonfamily type rated their satisfaction relatively high despite their smaller network size. The authors postulated that those in the restricted non-friends type are often disappointed by failed attempts to maximize emotional support

from close relationships, and therefore may prefer such a network type. Individuals in the friend focused unsupported network type had higher levels of depressive symptoms and lower subjective wellbeing than individuals in the diverse supported, family focused or friend focused supported types. Those in the latter two groups presented with lower morbidity and higher subjective wellbeing.

Fiori et al's (2007) study was quite innovative as it employed a pattern-centered approach, which addressed the complexities that can go unnoticed in variable centered research. Furthermore, the heterogeneity of social network types and their differential predictive value speaks to the diversity of life pathways to successful ageing. Therefore, identifying those who are at an increased risk of mortality and customizing intervention for their specific social support needs, is a crucial aspect of successful ageing. A previous study by Fiori et al (2006) on social network typologies and mental health among older adults also supports this account, where person centered typology established a way to examine social relationships in their naturally multifaceted and aggregate status. Fiori et al. (2006) noted that certain network types are robust even across samples and culture, and consistent with Fiori et al (2007), their study found that individuals in the non-friends restricted network had significantly higher depressive symptomatology than non-family restricted. This reflects on the notion that friendship may be more influential than family relations, as they are optional and may be important for feelings of autonomy, integration into the community, and reaffirmation of self-worth.

Research by Litwin and Landau (2000) has provided an empirical foundation for this theory. With the utilisation of cluster analysis, the authors were able to create four network typologies among their Israeli participants aged 75 years and older. The study uncovered that the family intensive network type was the least supportive, in comparison to the diffuse ties network type, which is characterised by quite a large network consisting of a fusion of potential sources of support (Litwin & Landau, 2000). This study supports role theory as it insinuates that supportiveness or support quality may be one cause for the mental health benefits of belonging to particular network types

#### **5.4. The Wenger Network Typology: Practitioner's Assessment of Network Types (PANT)**

Wenger's (1994) influential research recognised the differences in network structures and enabled correlations between network type and other variables, such as health and mortality to be investigated. Network type has been shown to be related to variables such as morale, loneliness and isolation, patterns of self-help and mutual aid, use of formal services and response to service interventions (Wenger & Tucker, 2002). Litwin (2001) notes that network typology is an important predictor of morale in later life, and can be used to construct policy and gerontological service planning. It can serve in assessing the extent of need for formal support services, and alert service personnel to elderly people who are at risk (Litwin, 2001).

The underlying assumption of Wenger's PANT (Wenger, 1984) is that if we can understand how the support networks of elderly people work, how some differ from others and how these networks respond to the problem of ageing, then we can provide the necessary assistance that older adults require. Research that has implemented network typology has shown that various aspects of statutory health and social provision are closely connected with the type of network individuals are based in. In this regard, some types of networks are more likely to request formal help than others, some use more services than others, and different typologies are associated with different types of presenting problems. For these reasons, the identification of support network type is significantly relevant to practice, policy and decision making in the community (Wenger & Tucker, 2002).

In addition to qualitative analysis, detailed standardised quantitative data from the Bangor research facilitated the formation of an eight-item measurement instrument to identify an individual's network type. Five network types were established (as described below), where the dominant differences between the network types were associated with the presence and availability of local close family, frequency of interaction within the networks and the degree of involvement within the community (Wenger, 2002). The first three networks are based on the presence of local kin, while the last two are associated with a lack of local kin:

### **Family Dependent Network**

This network consists mainly of close family ties, few neighbours and peripheral friends. Respondents are less likely to be in good health compared with those with other types of networks. Over the years, members of this social network have built the expectation of giving and receiving help, and therefore have the highest levels of dependency. As the older adult becomes frailer, care becomes concentrated on one member of the family (typically a daughter or spouse) or a married couple. When the carer is a daughter or younger family member, fear of risk leads to dissuasion of self-care and self-help. However, when the carer is a spouse or closer in age, the opposite occurs where there is a reinforcement of self-care and promotion of self-help. This is thought to be due to the carer being to identify more strongly with the needs of the dependent adult.

Neighbours in this network assume that caring lies within the rights of the family and therefore do not become involved. Similarly, friends of the older adult may constrain their visits as they assume that emotional support from the family is adequate and/or view their visits as vexatious.

Adults in this network are more opposed to help or they distribute the help that they receive to sustain an independent self-helping routine. There is also a prominence of depression and loneliness among these elderly, as they feel they can do nothing to help and worry about being a burden upon family members.

### **Locally Integrated Network**

This is the most robust and common typology. This network represents the culmination of “mutual aid patterns” (Wenger, 1993, p. 34). Older adults contained in this network are very much entwined in a long established network of family, friends and neighbours. Compared to the other network types, these adults tend to be younger, in better health and living independently. They are more capable of maintaining self-help and with health and daily activities. Due to the widespread support these individuals obtain within their communities, they are able to continue to live independent of carers far longer than those in the family dependent network.



Family, friends and neighbours visit comfortably and often, and tasks are spread between the members of the locally integrated support network.

These older adults are more involved the community, church, and volunteer organisations. This increased the amount of contact they have with other members of the community, and consequently enables them to engage in conversations and reciprocal community activities (where they both give and receive help as needed) more frequently.

### **Local Self-contained Network**

Typically have an arm's length relationship or infrequency of contact with at least one relative but the primary reliance is on neighbours. These individuals are associated with rurality, population scarcity and can be seen as adjustment to depleted social contact. It is possible that there was an unavailability or unreliability of help earlier on in their lives, and accordingly, they restrict mutual aid.

In general, these elderly do not have anyone in the network that can commit to regular assistance and personal care. When there is, it is likely to be on a weekly visit. Involvement within the community is very limited and is inconspicuous. They are less likely to think that regular help is available and forthcoming in emergency situations. They rely primarily on neighbours for help in emergencies, however they are less likely to ask for help and as the level of frailty increases, they rely on no-one or statutory services.

In a way autonomy is viewed as a virtue, and therefore individuals will attempt to manage on their own or conceal difficulties. They believe that failure to do so will result in admission into residential care. Furthermore, neighbours are usually not able to provide long-interval help as the older adult increases in levels of dependency.

### **Wider Community Focused Network**

Typified by an absence of nearby relatives due to migration during the life-cycle, but have active relationships with distant relatives, usually children and a high salience of friends.

In comparison to the local self-contained networks, those with wider community networks are more likely to look towards the community for support and assistance,

rather than their household. Furthermore, they broaden the notion of self-help to incorporate the “organisation and buying of professional help to solve the problems of ageing” (Wenger, 1993, p.36). This means that they are more likely to have house calls from the doctor and employ private household assistance.

In regards to family, the primary source of contact is by telephone, and it is a significant source of emotional support and advice for both parties. However in cases of emergency, long-term informal help becomes problematic, as relatives are only able to stay for short periods due to other obligations.

Voluntary organisations are more prominently utilised by this network type than any of the others. Community membership is perceived as a path by which these individuals can become accepted into the community. By and large, this network type is much more social and active than the others. They not only obtain support, but also provide support and aid to their community and network members. However, their perception of help is slightly different to that of the locally integrated network, as they have “mutual aid” where they help one another. Wider community network members do not need to identify with their neighbours; they simply see them as needing support and provide. It is not necessarily reciprocal.

Self-help is in the form of active organisation of help from the local community. Members believe that in cases of emergency, help is readily available and forthcoming, which is quite different from the local self-contained network, where members are more likely to struggle on their own.

### **Private Restricted Network**

This network is associated with the absence of local kin, few nearby friends and low levels of community contacts or involvement. Contrary to the wider-community focused network, this network is not associated with rurality, but life-long patterns of low levels of social interaction and migration after middle age. Childlessness is more common and if they do have adult children, they are likely to be living over 50 miles away.

Older adults in this network do not expect regular assistance to be available and fear that in a case of emergency, no one will be around to help. They are less sociable and

do not talk with neighbours, and are the least likely to belong to a religious or voluntary group in comparison to the other networks.

Self-help appears to be the only choice exposed to members of the private restricted network, even as dependency rises. Similarly to the local self-contained type, they feel that acknowledgment of frailty and the inability to manage an independent lifestyle will mean admittance into residential care. However, in the absence of spouse, or informal care these individuals will rely solely on self-care or formal services.

## **Summary**

Social networks have illustrated substantial similarities across the western world. A number of factors interplay to contribute to the amount and type of support older adults receive, as well as the structure of their social networks. Although the study of network typologies has only begun to branch over to non-western societies (For example Litwin, 1997; 2001; 2006), there are clear parallels ranging from close knit family dependent to wider distributed and disjointed networks. Furthermore, the constructions of particular networks are highly influenced by marriage, fertility, and migration patterns, which are then mediated by personality (Wenger, 1994). Therefore the distribution of network types is affected by the patterns of these effects in a community or country.

The study of network types has revealed relationships to a wide range of outcome variables. These include: service use and duration; morale; social isolation; loneliness and morbidity (Wenger, 1994) In most cases, more resilient support networks act as a buffer to the effects of deteriorating health and the emergence of frailty (Wenger, 1997). Some network types make it easier for frail elderly to remain in their own homes and communities, while others are connected with early admittance to care (Wenger, 1994; 1997; 2001). Cohen, Underwood & Gottlieb (2000), mention that no single process can elucidate the link between social integration and health. Therefore, when assessing the relationship, it is crucial to identify and understand a variety of contributing processes in order to identify which pathways may be most important and most amenable to intervention. The effects of social integration can therefore be

the result of differences in cognitive, behavioural and biological functioning. This notion draws attention to the necessity of a multiple level approach to research in order to account for the complexities of social networks.

#### **5.4 The Contribution of Studying Social Networks to the Health of Older Adults**

International studies have provided evidence that illustrates the health benefits of social integration. Social support and social networks have demonstrated significant effects on health and general performance (Unger et al., 1999). Those who are more integrated within their communities and maintain social ties have been shown to sustain better physical and mental health (Seeman et al., 2001). Social activity decreases the risk of institutionalisation by one half (Wenger, 2002), and adults who have close knit ties are less likely to seek residential admission in the future (Bear, 1990, as cited in Wenger, 2002).

As adults age, one of their primary aims is to maintain independence and to avoid becoming a burden (Wenger, 1993). Social network types have been found to correlate highly with all demographic variables, such as age, sex, marital status and migration patterns (Liwin, 1997). Within different communities there are variations in network types which all have different capacities to cope with the shortcomings associated with old age. Moreover, different network types present different patterns of problems for formal care/support organisations and respond differently to interventions (Wenger, 1993).

Social network typologies can operate as guides to designing appropriate interventions and combinations of care services. Some interventions are incompatible with certain network types and therefore identifying the individual's support network can help predict which network will require more support, what help individuals require and what type of intervention is likely to be most efficient and effective (Wenger, 1994). This means that social service programs may be more successful if they are directed at different groups of elders with different social network based needs, rather than at viewing older adults as a homogenous group.

Berkman's Conceptual model of social networks and health can further the development of successful and responsive interventions and care services, as well as assisting in the identification of groups that may be in situations that are intermediary for worse health. It provides a means for examining how social networks influence health by controlling for important social contextual factors such as ethnicity and socioeconomic status, as well as analysing whether social networks shape an individual's social support- an aspect which past research has shown to be the main purpose of social networks.

## 5.5 Objectives of the Study

Taking the above into account, the initial aims were to:

1. To test Wenger's PANT as a survey instrument for measuring the relationship between social network types and social support among older adults.

**Hypothesis 1.** Social network types are related to each other in the following ways:

Scores on locally integrated and wider community focused network types will be positively correlated.

Scores on local self-contained, private and family restricted network types will be positively correlated.

**Hypothesis 2.** Social networks types are differentially related to provisions of social support.

2. Test the relationships between social networks and health while taking into account the upstream factors in the Conceptual model (Berkman et al, 2000) with the following hypothesis:

**Hypothesis 3.** Social network types are related to health after controlling for SES, ethnicity, gender and education.

After reviewing the somewhat confusing results and relationships between the network types themselves and weak relationships between the variables, it was decided that the network measure itself may need to be examined and refined.

Therefore, an additional set of aims were formed, as follows:

3. To rescore the PANT, in order to:
  - a) See if the relationships between the network types would make more theoretical sense.
  - b) Reduce the number of participants who fit into the inconclusive (those who fit into more than two network types) and borderline (those who fit into two network types) networks.
  - c) Re-test the study hypotheses, to see if there were any improvements in the results.

## 6.Method

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### 6.1 Introduction

This chapter will firstly introduce the New Zealand Longitudinal Study of Health Work and Retirement, as well as the variables of focus for this study. The procedures undertaken in this study are reserved for Chapter 7 followed by results in Chapter 8. This structure was chosen to avoid confusion, as there were three different storylines to this study.

### 6.2 Sample Population

This analysis used data from the second wave of the New Zealand Health Work and Retirement Study. The target population were New Zealanders aged 55 to 70, who are to be followed throughout a ten year period. Population estimates from Statistics New Zealand (Statistics New Zealand, 2002) have shown that there are approximately 609,000 New Zealanders aged 55 to 70, with 47,400 of those identifying as Māori. Based on this information, equal probability sampling procedures and random selection were used to select general and Māori population sub-samples.

The New Zealand Electoral roll was used to extract a nationally representative sample. Those who were in institutions were excluded from the survey population (i.e. individuals in prisons, nursing homes, or dependent care). Approximately 96% of all New Zealanders eligible to vote in government elections were registered on the roll from the end of March 2007, therefore providing researchers with a database that can accurately portray the characteristics of the adult population in New Zealand.

Māori were oversampled in order to significantly maximise participation rate, as they only accounted for 7.8% of the general population between the ages of 55 to 70. Statistics forecasted that out of the estimated general population willing to take part in the study (N=1,420) only 101 of these participants would be Māori, and less than 76 would be expected to remain in the final wave of the study. To overcome this sampling issue 7,780 Māori adults aged 55 to 70 were randomly selected from the

New Zealand Electoral Roll (excluding those in institutions). The Māori descent indicator on the combined electoral roll dataset was used to categorise Māori identity.

Overall, there were N=1366 participants in the general sub-sample and N=1064 in the Māori sub-sample. 1127 (46.8%) of the participants were male and 1280 (53.2%) were female. In regards to age, 615 (26%) participants were aged between 52-59, 823 (35%) were aged between 60-64, 653 (27%) were between 65-69 and 290 (12%) participants were aged between 70-73.

### **6.3 Variables of Focus**

Although the HWR questionnaire consisted of a number of sections, this study used the following measures:

#### **Independent Variable**

##### **Social Network Types**

The PANT (please refer to Chapter 5, for a comprehensive description of this measure) was employed to measure social networks. This measure consisted of 8-items to assess distance from relatives, frequency of face-to-face contact with family, friends and neighbours, and involvement in community groups/religious activity. Items measuring distance from relatives were changed from “miles” to “kilometres” to fit the New Zealand context. Scores on these items are summed to provide continuous scores on each network type (see Wenger (1994) for scoring details). The scores varied from 0-8 for each network, with the following mean scores: Family Dependent= 2.47 (SD=1.37), Locally Integrated= 3.51 (SD=1.6), Local Self-contained= 3.39 (SD=1.42), Wider Community Focused=3.58 (SD=1.52), Private Restricted= 2.93 (SD=1.57).

These scores were then used to categorise participants as belonging to one of five network types: Family Dependent, Locally Integrated, Local Self-contained, Wider Community Focused and Private Restricted. In practice, the network type with the highest score is deemed as the individual’s network type, however a participant can score equally on more than one network type, thus making them “borderline.” In the present study there were N=87 participants in the Family Dependent network, N=442 in the Locally Integrated network, N=328 in the Local Self-contained network, N=386



in the Wider Community Focused network, N=213 in the Private Restricted network, N=436 in the Borderline network and N=129 in the Inconclusive network type. The majority of participants were Borderline (17.8%) or Locally Integrated (18%).

## **Control Variables**

### **Socio-economic Status**

Socio-economic status (SES) was measured by two measures: the Economic Living Standards Index Short Form (ELS-SF) (Jensen et al., 2002; 2003), and educational qualifications. The ELS-SF is specific to New Zealand and measures levels of consumption, social activity, and asset ownership- rather than the economic resources that enable them (Jensen, Spittal & Krishnan, 2005). The index synthesises a large amount of information based on the different features of a person's economic welfare into one single score. The ELSI-SF assessed:

1. Restrictions in ownership of assets (8 items), such as owning a telephone, washing machine or "good" pair of shoes.
2. Restrictions due to cost in social participation (6 items), such as giving presents to friends and family, or going on holidays
3. The extent to which respondents economise (8 items), such as eating less fruit and vegetables, postponing doctors visits, or wearing old clothes.
4. Self-rated indicator of living standards (3 items), which included a scale that measured participant's perception of the adequacy of their income, and satisfaction of living.

An overall score was obtained by calibrating scores on each of the items to form a continuous variable from 0 to 31, where higher scores represented better economic living standards. Once the ELSI-SF score was obtained, it was then translated into a "Living standard level" ranging from 1 (severe hardship) to 7 (Very good). This analysis showed that 3.3% of the sample lived in severe hardship, 4.7% significant hardship, 7.9% some hardship, 11.3% live fairly comfortably, 23.7% comfortably, 33.6% live good, and 15.5% very good. The average ELSI level was M=5.1 (with item totals ranging from 21-24), SD=1.53, thus indicating that the majority of the participants enjoyed a comfortable lifestyle.

## **Education**

Educational qualifications were assessed as an additional indication of socio-economic status. The participants were categorised as having no qualifications, secondary qualifications, or tertiary qualifications. Of this sample, N=1031 (45%) said they had post-secondary qualification, and N=1251 (55%) indicated that they did not. In order to conduct regression equations for the sample a dummy variable was used that compared those with no qualifications with all other educational qualifications.

## **Ethnicity and Gender**

Participants also indicated their ethnic category with a choice of: NZ/Pakeha (N=1252), Māori (N=1049), Pacific (N=14), Asian (N=17), MELAA (N=1) and Other (N=67). Participants also indicated whether they were male (N=1127) or female (1280). Again for use in regression analyses, a dummy variable was created that compared Māori to all other ethnicities, and for gender, which compared females to males.

## **Dependent Variables**

### **SF-36 v.1: Physical and Mental Status**

Health was evaluated using the SF-36, a self-report health questionnaire which is a widely used, reliable and validated measure of overall health status (Ware & Sherbourne, 1992). The SF-36 incorporates one multi-item scale that measures the following eight health concepts:

1. Physical functioning
2. Role limitations due to physical health problems
3. Bodily pain
4. Social functioning
5. General mental health (psychological distress and psychological wellbeing)
6. Role limitations caused by emotional problems
7. Vitality- energy or fatigue
8. General health perceptions

Scores on all the Likert style items were integrated using principle components (orthogonally rotated) extracted coefficients that formed two components: physical and mental health, thus allowing for the effects of these to be assessed separately. The physical and mental component summaries were standardised (by utilising norms from the current study; 0-100), where lower scores indicated poorer health status. The mean for SF-36 Physical Health was 48.5 (SD=10), and the mean for SF-36 Mental Health was 49.9 (SD= 9.3).

### **Social Provisions Scale**

Cutrona and Russell's (1987) Social Provisions Scale (SPS) was used to assess perceived social support. This scale was constructed to reflect Weiss's (1974) description of social relationships, where social provisions mirror what we obtain from relationships with others. The SPS incorporates six provisions:

1. Guidance: measures advice or information
2. Reliable alliance: includes assurance that others can be counted on in times of need.
3. Reassurance of worth: assesses the individual's acknowledgment of their self-competence.
4. Attachment: reflects how close a person feels towards friends and family.
5. Social integration: measures the sense of belongingness to a group of friends
6. Opportunity for nurturance: looks at how much assistance an individual provides to others.

Respondents were asked to rate the degree to which each of the four statements (2 positive and 2 negative) best described how their social relationships related to the six different provisions. SPS utilises a 4-point scale ranging from completely true, to not at all true. Four items were used to evaluate each provision: two positive (described the existence of a provision) and two negative (described the nonexistence of a provision). For instance, the statements used to assess guidance were: "there are people I can depend on to help me if I really need it", "I feel that I do not have close personal relationships with other people", "there is no one I can turn to for guidance in times of stress", and "there are people who depend on me for help." Respondents indicated on a 4-point scale (ranging from strongly *disagree* to strongly *agree*) the extent to which each statement described their current circumstances. For scoring purposes, the negative items were reversed and added together with the positive items

to produce an overall score for each of the six social provisions (0-16). A high score signified the existence of the social provision from the participant's current social relationships.

A total social support score was also constructed through summing the six different provision scores (ranging from 0-96). A factor analysis revealed six factors that corresponded to the six social provisions and several studies have contributed evidence towards the scale's validity (Cutrona & Russell, 1987). A previous study by Cutrona, Russell and Rose (1986) employed the SPS in order to establish the validity of its use in predicting health among older adults. For the present study, sample scores ranged from 31-96 with a mean of 78.16 (S.D 9.35).

## **6.4 Procedures**

The HWR study employed the Tailored Design method (Dillman, 2000) in order to strengthen response rates and participant involvement. This approach incorporates multiple contact points between the investigators and the study's participants in order to increase their level of response. At first point of contact, a brief letter was sent to a random selection of New Zealanders aged 50 and over, informing them of the study and that a postal survey would be sent to them soon. The postal questionnaires were accompanied by a cover letter and consent form, which described the rights and expectations of the participants and asked if they would be willing to take part in a face-to-face interview. Post cards were then sent to all those who chose to participate in the survey, and replacement questionnaires were sent to non-respondents in attempt to encourage them to take part. At the final contact, another postcard was sent to non-respondents, again to encourage participation. This research was completed in accordance to the Massey University Human Ethics Committee (application number 05/90).

## 7.Data Analysis

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To test Hypothesis 1 and Hypothesis 2, bivariate correlations (Pearson's  $r$ ) were used to test the relationships between social network scores and social support, and between social network types. To examine the relationships preparatory to regression analyses, correlations between all variables were also examined.

For Hypothesis 3, multiple regression equations were used to test the relationship between social networks and health, whilst controlling for "Macro" level factors of the conceptual model (in this case, ELSI-SF, gender, education and ethnicity). This allowed for a focus on the "mezzo" level, which encompasses social networks (Berkman et al., 2000).

The chosen method of entry for the predictor variables was simultaneous (forced) entry, where in step one the Macro level variables were entered: ELSI-SF, gender, education and ethnicity. In step two all the social network types derived from Wenger's PANT (1994) were entered, where the dependant variables tested were SF-36 Mental Health and SF-36 Physical Health. The aim was to see the relationship between the "mezzo" level and health, whilst controlling for "macro" level variables.

Multicollinearity was assessed through the variance inflation factors (VIF) and tolerance levels. For this analysis data with VIF values below 3.5 were accepted, and tolerance levels above 0.4 were accepted. An analysis of the variables of concern revealed that VIF values for all items were below 3.5, and tolerance levels were all above 0.4, thus multicollinearity was not found.

MVA was run using the EM syntax to test whether the missing data were completely at random (MCAR). Univariate statistics showed that the first three items of the PANT had the highest percentage of missing values (i.e. over 5% missing values). Distance of nearest relative had 6.4% (N=160) missing, distance to nearest child had 9.2% (N=229) missing, and distance to nearest brother or sister had 7.1% (N=177) missing. All other variables had less than 5% missing data. Further investigation of the analysis revealed no clear pattern to the missing data, with Little's MCAR test of significance being  $0.264 > 0.05$ . Therefore it was confirmed that the data were

MCAR, and listwise deletion was included in analyses to exclude cases with missing data on the variables of concern.

Assessment of normal distribution showed that the SF-36 Mental and Physical Health variables, Social Provisions Scale, Private Restricted Network and Wider Community Focused Network variables were moderately skewed. Logarithmic and square root transformations did not improve the distribution of the data. However owing to the large sample size of this study, mild-moderate skewness was not of great significance (Tabachnick & Fidell, 2001). Residual analysis revealed no violation of linearity and homoscedasticity within the data set.

Following analysis of residuals 48 multivariate outliers were removed when SF-36 Physical Health was the criterion (N=2382) and 89 multivariate outliers were removed when SF-36 Mental Health was the criterion (N=2341).

## 8. Results

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### 8.1. Part 1: Initial Result

#### Hypothesis 1

Bivariate correlations were run to test the associations between the network types (see Table 8.1). Only Family Dependent and Local Self-contained network scores were positively related as predicted. Wider Community Focused and Private Restricted network scores were positively related. Scores on the Locally Integrated and Wider Community network were negatively correlated. These findings did not support Hypothesis 1.

*Table 8.1 Correlations Between Social Network Types using the Original Wenger PANT*

	Family Dependent	Locally Integrated	Local Self- contained	Wider Community Focused	Private Restricted
Family Dependent	1	0.029	0.120*	-0.535*	-0.219*
Locally Integrated		1	-0.278*	-0.179*	-0.757*
Local Self - contained			1	-0.394*	-0.086*
Wider Community Focused				1	0.288 *

*Note.* \*p < 0.001

## Hypothesis 2

Table 8.3 shows correlations between the social network types and social provisions. The Family Dependent, Local Self-contained and Private Restricted network types showed negative associations with provisions of social support, whereas the Locally Integrated and Wider Community Focused networks showed positive relationships.

Multiple regression analysis was conducted to predict the overall variance in social provisions scale, explained by social network type scores together and to further examine the differential relationships while controlling for all other network type scores (see Table 8.2). The total variance in social provisions scores explained by the five network types was 5% ( $Adj.R^2 = .05$ ,  $F(5,1803)=19.3$ ,  $p<0.01$ ). Overall, the Local Self-contained and Private Restricted networks were significant and negatively related to social provisions and the Wider Community Focused network was significant and positively related. However the Family Dependent Network and Locally Integrated Network were not found to be significant. Overall these results provide support for hypothesis 2, as social network types were shown to be differentially related to provisions of social support.

Table 8.2 *Linear Regression of Social Provision Scale on 5 Social Network Types.*

	B	Std. Error	$\beta$
Constant	80.87	2.62	
Family Dependent Network	-0.19	0.2	-0.03
Locally Integrated Network	0.09	0.26	0.02
Local Self-contained Network	-0.58	0.2	-0.09*
Wider Community Network	0.7	0.19	0.12**
Private Restricted Network	-0.94	0.24	-0.16**

Note:  $Adj. R^2 = 0.05$ ,  $F = 19.3$ , \*\* $p < 0.001$ , \* $p < 0.05$



Table 8.3 *Correlations Between Social Network Types and All variables.*

	Family Dependent	Local Integrated	Local Self- contained	Wider Community Focused	Private Restricted
Ethnicity: Māori vs. Non-Māori	0.13**	0.05*	0.02	-0.09**	-0.11**
Gender: Female vs. Male	0.06**	0.08**	-0.06**	-0.002	-0.11**
ELSI-SF	-0.07**	0.02	-0.04	0.09**	0.01
No Post Secondary Education	0.03	0.05*	0.06**	-0.13**	-0.01
Physical Health	0.01	-0.04	-0.03	-0.05*	0.05*
Mental Health	-0.06*	0.06*	-0.1**	0.08**	-0.01
Social Provisions	-0.07*	0.14*	-0.13*	0.12*	-0.13*

Note. \* $p < 0.01$ ; \*\* $p < 0.05$

### Hypothesis 3.

Table 8.3 also shows correlations between the social network types and all study variables. Although relationships between variables and social network typologies were weak there were clear patterns of significant relationships that showed the social contextual variables, social support and health were consistently related with network types. Those who were categorised in the Local Self-contained and Private Restricted

networks showed negative relationships with both mental and physical health. In regards to gender, females were positively correlated with Family Dependent, and Local Integrated, and negatively correlated with Private Restricted Network. Furthermore, ethnicity was differentially related to network type, where Wider Community Focused and Private Restricted were negatively correlated with Māori ethnicity.

Two multiple regressions were run to test the relationship between social networks and health (SF-36 mental health and SF-36 physical health) while controlling for social contextual factors.

Table 8.4 displays the multiple regression in which mental health was the criterion variable. In step one, the social contextual variables contributed to 15.7% of the variance in SF-36 mental health, however only ELSI-SF and Ethnicity were significant ( $p < 0.01$ ). At step two, the social network types explained an additional 0.7%, ( $\text{Adj.}R^2 = .16$ ,  $F(9,1622) = 36.5$ ,  $p < .05$ ) and only the Local Self-Contained network made a significant negative contribution to explaining.

When SF-36 Physical Health was the criterion, step one showed that the social contextual variables contributed to 10% of the variance, where again the ELSI-SF score and Ethnicity were the only significant contributors. When the social network variables were entered in step two, the variance increased by 1% ( $\text{Adj.}R^2 = .11$ ,  $F(9,1622) = 21.06$ ,  $p < .01$ ) and only the Family Dependent network made a significant positive contribution to physical health.

Table 8.4 *Multiple Regression Analysis of SF36 Mental Health on Social Network Type Scores, Controlling for gender, education, ELSI and ethnicity.*

	B	Std. Error	$\beta$	Adj. $R^2$	F
Step 1				0.157**	76.78**
Constant	39.6	0.83			
Female Gender	0.01	0.39	0.00		
No post secondary qualification	0.24	0.38	0.01		
ELSI-SF Score	2.23	0.13	0.39**		
Māori Ethnicity	-0.85	0.4	-0.05*		
Step 2				0.164*	36.5*
Constant	41.12	2.5			
Female Gender	-0.13	0.39	-0.01		
No post secondary qualification	0.31	0.39	0.02		
ELSI-SF Score	2.2	0.13	0.39**		
Māori Ethnicity	-0.82	0.39	-0.05*		
Family Network	-0.18	0.18	-0.03		
Locally Integrated Network	0.18	0.23	0.03		
Local Self Contained Network	-0.42	0.18	-0.07*		
Wider Community Network	0.02	0.18	0.00		
Private Network	-0.06	0.22	-0.01		

Note: \* $p < 0.05$ , \*\* $< 0.01$

Table 8.5. *Multiple Regression Analysis of SF36 Physical Health on Social Network Type Scores, Controlling for gender, education, ELSI and ethnicity.*

	B	Std. Error	$\beta$	Adj. $R^2$	F
Step 1				0.09**	44.97**
Constant	41.05	0.99			
Female Gender	0.41	0.46	0.02		
No post secondary qualification	-1.98	0.46	-0.11**		
ELSI-SF Score	1.80	0.16	0.27**		
Māori Ethnicity	-1.27	0.47	-0.06**		
Step 2				0.1	21.06**
Constant	35.86	3.01			
Female Gender	0.42	0.46	0.02		
No post secondary qualification	-1.98	0.47	-0.01		
ELSI-SF Score	1.81	0.16	0.28**		
Māori Ethnicity	-1.28	0.48	-0.06**		
Family Network	0.53	0.22	0.07*		
Locally Integrated Network	0.26	0.28	0.04		
Local Self Contained Network	0.16	0.22	0.02		
Wider Community Network	0.25	0.21	0.04		
Private Network	0.49	0.27	0.08		

Note: \* $p < 0.05$ , \*\* $< 0.01$

## **Conclusion**

These results show that the relationships between social network types and health were very weak. Correlations with social contextual variables and social support were also weak. However, the initial analysis of the relationships between the network type scores showed that there were some problems with the measure in terms of the theorised relationships between the types. In particular the relationship between Wider Community Focused and Locally Integrated, as well as Wider Community Focused and Private Restricted network types. In addition, the large number of participants who were categorised into the Borderline and Inconclusive categories (approximately 25%) made the utility of the measure questionable.. These findings suggested the need for further investigation into Wenger's PANT (1994).

## **8.2 Part 2: Rescoring Wenger's PANT**

### **Factor Analysis**

The Wenger PANT items were subject to a Principal Component Analysis (PCA) with VARIMAX rotation to discover latent components underlying the eight questions. It is not common, nor is it good practice to use categorical data in a factor analysis, unless the aim of the analysis is to discover possible latent variables underlying the data (Takane & Leeuw, 1987; Muthen, 1986; Bartholomew, 1980).

At the outset, there must be a sample size large enough in order to reliably evaluate correlations. As noted by Comrey and Lee (1992, cited in Tabachnick and Fidell, 2007, p. 613) a sample size of over 1000 is deemed as "excellent." Therefore the sample population of the present study (N=2430) is more than sufficient to carry out a PCA. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.57, which indicated that 57% of the variance within the data could be explained by a factor structure. The Bartlett's test of sphericity was significant  $p < 0.001$ . This indicated that the data is factorable, as there was intercorrelation between the PANT (Wenger, 1994) items.

## Results

The PCA revealed four components that had eigenvalues greater than one. A scree-plot test also showed that there were four clear components. Table 8.6 shows the factor loadings for the components, which were labeled according to underlying similarities: Family component, which accounted for 23% of the total variance, Neighbourhood component accounted for 19% of the variance, Community component accounted for 14% of the variance and Children accounted for 13%. The four components appear to be relatively independent from one another, as factor loadings in table 8.6 show a number of negative loadings between the variables, which have inverse impacts on the factor.

Table 8.6 *Factor Loadings for the Social Networks Measure*

	Family Component	Children Component	Neighbourhood Component	Community Component
Distance to nearest relative	<b>0.82</b>	0.11	0.00	0.02
Distance to sibling(s)	<b>0.88</b>	-0.08	0.04	-0.01
Distance to child	0.12	<b>0.75</b>	-0.08	0.02
Speak or do something with children/relatives	-0.09	<b>0.84</b>	0.09	-0.03
Speak or do something with friends in the community	-0.02	0.1	<b>0.8</b>	0.08
Speak or do something with neighbours	0.06	-0.07	<b>0.85</b>	-0.06
Attend religious meetings	0.06	0.02	-0.09	<b>0.82</b>
Attend meetings in community	-0.06	-0.04	0.1	<b>0.75</b>

*Note* The items with the highest factor loadings are presented in bold.

## **Modifying the PANT**

### **1. Additional Items**

To strengthen the assessment of perceived social integration provided by the measure (rather than the focus on distance and specific relationships) four new items were included:

- 1) Do you feel you have regular contact with your family?
- 2) Do you feel you have regular contact with your friends?
- 3) Do you regularly participate in family (whanau) activities?
- 4) Do you have family or friends over for a meal at least once a month?

Questions one and two were included by the original researchers of the HWR study as a straightforward assessment of the degree of self-assessed contact with friends and family. These items were added as a number of researchers have stressed the importance of including perceptual measures of social networks as well as structural aspects in order to adequately evaluate an individual's network (Lahey & Cassady, 1990; Cohen et al., 2000; Tomaka et al., 2006). Questions three and four provide additional information on family/friend interaction. These items were variations on two of the Social Participation Restriction questions that were used in the validation of the ELSI scales (Fergusson et al., 2001), and are direct measures of regular contact with family and friends. The questions were transformed from a Likert scale, to a dichotomous 'Yes/No' scale for the present study.

### **2. Rescoring**

SPSS Syntax was used to create a scoring algorithm for which participants were allocated into each network type based on their summated total response. Firstly, the response codes for the scoring algorithm were reorganized to reflect the factors found in the PCA (Table 8.6). Secondly, these responses were reexamined and rescored based on Wenger's (1994) descriptions of the network types in conjunction with the examination of PCA. The syntax was remodeled a number of times in order to seek the best possible solution, which is presented in the results. Thus this modification of the scoring system created a new version of the PANT.

This section will describe the detailed reasoning for the changes behind the PANT for each network type. For reference and ease of understanding, table 8.7 displays the scoring system of the original Wenger PANT (1994), and table 8.8 depicts the modified version of the scoring system.

### **Family Network**

*1) How far away in distance does your nearest relative live? (excluding your spouse and children)*

Option ‘2’ was added as a response, as people in this network type may live close to relatives, but not necessarily live in the same premises.

*2) If you have any children, where does your nearest child live?*

Option “2” was removed, as Wenger (1994) notes that these individuals are more likely to live with their children- mainly their daughters.

*3) If you have any living sisters or brothers, where does your nearest sister or brother live?*

Based on the PCA, the response options were as kept the same, to reflect the nature of the relationship with question one.

*4) How often do you see any of you children or other relatives to speak to?*

Option “2” was removed, as people in this network are dependent on family members and are more likely to see them on a daily basis. This option was also removed, as these individuals in this network type are the only ones who are likely to live with family members, and helped reduce the number of individuals within the inconclusive network.



Table 8.7 *The Original PANT Scoring System* (Wenger, 1994)

Question	Response Codes	Family dependant	Locally integrated	Local self-contained	Wider community	Private Restricted
How far away in distance does your nearest relative live? Excluding spouse	1. Same house/1km 2. 1-5km 3. 6-15km 4. 16-50km 5. 50+ km 9. No relatives	1      1	 2 3	  3 4	   4 5	   4 5
If you have any children, where does your nearest child live?	1. Same house/1 km 2. 1-5km 3. 6-15km 4. 16-50km 5. 50+ km 9. No relatives	1 2	1 2 3	  3 4 9	   5	   5 9
If you have any living sisters or brothers, where does your nearest sister or brother live?	1. Same house/1km 2. 1-5km 3. 6-15km 4. 16-50km 5. 50+ km 9. No siblings	1 2	1 2 3	 2 3 4	   5 9	   5 9
How often do you see any of your children or other relatives to speak to?	1. Daily 2. 2-3 times a week 3. At least weekly 4. At least monthly 5. Less often 6. Never/no relatives	1 2	1 2	  3 4	   4 5	    5 6
If you have friends in this community/ neighbourhood, how often do you have a chat or do something with one of your friends?	1. Daily 2. 2-3 times a week 3. At least weekly 4. At least monthly 5. Less often 6. Never/no friends	   4 5	1 2 3	   4 5	1 2 3	    5 6
How often do you see any of your neighbours to have a chat with or do something with?	1. Daily 2. 2-3 times a week 3. At least weekly 4. At least monthly 5. Less often 6. No contact with neighbours	   4 5 6	1 2 3	  3 4	  3 4	    5 6
Do you attend any religious meetings?	1. Yes regularly 2. Yes occasionally 3. No	2 3	1	2 3	1	  3
Do you attend meetings of any community/social groups, such as clubs, or lectures?	1. Yes regularly 2. Yes occasionally 3. No	2 3	1	2 3	1	  3

Table 8.8 *Modified Version of PANT Scoring System (Wenger, 1994)*

Question	Response Codes	Family dependant	Locally integrated	Local self-contained	Wider community	Private Restricted
How far away in distance does your nearest relative live? Excluding spouse	1. Same house/ 1km 2. 1-5km 3. 6-15km 4. 16-50km 5. 50+ km 9. No relatives	1 2	2 3	3 4	5	9
If you have any children, where does your nearest child live?	1. Same house/ 1km 2. 1-5km 3. 6-15km 4. 16-50km 5. 50+ km 9. No relatives	1	2 3	4 5 9	5	9
If you have any living sisters or brothers, where does your nearest sister or brother live?	1. Same house/ 1km 2. 1-5km 3. 6-15km 4. 16-50km 5. 50+ km 9. No siblings	1 2	1 2 3	3 4	5	5 9
How often do you see any of your children or other relatives to speak to?	1. Daily 2. 2-3 times a week 3. At least weekly 4. At least monthly 5. Less often 6. Never/no relatives	1	1 2 3	3 4	4 5	6
If you have friends in this community/ neighbourhood, how often do you have a chat or do something with one of your friends?	1. Daily 2. 2-3 times a week 3. At least weekly 4. At least monthly 5. Less often 6. Never/no friends	5 6	1 2 3	4	2 3	6
How often do you see any of your neighbours to have a chat with or do something with?	1. Daily 2. 2-3 times a week 3. At least weekly 4. At least monthly 5. Less often 6. No contact with neighbours	5 6	1 2	4 5	2 3	6
Do you attend any religious meetings?	1. Yes regularly 2. Yes occasionally 3. No	2 3	1	2	1	3
Do you attend meetings of any community/ social groups, such as clubs, or lectures?	1. Yes regularly 2. Yes occasionally 3. No	3	1	2	1	3

Do you feel you have regular contact with family?	1.Yes 2.No	1	1	2	1	2
Do you feel you have regular contact with your friends?	1.Yes 2.No	2	1	1	1	2
Do you regularly participate in family (whanau) activities?	1.Yes 2.No	1	1	2	2	2
Do you have friends/family over for a meal at least once a month?	1.Yes 2.No	1	1	2	1	2

*5) If you have any friends in the community/neighbourhood, how often do you have a chat or do something with one of your friends? And 6) How often do you see any of your neighbours to have a chat with or do something with?*

The optional responses for these questions were changed from 4 and 5, to 5 and 6. This choice was made because the family dependent network has very little, if any interaction or contact with friends and neighbours within their community. As Wenger (1994) notes, any outside contact is likely to be with friends of their family members rather than friends of the individual.

*7) Do you attend any religious meetings?*

The responses to this question were not changed, as these individuals may occasionally attend religious meetings depending on family preferences. If their family is religious, then they are more likely to attend these meetings with them than not

*8) Do you attend meetings of any community/neighbourhood or social groups, such as clubs or lectures?*

Meetings of community/neighbourhood may be less likely than religious activity- as these meetings have more to do with the individual than family preferences. Seeing as people in this network are more likely to view themselves as a liability (Wenger, 1994), they may be less likely to participate in community activities as they may feel their family members will be going out of their way.

9) *Do you feel you have regular contact with your family?*

Option “1” was chosen, as these individuals live and/or depend on their family

10) *Do you feel you have regular contact with your friends?*

Option “2” was chosen as these individuals are less integrated within their community

11) *Do you regularly participate in family (whanau) activities? and 12) Do you have family or friends over for a meal at least once a month?*

Option “1” was chosen, again as those who are in this network type live with their family members.

### **Locally Integrated**

1) *How far away in distance does your nearest relative live? (excluding your spouse and children)*

2) *If you have any children, where does your nearest child live?*

3) *If you have any living sisters or brothers, where does your nearest sister or brother live?*

Option “1” was removed for these three items, as it included living in the “same house.” These individuals are highly *unlikely* to live with family members, as they are one of the more independent network types- living in the same house and living within 1 kilometre away are less likely than living 1-5 kilometres away. Furthermore, this amalgamation contributed to an increase in the number of participants in the inconclusive category.

4) *How often do you see any of your children or other relatives to speak to?*

Option “3” was added, in attempt to reflect the modern day context. People may not have the opportunity to visit on a daily basis due to busier lifestyles- especially as the population group included people between 50-65, who are likely to still be working.

5) *If you have any friends in the community/neighbourhood, how often do you have a chat or do something with one of your friends?*

These responses stayed the same, for reasons described for item four.

*6) How often do you see any of your neighbours to have a chat with or do something with?*

Because of the out-going nature of this network type, and the close proximity between neighbours, Option “3” was removed, as this they are likely to have some form of interaction more than once a week.

*7) Do you attend any religious meetings? And 8) Do you attend meetings of any community/neighbourhood or social groups, such as clubs or lectures?*

These item responses were unchanged, as Wenger describes the Locally Integrated network as being highly active within their communities.

*9) Do you feel you have regular contact with your family?*

*10) Do you feel you have regular contact with your friends?*

*11) Do you regularly participate in family (whanau) activities?*

*12) Do you have family or friends over for a meal at least once a month?*

The responses to these four items were “Yes”, again this reflects upon the fact that this network is larger and more active, made up of extended family, friends and neighbours and that they have friendlier outgoing personalities (Wenger, 1994).

### **Local Self-contained**

*1) How far away in distance does your nearest relative live? (excluding your spouse and children)*

*3) If you have any living sisters or brothers, where does your nearest sister or brother live?*

The options for this item remained the same, as their immediate family are likely to live outside of the their immediate community, yet close enough to visit once a week or month (Wenger, 1994).

*2) If you have any children, where does your nearest child live?*

Option “2” was removed to reflect item 1, as there was no evidence that this network type had children who lived close by i.e. within 5 kilometres.

*4) How often do you see any of you children or other relatives to speak to?*

Responses to this item remained the same, as relatives are known to visit, albeit irregularly due to undemanding ties. Wenger (1994) mentions that help is available from kin, however it is only likely to be on a weekly basis.

*5) If you have any friends in the community/neighbourhood, how often do you have a chat or do something with one of your friends?*

For this item, option “5” was removed, as people in this network are likely to have some interaction with community members. Interacting “less often” coincides highly with the Private network, which was a means for inadequate categorisation.

*6) How often do you see any of your neighbours to have a chat with or do something with?*

Option “3” was removed and “5” was added, because they are only likely to interact with people in their neighbourhood if necessary, or in case of an emergency, which is unlikely to be on a weekly basis.

*7) Do you attend any religious meetings? And 8) Do you attend meetings of any community/neighbourhood or social groups, such as clubs or lectures?*

Although those in this network are less socially integrated, Wenger (1994) notes that community and religious meetings do occur, but are irregular and passive. Therefore response option “3” was removed from both of these items.

*9) Do you feel you have regular contact with your family?*

Option “2” was selected as the response as they have a marked absence of interaction with kin.

*10) Do you feel you have regular contact with your friends?*

Option “1” was selected as the response for this item as they are likely to interact with neighbours/community members on a weekly basis, as reflected in items 5 and 6.

*11) Do you regularly participate in family (whanau) activities? And 12) Do you have family or friends over for a meal at least once a month?*

Option “2” was selected because participation in community/family activities occur less frequently, where isolation is common due to the absence of involved kin.

## **Wider Community Focused**

*1) How far away in distance does your nearest relative live? (excluding your spouse and children) And 2) If you have any children, where does your nearest child live?*

Option “4” was removed, as people in this network are likely to have migrated, and therefore live far way from relatives.

*3) If you have any living sisters or brothers, where does your nearest sister or brother live?*

Option “9” was removed because there is no evidence contributing towards this particular network type having no siblings. Similarly to items one and two, they are likely to exist, but to live in a different city or country.

*4) How often do you see any of you children or other relatives to speak to?*

The response options for this item were kept the same, as those in this network type are likely to visit their relatives, but as a consequence of distance, the possibility for frequent face-to-face interaction is reduced.

*5) If you have any friends in the community/neighbourhood, how often do you have a chat or do something with one of your friends?*

Option “1” was removed, although those in the wider community network are sociable, they are not as integrated as the locally integrated network due to migration, and friendship interaction occurs in community organisational activities (Wenger, 1994).

*6) How often do you see any of your neighbours to have a chat with or do something with?*

Due to the proximity of neighbours, and the social nature of members in this network type, option “4” was removed and option “2” was added. Furthermore, this question synthesises chatting and doing something with neighbours. These two are quite different concepts, where Wider Community network members are likely to have chats with neighbours more than once a week, but less likely to “do something with” them.

7) *Do you attend any religious meetings?* And 8) *Do you attend meetings of any community/neighbourhood or social groups, such as clubs or lectures?*

Responses to these items were maintained, because they are highly sociable and regularly take part in religious and community activities.

9) *Do you feel you have regular contact with your family?*

Option “1” was chosen for this item, because even though they do not physically see or participate in family activities, they do keep in touch on a regular basis.

10) *Do you feel you have regular contact with your friends?* And 12) *Do you have family or friends over for a meal at least once a month?*

Option “1” was selected because members are highly integrated and therefore are in regular contact with friends.

11) *Do you regularly participate in family (whanau) activities?*

Option “2” was selected because proximal distance constrains members from being able to regularly participate in family activities.

### **Private Restricted**

1) *How far away n distance does your nearest relative live? (excluding your spouse and children)*

Option “5” was removed and option “9” was retained, as people in this network are likely to have no surviving local ties, or have withdrawn completely and have become isolated from local and distal kin.

2) *If you have any children, where does your nearest child live?*

Option “5” was removed, and option “9” was retained, as Wenger (1994) indicates that members of this network type are unlikely to have children

3) *If you have any living sisters or brothers, where does your nearest sister or brother live?*



Option responses remained the same for this item as Wenger (1994) mentions that if people in this network do have siblings they are unlikely to live in close proximity to them.

*4) How often do you see any of you children or other relatives to speak to?*

*5) If you have any friends in the community/neighbourhood, how often do you have a chat or do something with one of your friends?*

*6) How often do you see any of your neighbours to have a chat with or do something with?*

Option response “5” was removed from all of these variables, to a) reduce categorisation overlap between family and private networks and b) because people in this network type are withdrawn, with a lifelong pattern of introversion. Therefore retaining option “6” was most appropriate.

*7) Do you attend any religious meetings?*

*8) Do you attend meetings of any community/neighbourhood or social groups, such as clubs or lectures?*

Option responses were unchanged for these two items, as out of all the social network types, they have a complete lack of community or religious involvement.

*9) Do you feel you have regular contact with your family?*

*10) Do you feel you have regular contact with your friends?*

*11) Do you regularly participate in family (whanau) activities?*

*12) Do you have family or friends over for a meal at least once a month?*

Responses for these items were “2” because people in this network are reclusive and isolated from local contacts (Wenger, 1994).

## Assessment of Modified PANT

Table 8.9 shows a substantial transformation in the correlations between the network types. Table 8.1 showed a positive correlation between Wider Community Focused and Private Restricted network ( $R=.288$ ). The correlation is now  $R=-.089$ . This negative correlation makes more theoretical sense, as those who are in the private restricted network type have less social ties, and those in the wider community focused network are socially integrated although they live far way from kin. However this does not necessarily take away from the contact they have with family members, as reflected in the self assessment items added to the measure.

Table 8.9 *Correlations Between Social Network Types using the new PANT*

	Locally Integrated	Local Self - contained	Wider Community	Private Restricted
Family	0.245**	-0.511**	-0.499**	-0.200**
Locally Integrated		-0.441**	0.005	-0.760**
Local Self Contained			-0.171**	0.163**
Wider Community				-0.089**

Note. \*\* $p < 0.001$

The association between private and local self-contained was reversed from a weak negative relationship to a positive association ( $R=.163$ ). This relationship makes theoretical sense, as these network types are the most disengaged from kin and community.

The negative association between wider community and locally integrated was eradicated completely-with the new measure there is no longer a significant association between the two. However a positive correlation was expected.

The positive correlation between local self contained and family dependent was reversed, where the new measure reveals a moderately-strong negative correlation between the two. This would be expected as those in the local self-contained have “at arms-length” relationships with their family, and are more likely to depend on neighbours than friends in times of need.

A positive association was found between locally integrated and family network using the new PANT, whereas there was previously no significant relationship between the two. This rise in the positive association may be due mainly to the new items added, in which the response options were the same for 3 out of the 4 questions.

Table 8.10. *Number of Participants in each Network Type: Original Wenger PANT versus New PANT*

<b>Network Type</b>	<b>Frequency: New PANT</b>	<b>Frequency: Original Wenger PANT</b>
Family	175	88
Locally integrated	842	452
Local Self-contained	101	332
Wider Community Focused	469	391
Private Restricted	56	222
Borderline	334	443
Inconclusive	58	133

The categorisation of the network types displayed in table 8.10 also shows significant changes. The aim to reduce the number of members in both the borderline and inconclusive networks was met, where there was a 25% decrease in the number of participants in the borderline network, and a 56% decrease in the inconclusive network.

### **8.3. Part Three: Testing Hypotheses with Modified PANT**

Another series of bivariate correlations between the new social network types and the variables of concern were conducted to assess how much the relationships had changed (see table 8.11). The relationships between the Family Dependent network and mental health, ELSI-SF, as well as social provisions became insignificant. The negative relationship between Wider Community Focused and ethnicity strengthened (became more negative), as well as the positive relationship between this network type, mental health and social provisions. The relationship between Locally Integrated and the variables measuring gender, ELSI-SF and mental health also improved, as well as a considerable improvement in the relationship between this network and social provisions. In regards to the Local Self-Contained network, only the negative association with ELSI-SF was enhanced. There were quite substantial transformations in the relationships with the Private Restricted network typology. The negative relationships between gender, ELSI-SF, mental health, and in particular, social provisions strengthened, whereas the previously positive relationship between this network type and physical health was reversed and became insignificant.

Multiple regression analysis was run to predict the overall variance in the social provision scale by the social network types that were formed using the new PANT. Table 8.12 shows that the overall variance explained by the network types as predictors was 10% ( $Adj.R^2 = .1$ ,  $F(5,1783)=38.59$ ,  $p<0.01$ ). This figure is twice the variance than that predicted using the original Wenger PANT. Overall, the Locally Integrated, Wider Community Focused had a significant positive contribution and the Private Restricted network type had a negative contribution to the equation. With the new PANT, the Local Self-contained network that contributed significantly to social support in the original measure became insignificant and Locally Integrated became significant.

Table 8.11 *Correlations Between Social Network Types and All variables*

	Family Dependent	Local Integrated	Local Self- contained	Wider Community Focused	Private Restricted
Ethnicity: Māori vs. Non-Māori	0.12**	0.06*	0.02	-0.13**	-0.11**
Gender: Female vs. Male	0.07**	0.13**	-0.04**	-0.02	-0.14**
ELSI-SF	0.01	0.09**	-0.09**	0.12**	-0.1**
No Post Secondary Education	0.08**	0.03	-0.04	-0.12**	0.04
Physical Health	0.01	-0.00	-0.05*	0.06**	-0.03
Mental Health	0.00	0.1**	-0.09**	0.11**	-0.1**
Social Provisions	0.04	0.25**	-0.13**	0.15**	-0.27**

Note. \*p<0.01; \*\*p<0.05

The multiple regressions testing the macro and mezzo levels of Berkman's model (2000; Berkman & Kawachi, 2000) were also retested using the new version of PANT.

8.12. *Linear Regression of the Association Between Modified Social Network Types and Social Support*

	B	Std. Error	$\beta$
Constant	72.72	23.84	
Family Dependent Network	0.19	0.21	0.04
Locally Integrated Network	0.46	0.19	0.11*
Local Self-Contained Network	-0.07	0.23	-0.01
Wider Community Network	0.77	0.18	0.15**
Private Restricted Network	-0.92	0.23	-0.17**

*Note.* Adj.  $R^2$ =0.1, F= 38.59, \*\*p<0.001, \*p< 0.05

When SF-36 Physical health was the criterion (see table 8.13), at step one, the social contextual variables explained 9.9% of the variance, where education, ELSI-SF and ethnicity contributed significantly. At step two, the new network variables explained an additional 0.3% (Adj. $R^2$  =0.1, F(9,1609)=20.79, p<0.01), however none of the network types contributed significantly to the model. Therefore, the new PANT did not enhance the relationship between social networks and physical health, when controlling for social context.

Table 8.14 shows the multiple regression where the criterion was mental health. In step one the social context variables contributed to 15.7% of the total variance in mental health. When the new network types were introduced in the second step, the variance increased to 17% (Adj. $R^2$  =0.17, F(9,1609)=36.56, p<0.01), where the Locally Integrated and Wider Community network types made a significant positive contribution. Using the original Wenger PANT, only the Family Dependent network contributed significantly to the equation. In this case, the modified network types did improve the model, although the effect size was very small.

Table 8.13. *Multiple Regression Analysis of the Relationship Between Social Network Types on Physical Health, whilst Controlling for Social Contextual Variables*

	B	Std. Error	$\beta$	Adj. $R^2$	F
Step 1				0.99**	45.33
Constant	41.04	1.01			
Female Gender	0.42	0.46	0.02		
No post secondary qualification	-2.06	0.46	-0.1**		
ELSI-SF Score	1.82	0.16	0.27**		
Māori Ethnicity	-1.3	0.47	-0.07**		
Step 2				0.99	20.79
Constant	42.06	4.41			
Female Gender	0.40	0.47	0.02		
No post secondary qualification	-2.02	0.47	-0.1**		
ELSI-SF Score	1.79	0.16	0.27**		
Māori Ethnicity	-1.36	0.48	-0.07**		
Family Network	0.24	0.23	0.04		
Locally Integrated Network	-0.27	0.22	-0.06		
Local Self Contained Network	-0.13	0.26	-0.02		
Wider Community Network	0.13	0.2	0.02		
Private Network	-0.21	0.26	-0.04		

Note: \* $p < 0.05$ , \*\* $p < 0.01$

Table 8.14. *Multiple Regression Analysis of the Relationship Between Social Network Types on Mental Health, whilst Controlling for Social Contextual Variables*

	B	Std. Error	$\beta$	Adj. $R^2$	F
Step 1				0.157**	75.3**
Constant	39.71	0.83			
Female Gender	0.03	0.38	0.00		
No post secondary qualification	0.21	0.38	0.01		
ELSI-SF Score	2.21	0.13	0.39**		
Māori Ethnicity	-0.79	-0.39	-0.05**		
Step 2				0.17**	36.56**
Constant	35.74	3.63			
Female Gender	-0.17	0.38	-0.01		
No post secondary qualification	0.22	0.39	-0.01		
ELSI-SF Score	2.12	0.13	0.37**		
Māori Ethnicity	-0.75	0.4	-0.04*		
Family Network	0.04	0.19	0.01		
Locally Integrated Network	0.38	0.21	0.09*		
Local Self Contained Network	-0.03	0.21	-0.01		
Wider Community Network	0.33	0.16	0.07*		
Private Network	0.04	0.22	0.01		

Note: \* $p < 0.05$ , \*\* $p < 0.01$



## 9. Discussion

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The purpose of this study was to examine the relationship between social networks and health by testing the Conceptual Model (Berkman et al., 2000). However, the study expanded to examine Wenger's PANT (1994) with the aim of discovering the underlying dimensions, and improving the measurement tool itself, to consequently improve the association between social networks and health. The results provided some support for the predictions, and confirmed understandings of the relationship between perceived social support and social networks, as well as the relationship between social networks and health. In particular, the results highlight the importance of incorporating the social context as an 'upstream' effect on the influence of social networks on health. There was also significant evidence of the need to develop a more effective measure of social networks.

### 9.1. Social Context and Social Networks

Social contextual factors of gender, education, ethnicity and socioeconomic status were shown to influence the types of social networks participants reported. Therefore, social networks are lodged within the larger social and cultural context, which as suggested by Berkman (2000), shape the structure of the networks themselves.

Education and socioeconomic status varied in their associations with network types. Those who had post secondary education and scored highly on ELSI-SF were more likely to be in the Wider Community Focused network type. Conversely, those who did not have post secondary education were more likely to be in the Family Dependent network. Those in the Locally Integrated network were more likely to score better on the ELSI-SF, however no association with education was found. Similarly, those in the Local Self-contained and Private Restricted networks were more likely to score lower on the ELSI-SF, however there was no interaction with education.

Previous research has also shown that those with higher education levels are linked to diverse networks rather than those who are in family based networks (Wenger, 1995). This has been attributed to an assortment of cognitive resources and skills that equip these individuals with the tools necessary to develop and maintain social relationships (Ajrouch et al., 2005).

A number of studies have also provided evidence that those who are of lower socioeconomic status and education are more likely to be found in family focused networks, as they rely more on family rather than friends to make ends meet (Seeman et al., 1993; Zuckerman et al., 1984). Zunzunegui et al. (2004) also support these results, where their study showed that those in less affluent areas are more likely to have restricted social relations, such as those in the Local Self-contained and Private Restricted network types. People in these networks have less access to educational resources, and are faced with material insecurity (Zunzunegui et al., 2004).

Women were more likely to be in the Family Dependent and Locally Integrated networks, whereas men were more likely to be in the Locally Self-contained and Private Restricted networks. Gender disparities in network types may be due to the two genders being conditioned differently towards family and friends, as well as with major life events (West & Simmons, 1983). Women have been found to prefer more diverse networks, such as the Locally Integrated network as they positively influence their sense of belongingness and self-efficacy (Ajrouch et al., 2005). Moreover, major life events, such as rearing children, and pertaining to the home, may shape women into preferring to be in networks that have more contact with family (Shye et al., 1995). Men on the other hand are more likely to be in the Private Restricted and Wider Community Focused networks, as they are socialised towards independence and withdrawal from support-seeking behaviours (Ashton & Fuehrer, 1993).

Māori were more likely to be in Family Dependent and Locally Integrated networks, and less likely to be in Wider Community Focused and Private Restricted networks. These findings have been replicated by a number of researchers who have also found that collectivist and individualist cultures have different views and preferences for social engagement and cohesion (Litwin, 2006; Tomaka et al., 2006; Zunzunegui et al., 2004). In collectivist cultures, such as Māori, emphasis is placed on relationships

and support within the familial domain, whereas there is more emphasis on social ties within individualist cultures. The notion of Whanau (family) plays a significant role in the formation of identity in Māori, as well as providing them with a sense of belongingness (Durie, 2003). In times of need, it is whanau to which Māori will turn to for support rather than friends, and family are essential for implications of an individual's well-being (Henare, 1998; Durie, 2003)

## **9.2. Social Context and Health**

The second aim of this study was to test the relationships between social networks and health while taking into account the upstream factors in the Conceptual Model (Berkman et al., 2000). The results showed that social contextual factors do contribute significantly to health, however the social network variables revealed a very weak effect size, and the possible reasons will be discussed more broadly in section 9.4.

The multiple regression equations showed that socioeconomic status and ethnicity contributed significantly to the variance in both mental and physical health, and education positively and significantly contributed towards physical health. Participants who had higher socioeconomic status were more likely to have better health, compared to those who had lower socioeconomic status. These results are not surprising, as previous studies have established that monetary restrictions due to poverty and prioritisation greatly affect health (Seeman et al., 1993). People with lower socioeconomic status also have less access to adequate healthcare services (Wenger, 1997), which coincides with the “micro” level of the Conceptual model. Those in underprivileged areas are more likely to have unmet needs for care as well as a paucity of immediate and preventative healthcare (Kirby & Kaneda, 2005). Moreover, research has also shown that those from lower socioeconomic status groups generally report higher levels of negative emotions, disease and stressful physiological responses (Berkman, Leo-Summers & Horiwitz, 1992; Kessler & Neighbors, 1986; Thoits, 1982).

Furthermore, Māori are more likely to be in worse health than the non-Māori general population. There are a number of explanations for these results. Firstly, Māori

incorporate the essence of Wairau (spirituality) into their construction of health and wellbeing. Within the urban environment, Māori may experience disruption to their Wairau, due to a lack of access to tribal land, poverty, increased rates of unemployment and/or lack of education (Durie, 2003). Consequently, the delivery of healthcare to Māori has greatly affected the general health of this population (Cram et al., 2003). Until recently the multiple dimensions of Māori health, such as Wairau, were ignored in health programs, which led to miscommunication, negative outcomes, and thus digression away from the healthcare system (Cram et al., 2003; Durie, 2003; Metge & Laing, 1984). Māori have also been found to have lower life expectancy, increased mortality and morbidity and lower socioeconomic status (Statistics New Zealand, 2007).

Durie and Kingi (1997) also point out that the SF-36, which was implemented to measure health status in this study, may be inadequate for capturing Māori health. As previously mentioned, Māori have a different outlook on health to non-Māori. Therefore, a measure of Māori health that incorporates the philosophy of the Whare Tapa Wha (comprising of spiritual, mental, physical and whanau wellbeing) model may provide a more comprehensive and tenable measure of health.

Education contributed significantly and negatively to physical health, in that those who did not have post-secondary education were more likely to be in poorer health. An explanation of this finding may be ascribed to access to resources, where those who are from a more educated background have better knowledge of healthcare (Broese van Groenou & van Tilburg, 2003, as cited in Ajrouch et al., 2005). Furthermore, Ross and Wu (1995) note that compared to the poorly educated, those who are not, are less likely to be unemployed, more likely to work full-time, have higher incomes and lower economic hardship. In return, these factors improve health status. Lower education has also been linked to an increased likelihood of smoking and drinking, as well as decreased exercise and health checkups (House et al., 1994). Therefore, it may be that education improves health through economic circumstances, social resources and health lifestyle.

Gender was not found to be a significant predictor of mental or physical health. This may reflect the relatively low gender stratification in New Zealand society and most

Western societies (Jylha et al., 1998). Studies that have looked at gender and health effects have discovered that in societies where life events, social disadvantage and resources are clearly divided along gender lines have greater gender related health differences than in countries where gender roles are less sharply defined (Jylha et al., 1998; Zunzunegui et al., 2004).

### **9.3 Social Networks and Social Support**

In regards to social support, those who were in the Locally Integrated and Wider Community Focused networks were found to have more positive associations with provisions of social support than those in the Local Self-contained and Private Restricted network types. These results support hypothesis 2 in that social network types are differentially related to social support. The results are not surprising and confirm previous research, as not all social ties are supportive and there is variation in the type, frequency and extent of support provided. The networks that are restricted have less social and familial ties, which also decreases the belief that there is support available to them in times of need (Uchino, 2004; Litwin & Shiovitz-Ezra, 2006) and increases the risk of loneliness and isolation (Thoits 1983; Tomaka et al., 2006; Wenger et al., 1996).

Furthermore, it was interesting to see that the only network types that contributed significantly to the variation in social support were Locally Integrated, Wider Community Focused (which were positively associated), and Private Restricted (which was negatively associated). The Conceptual Model (Berkman et al., 2000) shows that social networks influence the provision of social support, which then influences health. What these network types have in common is the element of social engagement, where the former two have high levels and the latter has very low levels. This provides evidence towards social engagement being an active ingredient in social networks (Ashida & Heaney, 2008; Golden et al., 2009; Kawachi et al., 1996; Walter-Ginzberd et al., 2002).

The negative contribution of the Private Restricted network type upon social support may be due to the almost complete lack of contact with family and friends. The response options for this network type were transformed so that they represented the lowest level of social contact out of all the network types. Past research has also supported this notion, where those who have lower frequencies of social contact report less received and perceived support (Barrera, 1986; Lake & Cassady, 1990; Idler & Benyamini, 1997; Ashida & Heaney, 2008). Wenger (1994; 1997) also suggests that those within the more restricted networks are more likely to be at risk of poor health. Although bivariate correlations showed a very weak, yet significant association with Private Restricted network and mental health, there was no interaction found when it was entered into the multiple regression equation. Therefore the results of this study did not support this past finding. As discussed in section 9.4 Wenger's PANT was intended for use in a population older than the sample population of this study (Wenger, 1994; 1997). Therefore, it may be that the health effects that were not detected in the present analysis will become apparent in the future waves of HWR data as the participants age.

The insignificant relationship between social support and the Locally Self-contained network type may be a result of the unavailability or unreliability of help earlier in the lives of these members (Wenger, 1994). As a result, these individuals have learnt to support themselves and restrict mutual aid. Wenger (1994; 1997) also mentions that those embedded within this network are less likely to ask for help in cases of emergency and autonomy is regarded as a sign of strength. The measure of support employed in this study measured provisions of social support and did not take into account self-support, and therefore may have been a means towards the lack of association between the two variables.

The Family Dependent network type did also did not contribute significantly to social support. This result is conflicting with a number of other studies, which have found that social support decreases with increased dependency on family members (Wenger 1993; 1996; 1997; Ashida & Heaney, 2008; Tomaka et al., 2006). It has been argued that the nature of the interaction with children, and the perception of being a burden upon family members, and dissipation of interaction with one's peers can cause individuals to feel despondent (Sabatelli & Waldron, 1995). The absence of

association between the Family Dependent network type and social support may reflect a problem with the modified PANT, in which the assessment of the perception of an individual's network was limited to two items. This could be an area in need of further development and examination in future research (as discussed in section 9.4.). Furthermore, this study is cross sectional, and future waves of the HWR study may be able to detect more interaction between the Family Dependent type and social support, as members become more embedded within this network.

#### **9.4. Social Network Measure: Examining Wenger's PANT**

Hypothesis one predicted that social network types would be related to each other in different ways so that scores on Locally Integrated and Wider Community Focused Network types would be positively correlated, and scores on Local Self-contained, Private Restricted and Family Dependent network types would be positively correlated. However the initial analysis using Wenger's PANT did not support this hypothesis. The study then progressed towards a detailed examination of how the PANT was scored, detecting the underlying dimensions of the measure. The transformation of the PANT showed theoretically congruent correlations between the measures, and dramatically decreased the number of participants in the Borderline and Inconclusive categories. These results question the validity of Wenger's PANT as an adequate measure of social networks in the New Zealand setting.

Another issue with Wenger's PANT was the fact that it was originally created to measure networks of people past the retirement age. The mean age of participants was 63 years old (SD=4.5) and mode was 61 years, both of which are below the retirement age in New Zealand. Therefore the structure of the measure reflects this and ignores other types of network connections that younger adults might have- for instance employee relations, and therefore it hinders the ability of this study to measure the participant's true social networks. However because this is a cross-sectional study embedded within a ten-year longitudinal study, it will be interesting to see if the categorisation of the network types improves as the participants age.

Response options that were more mutually exclusive in each network type, and inclusion of items that measured self-assessment of interactions with family and friends significantly improved the categorisation of participants into network types. However, transforming the scoring of response options to make them mutually exclusive may be a major flaw in the validity of the measure, as it excludes any commonalities which these network types may have. These issues regarding the overlap of response options may not be a flaw of the original measure itself. The problem may lie in the fact that the PANT was not intended for use in a postal survey- it is a social network assessment tool for health practitioners to help plan for more responsive, individualised interventions.

As shown previously, Wenger's PANT provided clear indications of the types of networks, which provide better support, however the impact of social network types on health were rather weak. Even after modifying the measure, associations only improved slightly. This is contradictory to other research that has found much stronger relationships between social networks and health (Kawachi et al., 1996; Litwin, 1996; 2000; 2001; 2004; Wenger, 1996; 1997; Yasuda et al., 1997; Zuckerman et al., 1984;). The social context variables that were employed contributed to 15.7% of the variance in mental health, whereas the social network measures merely increased this figure to 17%. Therefore, this study did not provide much support for the "Mezzo" level of the Conceptual model. Furthermore, the social network variables did not contribute to any variance in physical health.

A study by Golden et al (2009) may help elucidate reasons as to why this weak association was found. Golden et al (2009) also examined the underlying dimensions of Wenger's PANT. These authors found two dimensions that were uncorrelated: the family domain (interaction with relatives and children) and the social domain (frequency of attendance at social events and frequency of contact with friends and neighbours). The social domain was significantly related to mental and physical health, whereas the family domain was not associated with health at all. From their data, it was concluded that the 'active ingredient' of social support networks was social engagement. Those in the Locally Integrated and Wider Community Focused networks, which rated highest on this dimension, were positively associated with health and wellbeing.



The results of Golden et al's (2009) study supports the results of this study, in which only the Locally Integrated and Wider Community Focused networks were associated with health. Giles et al. (2005) also found similar results, where those who have more ties with friends and confidants had better health, whereas those in the networks that predominantly consisted of children and relatives did not reveal any significant associations. This relationship between social engagement and health may be due to the effects upon self efficacy, self esteem, coping and morale, or a sense of personal control, possibly through reinforcement of social roles, or because interaction with friends stem from choice or selectivity. This is in line with earlier theories of symbolic interactionism (Faris, 1934 as cited in Cohen, Underwood & Gottlieb, 2000; Helsin & Fowler, 2010) and Weiss' functional specificity theory (1974). Therefore, if this study implemented a network measure that measured social engagement and interaction, it may have found clearer and stronger associations with health outcomes.

The modified PANT also provided evidence towards the inclusion of perceptual and functional measures of social networks in addition to the structural. Future research could look at adding more perceptual measures, where they could measure feelings of belonging, isolation, fulfilling relationships, and quality of network members. Additionally, functional facets could also be added, as Fiori et al (2006) describe that individuals within a network type may have variations in the functional qualities within their networks. The PANT was chosen for this study because of its empirical basis; however it has limited assessment of contacts, because it only assessed face-to-face contact. In today's technological age, there will be a need to take into account Internet communication, to explore other methods of maintaining social contact beyond phone calls and visits.

As of yet attempts to develop network typologies have been rather one-dimensional (Fiori et al., 2006; Glass & Maddox, 1992; Golden et al, 2009), however this present study contributes to the growing pool of theoretical and empirical reasons for developing social network measures that look beyond frequency of social interaction or numbers of social contacts. An adaptation of the Covey Model by Antonucci and Akiyama (1987) may also be beneficial as it looks at the structure and quality of networks that are shaped over time by personal and situational factors. This viewpoint

takes into account preferences of network types, for instance, those who prefer to have less social connections, rather than amalgamating these individuals into restricted network types, that are deemed as dangerous to one's health.

## **9.5. Limitations**

The limitations of, and recommendation for the social network measure have already been discussed in detail in section 9.4. However, there were additional limitations to the present study, and these will be addressed in this section.

The cross-sectional nature of the study means that causality cannot be inferred from the associations made in the results. Therefore further research is required in order to discover if the association between social networks and health are causal. And, if it is, what is the mechanism? Is it possible to use this finding to improve health as we age? It is difficult to measure how exactly social network types may influence health, as the underlying mechanisms within each network type are unknown. This study only provided some support for the notion that social engagement may be an active ingredient, which will again require further research.

The self-report format of the questionnaire may have led to social desirability bias, as individuals may have thought that they would be viewed unfavourably if they reported low social interaction with friends and family, and similarly low levels of social support. However the assurance of anonymity and confidentiality to those who part took in the HWR study was a means towards reducing socially desirable responses.

Moreover, it is important to mention that the directional associations in the equations may have reverse associations. It was hypothesised that social network characteristics and functions influence the health status of older adults. However, it may be that the health status also influences social network characteristics and structure. These bidirectional relationships may need to be taken into account in future studies.

Berkman and Kawachi (2000) note that the function of social relationships, such as social influence, and social support are possible mediators between social network

characteristics and health. However this study did not test these “micro” level forces of the Conceptual model, and therefore it is possible that other factors that were not explored may mediate the relationship between social network characteristics and health.

The population sample of this study consisted of community dwelling adults between 55-70 years old. Therefore, they are more likely to be healthy, educated, still in the work force and thus have more financial stability. The exclusion of older adults who are in aged institutions may have contributed to underestimating the relationship between social networks and health. Future waves of the HWR study may help to detect stronger relationships.

Lastly, grouping the diverse ethnic groups of this study’s population sample into one ‘non-Maori’ general population meant that it was unable to detect the possible unique relationships between different ethnic groups with social networks and health.

## **9.6. Implications of the Study**

The present study provides information that is relevant for the development of social policy regarding the health of an ageing population. It highlights the differential relationships between social support and social networks and the implications for health. Importantly, it suggests that certain socio-cultural facets can shape an individual’s network structure. Therefore, these results suggest the need for more effective interventions that target specific groups, so that they match the needs of the individual, as well as those in their networks.

Results of the study also indicate that a number of this young-old population are already involved in networks that have negative associations with health. This identification can serve as a cue for health practitioners and policy developers to design early interventions so that improved health can be ensured as these people enter into retirement age and older. Litwin (2006) notes that measurement of social network types can serve as a basis for risk assessment, and a means for measuring the

efficacy of interventions. For instance, those who are in restricted networks are more likely to be at an increased health risk, and being able to measure the transition from one network to another can indicate the success or failure of an intervention.

The indication that social connectedness is an important aspect of social networks, and the relationship with health, may assist in maintaining the health and wellbeing of healthy adults, in addition to the construction of interventions. Rather than working on increasing the availability of social support, community health professionals and policy makers may be interested in constructing programs that enhance older adult's perceptions of social connectedness and engagement, in addition to strengthening social relationships that exist within their networks, to allow them to sense companionship

## **9.7. Conclusion**

Berkman's Conceptual model of health was the underlying theory for this thesis. Social contextual factors constitute the over-arching social forces that shape social network structure and function. Previous research has shown the link between macro-level factors and social support, networks and health (for instance, Litwin, 1996; Uchino, 2004). This study also provided support for these cases, where socioeconomic living standards and ethnicity were consistently related to the social networks and health.

A significant obstacle arose during analysis, which showed that the social network measure employed in this study inadequately measured the participants' network types. Therefore, the thesis took another route, and explored the possible problems with Wenger's PANT. The discovery of the theoretically peculiar associations between network types, as well as the large numbers of participants in the "inconclusive" and "borderline" categories provided the foundation for the modification of the measure. Wenger's PANT was improved marginally, however the effect of social networks on health remained weak. Nonetheless, this study has provided evidence towards, and suggestions for further development of the network measure. Future research on social networks would benefit greatly by incorporating

facets that measure technological interaction, which could have quite exciting and significant influences upon health. Additionally, incorporating measures of an individual's perception of their social ties, as well as measuring the functional roles within their networks, will provide more accurate insight into the structure of networks and network types.

This study provided support for the notion that not all social relationships are beneficial to health, and that specific types of relationships, namely with friends and confidants may be more advantageous than others. Moreover, it may be that only the social engagement aspect of a person's social network really influences his/her health. This is because only the Wider Community Focused and Locally Integrated network types were found to have an association with health, and these networks share the common factor of high levels of interaction with the community and friends. In this sense, there is a restoration of early theories of social networks and health, in which Durkheim explains that social integration and engagement, as well as social support, can have important effects on health.

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