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## Social Isolation and Health

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**Abstract:** Decades of research have examined the relationship between social isolation and health. In this entry, we discuss the impact of social isolation on physical health, mental health, and mortality. We also outline some potential behavioral, psychological, and biological mechanisms behind these relationships. Finally, we discuss some interventions that have been proposed for targeting social isolation.

**Keywords:** Social isolation, loneliness, mental health, physical health

“I don’t know if anyone has noticed, but I only ever write about one thing: being alone. The fear of being alone, the desire to not be alone... the devastation of being left alone. The need to hear the words: You are not alone.”

--Shonda Rhimes, Television writer and producer

What drives a compelling story? What pushes people to tune in each week to watch a story unfold on their televisions? Shonda Rhimes, an award-winning writer, producer, and creator of multiple widely successful television shows such as *Grey’s Anatomy* and *Scandal*, revealed her secret for creating a narrative that millions of people around the world want to follow each week: writing about loneliness. Her answer also tapped into the idea that humans have a “need to belong” – a fundamental need or drive to seek out and maintain social relationships (Baumeister & Leary, 1995). It has been suggested that this desire to connect with others is as essential to our existence as other basic needs such as food, water, and shelter, providing us with advantages for survival (Baumeister, Brewer, Tice, & Twenge, 2007; Baumeister & Leary, 1995).

If being social is such a crucial aspect of being human, then we would expect that not having social relationships would be associated with disadvantages and detrimental outcomes for our health and survival. Indeed, decades of research support the notion that lacking social connections has consequences for physical and mental health, including a significantly higher risk for all-cause mortality. In this chapter, we first briefly discuss measurement issues relevant to social isolation and then highlight health outcomes associated with social isolation. We follow this by a discussion of mechanisms that have

been proposed to explain the relationship between social isolation and health, as well as consideration of interventions to reduce social isolation.

### **Measuring Social Isolation**

Social isolation can be conceptualized in many ways. To assess whether an individual is socially isolated, we could ask whether she is living with other people, how often she gets together with or talks to people, or in how many organizations or social activities (e.g., work, volunteering) she participates. These kinds of measures that tap into an individual's social network size are typically referred to as measures of *objective social isolation*. Thus, someone who lives alone, has few social ties, participates in few social activities, and/or has minimal contact with others would be considered objectively socially isolated.

Rather than asking how many people comprise a person's social network, we could also ask about how satisfied the person is with their network by asking them how connected they feel. We could ask them things like "How often do you feel alone?" or "How often do you feel that your relationships with others are not meaningful?" (Russell, 1996). These subjective feelings of social disconnection, or loneliness, are measures of perceived or *subjective social isolation*.

Loneliness is distress resulting from the discrepancy between what an individual wants out of social relationships and what he or she is receiving (Peplau & Perlman, 1982). For example, people who say they often lack companionship, feel isolated from others, and feel there is no one they can turn to would be considered lonely.

Although these variables are related, they are separable and distinct. For example, it is possible to imagine someone who has only one confidant (and thus may appear socially isolated on objective measures) but feels perfectly content and socially satiated. Conversely, someone may be surrounded by people and participate in numerous social activities but still feel isolated or unsatisfied with these social relationships and thus feel lonely. While it is important to note that social isolation can be measured in numerous ways, this chapter covers the effects of isolation on health regardless of the way it was measured.

### **Impact of Social Isolation on Health**

Starting with Berkman and Syme (1979) and House and colleagues (1982) and continuing through today, decades of work have documented the impact of social isolation on morbidity and mortality. In fact, social isolation is a mortality risk factor comparable to traditional risk factors such as smoking or obesity (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015; Holt-Lunstad, Smith, & Layton, 2010). Interestingly, a recent meta-analysis also found that there was no difference between objective and subjective measures of social isolation in terms of predicting mortality risk (Holt-Lunstad et al., 2015), suggesting that social isolation is a powerful predictor of mortality regardless of how it is measured.

In addition to mortality, social isolation is related to lower levels of self-rated physical health (Cornwell & Waite, 2009), risk of cardiovascular disease (Caspi, Harrington, Moffitt, Milne, & Poulton, 2006), elevated blood pressure (Hawkey, Thisted, Masi, & Cacioppo, 2010), risk of poor outcomes post-stroke

(Boden-Albala, Litwak, Elkind, Rundek, & Sacco, 2005), metabolic syndrome (Horsten, Mittleman, Wamala, Schenck-Gustafsson, & Orth-Gomér, 1999), increased frequency of doctor visits (Qualter et al., 2013), and functional decline and disability (Perissinotto, Cenzer, & Covinsky, 2012).

There are also many associations between social isolation, in particular subjective social isolation or loneliness, and mental health. Loneliness is associated with depressive symptoms (J. T. Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006), suicidal ideation (Stravynski & Boyer, 2001), social anxiety (Anderson & Harvey, 1988), substance abuse (Åkerlind & Hörnquist, 1992), eating disorders (Coric & Murstein, 1993), and psychosis (Deniro, 1995). Loneliness is also related to poorer cognitive performance (J. T. Cacioppo & Hawkley, 2009), cognitive decline (Shankar, Hamer, McMunn, & Steptoe, 2013), and increased risk of Alzheimer's Disease (Wilson et al., 2007).

### **Potential Mechanisms**

Overall, social isolation is associated with a wide array of mental and physical health issues, as well as mortality. Many mechanisms have been proposed to explain the relationship between social isolation and adverse health outcomes. We briefly outline some of the theorized behavioral, psychological, and biological mechanisms below. Although we discuss these mechanisms separately for ease of presentation, in reality one mechanism is unlikely to fully explain the complex relationships between social isolation and health. These proposed pathways, along with other mechanisms not mentioned here, likely interact with and build off each other.

### *Behavioral*

Health behaviors have been discussed as potential pathways through which social isolation can impact health (Hawkley & Cacioppo, 2010; Taylor, 2011; Thoits, 2011). For example, friends and family can help individuals start and maintain healthy habits, and they can also provide meaning in life, which can have a positive impact on health behaviors (Thoits, 2011). Socially isolated individuals may thus be at risk for poor health outcomes in part because they are lacking a significant source of modeling of good health behaviors and a sense of purpose related to having close relationships.

Additionally, loneliness may impair executive control and self-regulation (Hawkley & Cacioppo, 2010), which could have a direct impact on health behaviors such as substance use, physical activity, and eating behavior. Indeed, social isolation is related to smoking and drinking more (Broman, 1993), and there also appears to be a relationship between loneliness and alcohol abuse (Åkerlind & Hörnquist, 1992). In addition to substance use, loneliness is related to obesity. Lonely individuals are more likely to be overweight than non-lonely individuals (Lauder, Mummery, Jones, & Caperchione, 2006). Furthermore, feeling disconnected can also impair self-control over eating behavior (Baumeister, DeWall, Ciarocco, & Twenge, 2005), and loneliness is predictive of reductions in physical activity (Hawkley, Thisted, & Cacioppo, 2009).

Sleep is another behavior that may be a potential mechanism through which social isolation can impact health. Loneliness is related to poor sleep quality throughout the lifespan (reviewed in Hawkley & Capitano, 2015), and it is

also associated with fatigue and low energy (Hawkley, Preacher, & Cacioppo, 2010; Jaremka, Fagundes, Glaser, et al., 2013). Given the importance of sleep for health and mortality (Irwin, 2015), this may be another behavior that may partially explain the social isolation-health association.

### *Psychological*

Many potential psychological mediators of the social ties-health link have also been proposed (Hawkley & Cacioppo, 2010; Thoits, 2011; Uchino, Bowen, Carlisle, & Birmingham, 2012). One psychological mechanism that has been proposed is maladaptive social cognition. That is, lonely individuals may have certain social cognitive biases, such as generally seeing the world as a more socially threatening place, which may set off a vicious, self-feeding cycle of psychobiological reactions that may ultimately contribute to poor health outcomes (Hawkley & Cacioppo, 2010). Socially isolated individuals may also lack the sense of purpose or meaning in life that is provided by social connection, which can lead to impairments in psychological well-being and physical health (Thoits, 2011). Those who are isolated may also lack socially supportive others who may “buffer” the impact of stressful life events on well-being and health (Cohen & Wills, 1985).

Besides these mechanisms, some other proposed psychological mediators explaining the impact of social isolation on health include positive affect, social influence, self-efficacy, and self-esteem (Thoits, 2011; Uchino et al., 2012). However, some have found that existing models of psychological mechanisms linking social ties to health are generally not supported by evidence

(Uchino et al., 2012), indicating that there is still room for further research to better understand the psychological pathways that may underlie the social isolation-health link.

### *Biological*

Numerous biological pathways have also been proposed to explain the effect of social isolation on health (Eisenberger & Cole, 2012; Hawkey & Cacioppo, 2010; Thoits, 2011; Uchino et al., 2012). For example, lonely individuals have immune system impairments (Glaser, Kiecolt-Glaser, Speicher, & Holliday, 1985; Pressman et al., 2005), suggesting that immune alterations may be one pathway through which loneliness operates to damage health.

Inflammation, the body's first line of defense against infection or injury, is one potential immunological process through which loneliness may exert its effects. Inflammatory processes are implicated in a wide array of physical and mental health conditions (Coussens & Werb, 2002; Finch, 2007; Haffner, 2006; Hansson, 2005), as well as mortality (Collaboration, 2010). Lonely individuals have increased pro-inflammatory reactivity (Jaremka, Fagundes, Peng, et al., 2013), as well as up-regulated pro-inflammatory gene expression (Cole et al., 2007). This heightened inflammatory activity in lonely individuals indicates that inflammation may be mediating some of the effects of social isolation on health. Interestingly, inflammation can also lead to feelings of social disconnection (Eisenberger, Inagaki, Mashal, & Irwin, 2010; Moieni et al., 2015), suggesting that inflammation and loneliness may engage in a dangerous, mutually reinforcing cycle.

Related to inflammation, loneliness may also operate through neuroendocrine pathways. For example, lonely individuals have impairments related to the hypothalamus-pituitary-adrenal (HPA) axis, including increased levels of cortisol (Adam, Hawkley, Kudielka, & Cacioppo, 2006; Doane & Adam, 2010; Kiecolt-Glaser et al., 1984; Steptoe, Owen, Kunz-Ebrecht, & Brydon, 2004). Chronic social isolation may also lead to glucocorticoid insensitivity (Cole et al., 2007; Hawkley & Cacioppo, 2010), inhibiting the ability of cortisol to have an anti-inflammatory effect.

Finally, neural mechanisms have also been proposed to mediate the social isolation-health link. A set of neural regions which are involved in threat detection, including the amygdala, dorsal anterior cingulate cortex (dACC), anterior insula, and periaqueductal gray, are thought to play a role in the relationship between social isolation and health (Eisenberger & Cole, 2012). These regions may serve as a neural alarm system to detect social threat (e.g., social isolation, social exclusion), and in turn, activation of these regions may have an impact on HPA and sympathetic nervous system activity, ultimately impacting health. For example, social exclusion or rejection activates the dACC and anterior insula (Eisenberger, 2015; Eisenberger, Lieberman, & Williams, 2003). Activation of these neural regions is related to both heightened inflammation (Slavich, Way, Eisenberger, & Taylor, 2010), which is involved in many physical and health disorders, and cortisol (Wang et al., 2005), a hormone involved in the body's stress response.

While the existing evidence lends support to these particular biological mechanisms, more work is needed to flesh out the details of these pathways, as well as how they may interact with behavioral and psychological processes, to impact health.

## **Interventions**

Given the influence of social isolation on health, it is not surprising that multiple types of interventions targeted at reducing social isolation have been conducted. Interventions have included offering social skills training, social cognitive training, mind-body interventions, opportunities for social contact or activities, or social support programs. The mode of delivery has ranged from group interventions to one-on-one interventions, from in-person to online, and lasting from a few weeks to multiple years. There have been multiple reviews on this topic (e.g., Dickens, Richards, Greaves, & Campbell, 2011; Masi, Chen, Hawkey, & Cacioppo, 2010), so we will highlight a few examples of effective interventions that have been tested using randomized trials.

One type of intervention that has shown positive effects on social isolation are those promoting social support and social activities. In one study, older adults who were randomly assigned to an intervention intended to increase peer support and social activity showed decreases in social isolation (Routasalo, Tilvis, Kautiainen, & Pitkala, 2009); those in the intervention group became more socially active and found new friends significantly more often than the control group. However, the intervention did not lead to decreases in loneliness or increases in social network size. Other interventions have examined the effect of

animal-assisted therapy to increase socialization and decrease loneliness (Banks & Banks, 2002; Banks, Willoughby, & Banks, 2008). Participants who were randomly assigned to the animal-assisted therapy group (i.e., regular visits from a dog) showed decreases in loneliness (Banks & Banks, 2002).

Another type of intervention that has shown promise for reducing loneliness is social cognitive training (Masi et al., 2010). For example, one study examined the effect of “reminiscence therapy” (vs. a wait-list control) on loneliness in nursing home patients (Chiang et al., 2010). Over the course of 8 weeks, those in the therapy condition participated in activities such as discussing how to be more aware and expressive of feelings, identifying positive social relationships, and recalling family history and life stories; those in this condition showed improvements in loneliness. Although these interventions have shown promise in reducing feelings of isolation, additional studies examining the effect of this type of intervention, particularly in different samples (e.g., isolated adolescents) are still needed.

Creswell et al. (2012) took yet another approach, examining the effect of a mindfulness-based stress reduction (MBSR) training on loneliness in older adults. They found that an 8-week MBSR program, compared to a wait-list control, led to reductions in loneliness, as well as reductions in pro-inflammatory gene expression. This finding suggests that other mind-body interventions may be successful in reducing loneliness, as well as biological mechanisms such as inflammation that may be driving some of the health effects associated with social isolation.

Indeed, there is certainly room to develop additional targeted interventions addressing social isolation based on these kinds of successful interventions. Some have suggested that interventions that incorporate some sort of social cognitive training are likely to be the most effective (S. Cacioppo, Grippo, London, Goossens, & Cacioppo, 2015; Masi et al., 2010), while others have found that interventions with a social activity or social support component, and delivered at a group level (compared to one-on-one), may be the most effective (Dickens et al., 2011). Still others have suggested tailoring new interventions for particular developmental stages and thus focusing interventions on aspects of social isolation that are most important across different times of the lifespan (Qualter et al., 2015). Overall, it appears that testing new evidence-based interventions, particularly using randomized trials, is an important area for future research in this field.

## **Conclusion**

In summary, social isolation has detrimental effects on a wide range of physical and mental health problems, as well as mortality. Numerous mechanisms have been proposed for the relationship between social isolation and health, but future work is needed to more fully flesh out these pathways. Finally, some interventions aimed at decreasing social isolation have been successful. However, given that social isolation can have such a powerful influence on our physical health and well-being, developing new low-cost, effective, and easy-to-implement interventions is an important area for further research that could ultimately have significant public health implications.

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