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## Review

# Social network structure and combating social disconnection: Implications for physical health

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Disconnection from one's social network has detrimental links to physical health outcomes, and there has been increased interest in treating social disconnection as a public health issue. Two perspectives guide much of the research on social networks, social disconnection, and physical health. One perspective emphasizes the *quality* of social ties over the *quantity* of social ties, whereas the other emphasizes *quantity* over quality. In this article, we discuss the importance of combining these perspectives to promote forming networks consisting of a few close relationships in addition to some peripheral ties to effectively combat social disconnection and maintain and promote better health. We also highlight important avenues for future research, including identifying critical moderators (e.g., age, culture) and using social network interventions to address issues of causality.

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Decades of research have revealed that the quantity and quality of our social ties are closely linked to physical health, leading social (dis)connection to be advanced as a public health priority [1,2]. *Social disconnection* is a broad term encompassing several experiences, including loneliness; isolation or separation; loss; rejection, exclusion, or ostracism; and feeling detached or disconnected from others [3-4\*]. Scholars have investigated the role of

social network structure in combating social disconnection and potentially improving physical health [5]. However, a question currently unanswered in the literature is what type of social network structure would be most advantageous. In this article, we review two seemingly contradictory perspectives on how to structure social networks to combat social disconnection and promote better health, synthesizing the two perspectives together. We then discuss domains where further research is needed for researchers to capitalize on the potential for social network structure to promote and maintain good health.

**Quality over quantity: benefits of close ties**

One major body of literature suggests that people should prioritize having a few high-quality close relationships over having a greater number of superficial social ties. It is normative for adults—especially older adults—to “prune” their social networks, building smaller and closer networks [6], [7\*\*] [8]. People do this by dropping peripheral, superficial social ties which take more effort to maintain [9,10]. Pruning results in greater life satisfaction and positive emotional experiences without loss of emotional support [6], [7\*\*] [8], and engagement with close social ties (rather than peripheral ties) predicts better pulmonary functioning [11] and lower mortality risk [12].

Close relationships fulfill broad connectedness needs efficiently because close others are more likely to be attachment figures who provide two key health-relevant functions. First, they provide a safe haven from stressful experiences. People are more likely to turn to close (vs. weak) ties for support in times of stress [13\*]. Close others are better equipped to provide more *responsive* support (i.e., support characterized by caring, understanding, and validation) than weaker ties [14]. It is this responsive support (or lack thereof) which is most closely tied to physical health [15,16]. Second, attachment figures serve as a secure base for exploration and growth. Close ties facilitate goal pursuit [17], including health-relevant goals like exercise [18,19]. Furthermore, close ties help us grow (e.g., toward an ideal version of the self [20]) and beliefs that a relationship will provide future self-expansion opportunities predict better ratings of physical health via greater positive affect [21].

Individuals must be careful not to prune their social networks too severely, however, as there are risks associated with overly small social networks. Not all close relationships are positive; in fact, the most common ambivalent social ties (i.e., those involving highly positive *and* highly negative perceptions and behaviors) are close family members [22]. Having more ambivalent ties in a social network predicts heightened cardiovascular disease risk and markers of aging like shortened telomere length [23]. Furthermore, relying solely on a few social ties for all connectedness needs may overwhelm those relationships, especially in times of high stress or socioeconomic disadvantage [24]. In contrast, turning to different close others for different forms of connectedness (e.g., soothing anxiety, celebrating successes) is associated with better well-being than relying on just a few people for all needs [25]. This suggests network diversity may have similar effects on health. Finally, if a network has only a few close ties, the loss of a single network member to death [26] or divorce [27] may decimate connectedness and lead to severe impacts on physical health.

### Quantity over quality: benefits of large networks

Although close relationships are a critically important feature of social networks that contribute to physical health, a competing body of literature suggests that it is better for health to have a larger, more diverse social network containing many weaker or peripheral ties. Larger networks and more frequent interactions with diverse others are associated with better immune, cognitive, and physical functioning [28,29] and lower heart disease risk [30].

This perspective argues that the amount and diversity of social resources obtained from a large social network have important health benefits. When faced with new or unusual problems (e.g., receiving a new diagnosis for Type II diabetes), having a larger network made up of individuals with diverse experiences increases the chances of having someone with similar experiences who can provide information or empathy (e.g., sympathizing about pain from testing glucose levels, suggesting different testing methods to reduce pain [31]). Large social networks can also maintain self-esteem by reassuring individuals of their social value, and higher self-esteem is associated with better health outcomes. In a longitudinal study, Stinson and colleagues [32] showed that having fewer friends predicted drops in self-esteem, which in turn predicted having more health problems. Furthermore, maintaining peripheral relationships encourages individuals to engage in activities that improve cognitive and physical functioning, such as exercise classes or volunteer work [33]. Unlike many marital or family relationships, individuals need to leave the house to interact with peripheral social ties, guaranteeing a basic level of physical activity ([34\*\*]). Finally, having a

larger network ensures for easier transitions when close ties are lost or dropped, as it provides an accessible pool of social ties that might be strengthened to take the place of lost or negative relationships.

As with the “less is more” social network perspective, there are caveats to the benefits of a large social network with many weaker ties. As mentioned above, weaker social ties are effortful to maintain [10] and may be less rewarding. Weaker social ties can promote *social snacking*, interactions that encourage superficial levels of self-disclosure and responsiveness but do not provide the full range and depth of benefits obtained from interactions with closer ties [35,36]. Furthermore, despite a larger number of ties in a network, it is less common for people to seek support from weak ties, hindering necessary support transactions and their health impact [13\*].

### Combining the quality and quantity perspectives

Although these two perspectives on social network structure and physical health may appear contradictory to one another, their mechanisms and caveats have meaningful overlap. It seems that the most adaptive social network for combating disconnection and maintaining and improving physical health consists of a mix of a few close ties and a reasonably-sized—and not too diffuse—collection of weaker, peripheral ties. This structure allows for highly responsive support and personal growth through attachment bonds, but also provides a more diverse network to encourage engagement in a broader array of health-promoting activities. Furthermore, it provides a larger group of people to turn to if close relationships are overwhelmed, unequipped to help with a particular issue, or dissolved.

Combined, these perspectives suggest that close and weak ties operate in complementary ways and improve health through three major channels: Social support, self-esteem, and activity engagement. Close ties are our primary sources of social support [13\*], but weaker ties can provide specialized support in unique or unusual circumstances [31]. Close ties provide opportunities for personal growth [20], while maintaining a large number of weaker ties makes us feel like a desired social partner with high relational value [32]. Both of those processes enhance self-esteem. Finally, both close and weaker ties can promote engagement in activities that fulfil health-relevant goals and improve or maintain physical health [17,33].

One of the first studies comparing the effects of close and peripheral social ties on health revealed evidence for this complementary pattern. Interacting with close ties promoted greater positive mood, whereas interacting with peripheral ties promoted greater physical activity [34\*\*]. Thus, when trying to reduce social disconnection to

promote better health, researchers should not target social tie quantity or quality in isolation, but instead ensure individuals have enough of both represented in their social networks.

### Future research directions

Future research should consider moderators of these effects. Larger, more diffuse social networks are normative in adolescence and early adulthood (i.e., through the twenties [8]). Some studies with these age groups have shown that social interaction quantity is more predictive of health than the quality, but effects of quality strengthen once individuals enter their thirties [37–38\*]. Although social tie quality is still linked to health in adolescence [39], quantity might be especially important in this age group. There are likely cultural differences in the effects of network structure on health as well; for example, Hispanic individuals experience similar levels of support to Non-Hispanic White individuals, but they report valuing this support more, suggesting they may receive more benefits from it [40\*]. Furthermore, individuals facing unique health challenges might benefit from a larger social network that can cater to their more specialized support and activity needs. It is also possible that people with greater support needs (e.g., due to illness) would benefit from a larger social network to ease the caregiving responsibilities that typically fall on and strain their close relationships partners [41].

Within the broad category of close ties, it is unclear whether different types of close relationships (e.g., family, friends, romantic partners) have distinct effects on connectedness and physical health. Early research in this area suggested that it would be difficult to overcome the negative impacts of a low-quality romantic relationship through other social ties [42,43], but recent research suggests that family relationships may be more impactful on health than romantic relationships [44]. Beyond quality and quantity of close ties, scholars should collect information about the types of close ties involved in individuals' social networks to determine if specific relationships have unique or stronger effects.

The health effects of social ties may also depend on the health behaviors enacted by those ties. Social influence and social contagion can have health-promoting or health-undermining effects depending on the beliefs of social network members [45–48]. If our social ties make engaging in health-promoting behaviors seem normative, give us faith that we can control our health-relevant behavior, and directly encourage us to pursue good health, then we are likely to see positive effects. In contrast, when poor health or risky health behaviors are normative in our network and we are pressured to maintain unhealthy habits, social networks may do more harm than good [45–48].

The quality and quantity of social ties are not the only network features worthy of investigation. Network analysis allows for several additional network features to be studied, including network density (i.e., the extent to which contacts are linked directly or indirectly) and centralization (i.e., the extent to which the network is reliant on a few contacts to stay connected) [47]. These types of metrics are related to a wide range of physical and mental health outcomes [47] and should be considered when trying to identify the most efficacious network structure for health.

Finally, a particularly fruitful avenue for future research involves investigating social network interventions. Interventions improving people's social network ties and interactions have shown promise for various health behaviour outcomes (e.g., sexual health, HbA1c, alcohol misuse, and smoking [48]). However, much of the research on social networks and health is correlational, making it difficult to determine the causal direction of these links [5,49]. For example, poor health can make it difficult to engage in activities that help form and maintain relationships [34\*\*], and third variables like neuroticism can undermine both social networks and health [50,51]. Intervention research can establish causality and help identify the most efficient and effective ways to improve connectedness and health. Interventions could also address questions regarding the ideal number of close and peripheral ties, which have been addressed vaguely in the literature thus far.

Social disconnection is a major threat to physical health. However, it can be mitigated with a carefully constructed social network. Extant literature points to the complementary benefits of a few close relationships in addition to some peripheral ties to provide opportunities for support, self-esteem, and activity engagement. Intervention studies and future research testing moderators of these effects are needed to clarify how researchers may maximize the beneficial effects of social network structure for physical health outcomes.

### Conflict of interest statement

Nothing declared.

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