

**Bridging and Elderly Health:  
Examining the Effects of Bridging on the Physical and Mental Health of the Elderly**

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## **Abstract**

While research in numerous fields have established the importance of social connection on health and well-being, not much research has decoupled the content and structure of connection. I study the effect of network structure on elderly physical and mental health through the measure of bridging - the act of mediating two disconnected individuals or groups. I use two waves of ego-centric network data of over 2,500 older adults from the National Social Life, Health, and Aging Project to conduct a longitudinal prospective study of the effect of bridging on long-term physical and mental health of the elderly. I also conduct two cross-sectional studies on both waves. Multivariate regression analysis shows that elderly adults with higher bridging activity are more likely to develop less than good physical health in the long-term. Further, subjective feeling of closeness to network members is strongly associated with better physical and mental health.

## **Introduction**

### *Background*

The importance of social connection and social support in health and well-being has been confirmed over the past thirty decades. Numerous epidemiological, psychological, and sociological studies have found absence of social connection to be detrimental for health. The various mechanisms through which social connection affects health has also been explored. However, despite calls for differentiating the positive *content* of social connection (social support) from the *structures* of social connection (social network structures), most studies have not yet decoupled the effects of support from structure.

### *Aim of Study*

This study explores the effect of core ego-network structure on the long-term physical and mental health of elderly adults. More specifically, the research seeks to understand the potential benefits or harms of *bridging* – the act of mediating two disconnected individuals or groups – on elderly physical and mental health. Thus, the research seeks to understand whether the cultivation of more widely spread, weak ties or more dense, strong ties best supports elderly health. The results of this study will inform researchers, clinicians, and caregivers on specific ways to foster social connections to best support the elderly.

## **Literature Review**

### *The structure and content of social connections*

While the terms “social network” and “social support” are often used interchangeably in studies on health and social connection, Berkman (2000) clearly distinguished the two constructs

of social connection. Berkman defines social network as the underlying *structure* of the relationships, while social support as the *content* of the relationships<sup>1</sup>. In contrast with the proliferation of social support studies, much less research has been done on social networks and how the structure of relationships may affect health (Berkman 2000, Smith and Christakis 2008). Five basic mechanisms have been identified through which social connection affects health, which are social support, social influence, access to resources, social involvement, and person-to-person contagion (Berkman and Glass 2000).

### *Social connection as integral to good health*

Numerous studies have established that social connection, especially positive social connection that facilitates social support, is integral to good health. A combination of social support and well-being research with animal research, social-psychological analogue, and prospective surveys established social support as a causal contributor to well-being (Cohen and Wills 1985). Not only have the conclusions been replicated many times in diverse populations (Smith and Christakis 2008), but numerous studies have also established the harmful effects of social isolation on health. Socially isolated individuals suffer from high rates of illness and mortality compared to non-isolated individuals (House et al. 1982, Berkman and Breslow 1983, Schoenbach et al. 1985). Yet, research on what type of relationship structures (i.e. social networks) best facilitate positive social connections seems to be lacking.

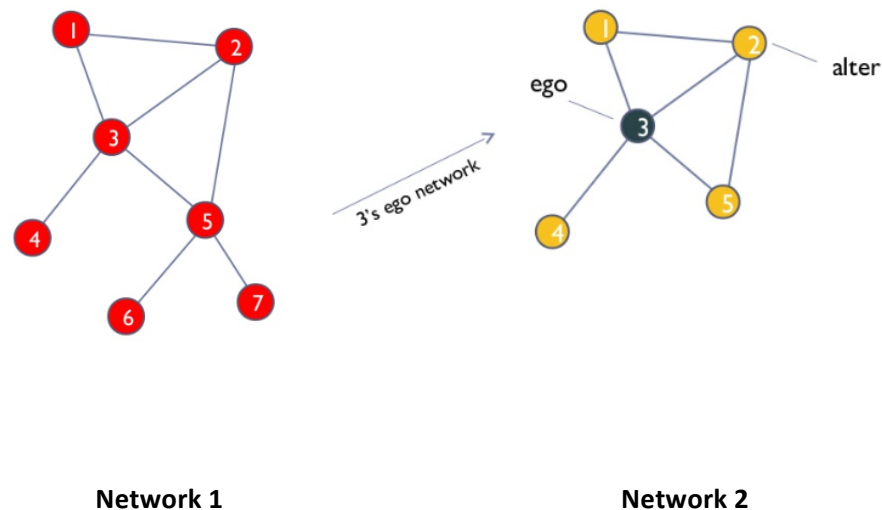
### *Primer on social networks*

Social network is the relationship structure that is formed between individuals, groups, or organizations. A *core ego-network* (Figure 1, Network 2), which is the network form analyzed

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<sup>1</sup> The content of the relationship may not always be positive. Social undermining is often posited as the opposite of social support where the behaviors towards the target individual display negative effects, evaluations, and behaviors that hinder the target individual's goals (Vinokur and Ryn 1993).

by this study, is made up of “core” relationships between the *ego* (individual under study) and her *alters* (people she forms relationships with). In Network 2, circle 3 is the ego, while circles 1, 2, 4, and 5 are her alters. The ego *bridges* when she mediates two disconnected individuals or groups. Bridging can be seen happening in Network 2 where the ego bridges alter 4 and alter 1, alter 4 and alter 2, and alter 4 and alter 5.



### *Conflicting view of bridging*

Bridging is key to social processes such as diffusion of information and innovation (Granovetter 1973, Burt 2004), community cohesion (Putnam 2000), the small world phenomenon (Watts 1999), and the spread of diseases (Morris and Kretzschmar 1997, Aral 2000). However, sociological literature offers conflicting views on the benefit of bridging to the individual. On the one hand, bridging is celebrated as an enviable activity that allows greater access to resources and greater influence and autonomy in relationships. On the other hand, dense connections between ego's alters where most alters are connected to one another has been argued to best support the ego through orchestrated teamwork and mutual trust.

*Bridging as a positive: greater access to information and resources*

Social network structuralists have long celebrated bridges as pathways for the flow of diverse information, ideas, and innovations. Sociology and social psychology research shows that information circulates more easily within groups than between groups (Burt 2002). Thus, bridging individuals with access to different groups may personally benefit from the diffusion of information and ideas that come from such ties.

Granovetter's famous study of job-information flow (1973) supports this argument. Out of respondents who obtained jobs through a contact, 83.3% saw those contacts only occasionally or rarely. Thus, the relationship that provided job-related information was a bridge relationship as opposed to a strong, embedded relationship. Podolny and Baron's findings in a high technology corporation (1997) also confirmed the advantages of bridging. Bridging has been shown to promote upward mobility in the company by being a conduit of task-related information and resources. Both of the studies demonstrate an emphasis on the importance of relationship structure over the strength of the relationship.

Burt's study (2004) on the managers of a large American electronics company also showed that compared to managers who did not bridge, managers who bridged different groups were promoted more quickly as well as being able to come up with more creative solutions to problems. This has been attributed to the fact that people connected across groups are more often exposed to alternative ways of thinking and behaving, which provides fresh perspectives and more options to choose from.

*Bridging as a positive: greater interrelationship power*

Individuals who bridge have also been argued to possess greater interrelationship power than those who do not. Not only does bridging allow the individual to facilitate transactions between two disconnected actors, but it also allows the individual to enjoy greater freedom from social norms and constraints that arise from being embedded in a dense network.

Bridging allows the individual to hold interrelationship power through the ability to facilitate transactions between actors lacking access or trust in one another. One such accumulation of power is through brokering communications between other individuals and controlling the flow of information (Freeman 1978). Further, the individual bridging two parties may also take advantage of the situation through mediating or stirring conflict and by exploiting the situation to her profit (Simmel 1950). Even just the perception of bridge status has been shown to heighten other members' perception of the individual's influence, regardless of the individual's actual influence resources (Gould 1989).

Further, greater autonomy and freedom of choice also comes from not being involved in dense networks of strong ties. Tightly knit networks with high kinship density foster rigid role segregation that conforms to social norms (Hill 1988, Bott 1957). Being free from such a structure may allow the individual to make decisions that best benefit their situation rather than confining them to role expectations.

*Bridging as a negative: inadequate structure for flow of social support*

While network structuralists such as Granovetter and Burt argued for weak ties as the basis for social capital, Coleman argued that social capital arises from dense social networks made of strong ties. Social capital is defined as a kind of capital that provides competitive

advantages to individuals or groups in pursuing their goals (Coleman 1988). Contrary to the negative view that dense networks impose oppressive role segregation and social norms that stunt the individual, Coleman argued that such norms and sanctions are able to monitor and guide behavior (Colman 1988). This is in part due to the individual reputation at stake in a closed, dense network, while reputation does not hold much importance in networks full of bridging where alters do not know each other. Individuals are held more accountable for their actions in closed, dense networks, which allow for development of trust and nudge individuals toward ethical choices (Tullock 1985, Greif 1989).

Further, bridging is associated with weak ties, both of which are inversely associated with network density. Relationships embedded in dense networks are also more likely to be strong (Granovetter 1985, Coleman 1990, Burt 2001). Thus, lots of bridging results in an ego-network of alters that are often disconnected from one another. Such sparse network structures made up of weak ties have proven to be antithetical from network structures that provide strong social support (Haines et al. 1996, Kelley-Moore et al. 2006, Ashida and Heaney 2008).

Moreover, strong ties such as kin ties are not only more normatively bound to provide support when needed (Hamon and Blieszner 1990), but also more forgiving of the “norm of reciprocity” which governs social relationships. Individuals establish relationships where obligations of mutual reciprocity exist (Gouldner 1960). Weak ties may rapidly dissolve when individuals in a relationship feel like they are under-benefitting (Kuijer et al. 2001, Sprecher 2001). In comparison, kin ties are more forgiving and may better tolerate long periods of inequity (Ingersoll-Dayton and Antonucci 1988).



*Bridging as a negative: bridging activity as a stressor*

Individuals have to work much harder to maintain bridges than in other embedded relationships (Burt 2002). Bridge relationships decay at much faster rates when compared with embedded relationships. In the sample of 345 bankers observed over a four-year period, nine out of ten bridge relationships did not last past one year. This stands in contrast with low-maintenance contacts in denser leisure and domestic networks (Burt 1992) as well as sticky relationships that are supported by larger groups they are embedded in, which provide stability and established norms (Krackhardt 1998).

Further, bridging across different individuals or groups may require one to “switch” between different cognitive frameworks if the individuals or groups are governed by different social norms, which require more cognitive processing and stress (Mische and White 1998). Role conflicts may also arise when brokers face conflicting demands and inconsistent expectations from the different roles they inhabit (Coleman 1990). Thus, bridging has been shown to cause significant psychological distress (Podolny and Baron 1997).

Greater bridging is also associated greater levels of loneliness. Social networks of partners in long-term intimate relationships usually converge to include mostly shared contacts (Milardo 1982, Kalmjin and Bernasco 2001). However, since this creates a tight-knit group of strong ties, bridging potential of each partner is greatly reduced. On the other hand, separation, divorce, and widowhood means the loss of the one of the most highly embedded alters in an ego’s network. While this increases the ego’s bridging potential, it comes at the expense of increased loneliness and sense of isolation (Paúl and Ribeiro 2009).

Moreover, research on friendship formation on college campuses has shown people to create largely three structures of social networks: tight-knitters who are involved in a closed dense group of strong ties, compartmentalizers who are involved in a couple distinct clusters of groups, and samplers, who form dyadic ties with individuals from many different groups (McCabe 2016). The third group, the samplers, were the ones with the highest bridging potential and were the most academically successful, but reported the greatest levels of social isolation and loneliness on campus.

### *Bridging and the Elderly: Two Contradicting Hypotheses*

Taking the existing literature on bridging into account, how can we think about the effect of bridging on elderly health? It is interesting to note that most of the literature on bridging originates from studies in formal settings such as the workplace. By studying bridging in core-ego networks of the elderly with their most intimate alters, and by studying how it affects the individual health, the study shifts the focus from networks in a public formal setting to those in the most private intimate of settings. Further, it explores how network structures affect the individual at the most intimate personal level.

*Hypothesis 1: Bridging will have a positive effect on physical and mental health of the elderly.* The advantages of greater access to information and resources that bridging brought to individuals in a more formal organizational setting such as the workplace may similarly apply to elderly adults in their private life. Those who have access to more diverse groups of people may obtain better health information as well as be able to pool different types resource to meet their different health needs (Wellman and Wortley 1990).

In addition, bridging may imbue the elderly with greater autonomy and power in relationships. This is extremely important as independence is greatly valued in elderly adults (Cohler 1983). Excessive provision of support and the loss of independence have shown to increase depressive symptoms and detract from elderly well-being (Silverstein et al. 1996, Martire et al. 2002). Further, higher levels of autonomy and power may prevent the elderly from abuse, which has been shown to occur in over one out of ten elderly adults (Laumann et al. 2008, Acierno et al. 2010). Elderly abuse has also been shown to have clear negative consequences on physical and mental health (Pillemer and Prescott 1988, Comijs et al. 1999, Schofield et al. 2013). Elders with small, dense kin networks are at greater risk of being abused (Pillemer and Finkelhor 1988, Paveza et al. 1992, Pillemer and Suitor 1992), which makes bridging an effective buffer.

*Hypothesis 2: Bridging will have a negative effect on physical and mental health of the elderly.* Such a negative effect can first be attributed to the inadequate network structure (weak, sparse ties) in facilitating social support. Closed network structure of strong, dense ties makes it easier to orchestrate teamwork to provide the elderly (Ashida and Heaney 2008), who may face growing need of additional support. Further, support of the elderly may entail uncomfortable caregiving duties such as helping with unpleasant bodily functions and hygiene routines. Strong ties such as kin member are more forgiving of such relationship norm violations and continue to provide support, as opposed to weak ties that dissolve more easily under strain (Stoller and Pugliesi 1991). Thus, essential support may not be provided in the absence of strong ties.

Additionally, bridging emerges as a stressor. Bridge relationships are prone to much higher rates of decay than embedded relationships, and require extra effort to maintain. Further, bridging may also require the elderly to “switch between different cognitive frameworks

according to different social norms governing the disconnected individuals as well as the possibility of role conflict that arises when facing conflicting demands. Such factors may all contribute to greater cognitive demand on the elderly. Finally, higher rates of bridging have been associated with increased levels of loneliness. Loneliness has been strongly associated with negative physical and mental health in the elderly (Luanaigh and Lawlor 2008, Luo et al. 2011).

## **Data**

I use Wave 1 and Wave 2 data of the National Social Life, Health, and Aging Project (NSHAP) carried out by the National Opinion Research Center (NORC). NSHAP is a longitudinal, population-based study of community-dwelling elderly Americans that has been conducted in three waves (2005, 2010, and currently ongoing).

Wave 1 used national area probability sample of elderly adults aged 57 to 85 who were living in communities, oversampling for Black and Hispanic populations. After screening for eligible households through the Health and Retirement Study (HRS), one individual per household was selected and a total of 3,0005 interviews were completed during July 2005 and March 2006. The overall weighted response rate for Wave 1 was 75.7%.

For Wave 2 (2010-2011), NSHAP returned to Wave 1 respondents (2,261 interviews) as well as including their cohabitating spouses and romantic partners (907 interviews). New respondents who were not interviewed for W1 were also added (161 interviews) as well as their partners (48 interviews). A total of 3,377 interviews were completed during August 2010 and May 2011. The overall unconditional response rate for Wave 2 was 74%. The conditional response rate of respondents who were interviewed in Wave 1 was 89%.

Since I conduct a longitudinal prospective study of long-term effects of bridging, I utilize health and social network data of 2,201 respondents who were interviewed in both Wave 1 and Wave 2. My independent variable (direct bridging) is drawn from Wave 1. My two dependent variables (self-rated physical and mental health) are drawn from Wave 2, while controlling for Wave 1 variables (sociodemographic controls, network structural characteristics, self-rated physical and mental health).

### *Social Network Data*

NSHAP collected extensive social network data through its in-person questionnaire. Data on individual's egocentric network was collected by the use of name generators where the interviewer asks respondents to name up to five alters that were important to them. The question used to determine the alters in elderly ego network was:

“From time to time, most people discuss things that are important to them with others. For example, these may include good or bad things that happen to you, problems you are having, or important concerns you may have. Looking back over the last 12 months, who are the people with whom you most often discussed things that were important to you?”

For each named alter, the respondents were further asked to identify the context of the relationship, the frequency of contact, and how close they were.

### *Independent Variable: Direct Bridge*

Bridging occurs when the two alters in a respondent's network are not connected, making the respondent the “bridge” between the two alters. I use the social network data from Wave 1(2005) to form my direct bridge variable. From the list of up to five alters (e.g. alter A, alter B, alter C, alter D, alter E) in their social network, respondents are asked about the frequency of

contact between each alter with the other four alters (e.g. alter A and alter B, alter A and alter C, alter A and alter D, alter A and alter E, alter B and alter C, etc.).

The respondent is classified as a “bridge” between the two alters if the two alters are reported as “having never spoken to each other” or talk to each other “less than once a year”. The direct bridge measure ranges from zero to ten since each respondent reports up to five alters, which allows for a maximum of ten unique relationships.

One drawback to this data is the name generator approach used to collect social network information. Such an approach may fail to fully capture the respondent’s bridging activity. Name generator approach in collecting egocentric network data often draws from the respondent a list of recalled alters that are biased towards strong, long-term contacts, who are embedded deeply in the respondent’s core social setting (Marin 2004). This fails to capture the respondent’s peripheral social contacts, where most of the bridging happens. However, NSHAP still remains one the most comprehensive and reliable dataset available for studying the link between elderly social network and health.

*Network Structural Controls: Kin Composition, Closeness to Alter, Frequency of Contact, Number of Alter Pairs*

For controls, I first include basic sociodemographic characteristics such as age, gender, race/ethnicity, education, employment status, and marital status from Wave 1. Since there are potentials for indirect associations between bridging and health (Cornwell 2009), I also control for several network structural characteristics including kin composition, self-rated closeness to alters, frequency of contact with alters, and number of alter-alter pairs from Wave 1. For example, high kin composition, high frequency of contact, and high closeness with network

members will all raise the likelihood that alters in the respondent's network know each other. Thus, lowering the chances that respondents "bridge" between them.

Kin composition is the proportion of kin (by blood or marriage) in the respondent's network. The variable is then divided into tertiles to reduce skewness (lowest tertile=0 to highest tertile=2). Self-rated closeness to alters is the average of respondent's self-reported closeness to each alter ("not very close" = 1 to "extremely close" = 4). Frequency of contact is the average days of contact the respondent had with each alter (range: 2 to 365). Number of alter pairs indicate the number of potential alter-alter relationships in the respondent's network. Number of alter pairs in the respondent's network is also included as a control, since the more alters the respondent has, the higher the respondent's potential for bridging. Correlations among network structural controls are presented in Table 2.

#### *Dependent Variables: Self-rated Physical and Mental Health*

Wave 1 and Wave 2 asked respondents to self-rate their physical and mental health on a five-category scale. Same questions were asked in both waves, which were:

Physical health question: "Would you say your health is excellent, very good, good, fair, or poor?"

Mental health question: "What about your emotional or mental health? Is it excellent, very good, good, fair, or poor?"

I use the above two self-rated measures of physical and mental health from Wave 2 as my dependent variables, while controlling for the same variables from Wave 1. The five categories in each physical and mental health variable was collapsed into a dichotomized variable of "good health"=0 versus "less than good health"=1. This allows the study to explore how each unit

increase in bridging activity impacts the likelihood for elderly adults to develop one health status over the other.

Subjective health assessments such as the one used in NSHAP have consistently proven to be valid health status indicators and predictors of mortality (Idler and Benyamini 1997, Miilunpalo et al. 1997, Mossey and Shapiro 1982).



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