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Notes

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2. This term comes from the structures involved in the secretion of so-called stress hormones. During a stress response, the brain's hypothalamus (H) releases a chemical that affects the pituitary gland (P). The pituitary then secretes a hormone that causes the adrenal glands (A) to release corticosteroids (cortisol in humans, corticosterone in rodents) into the bloodstream.

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Critical Thinking Questions

1. What is psychoneuroimmunology and how does it overturn an assumption long held within the medical community?
2. Briefly describe a study in which immune system activity was classically conditioned.
3. What evidence is there for the correlation between stress, immune system activity, and illness? What is the clinical significance of these associations?

Social Support, Physiological Processes, and Health

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Abstract

Social relationships serve important functions in people's everyday lives. Epidemiological research indicates that supportive relationships may also significantly protect individuals from various causes of mortality, including cardiovascular disease. An important issue is how social support influences such long-term health outcomes. In this article, we review evidence indicating that social support may influence mortality via changes in the cardiovascular, endocrine, and immune systems. These data suggest that it may be worthwhile to incorporate social-support interventions in the prevention and treatment of physical health problems.

Keywords

social support; cardiovascular function; immune function; health

Relationships with others form a ubiquitous part of people's everyday lives. In the classic analysis by Durkheim (1897/1951), suicide rates were higher among individuals who were less socially integrated than among those who had many social ties. The loneliness and despair that characterize a lack of social connections may be responsible for such unfortunate outcomes. Less obvious, however, is the possibility that individuals with poor relationships may also be more at risk for physical illnesses, such as cardiovascular disease, cancer, or infectious diseases. Is there evidence that such an association exists? If so, how is it that social relationships influence such disease processes?

The answer to the first question is relatively well documented. A review of large prospective studies comparing groups with differing degrees of social integration found that less socially integrated individuals had higher mortality rates from all causes, including cardiovascular mortality (House, Landis, & Umberson, 1988). In fact, the evidence linking social relationships to mortality was comparable to the evidence linking standard risk factors such as smoking and physical activity to mortality. What is less known is the answer to the second question, that is, how social relationships influence such long-term health outcomes. In this article, we review the evidence linking positive aspects of social relationships (i.e., social support) to physiological processes. These associations are helping us to understand how relationships may influence physical health outcomes such as cardiovascular disease.

HOW MIGHT RELATIONSHIPS INFLUENCE PHYSICAL HEALTH OUTCOMES?

Relationships serve important functions. For instance, most people can recall times when others made a difference in their lives by giving good advice (infor-

ma...ial support): helping them feel better about themselves (emotional support); directly providing aid, such as money (tangible support); or just "hanging out" with them (belonging support). The actual or perceived availability of these helpful behaviors by others is broadly defined as social support.

Figure 1 depicts a simplified model of how social support might influence physical health outcomes (see Cohen, 1988, for a detailed model). The major pathway depicted in the top portion of the figure suggests that social support may be beneficial because it protects individuals from the deleterious behavioral and physiological consequences of stress. In theory, social support may decrease how stressful an individual finds an event to be. For instance, a person who has supportive ties may experience less job stress because close others provide helpful information or reaffirm other aspects of that person's life (e.g., familial role). The decreased stress appraisal may in turn influence psychological processes such as negative mood states, feelings of personal control, and self-esteem. These psychological processes are thought to influence the cardiovascular, endocrine, and immune systems, with implications for relevant disease outcomes (Kiecolt-Glaser & Glaser, 1995). For instance, over the long term, alterations in cardiovascular function (e.g., heart rate) may influence cardiovascular disorders such as high blood pressure, whereas a decrease in immune function may have implications for cancer and infectious diseases. However, even when individuals are not encountering stressful life events, it is possible that social support may affect physiological processes by directly influencing the psychological processes of self-esteem, feelings of personal control, and negative mood states. For instance, simply being in the company of close friends may elevate one's mood.

An additional pathway by which social support may be linked to physical health outcomes is through the modification of health behaviors, such as smoking, exercise, and diet (Umberson, 1987), that in turn influence relevant physiological processes (e.g., exercise decreases blood pressure). There are several ways in which social support may influence health behaviors. First, higher levels of stress have been linked to poorer health behaviors (Kiecolt-Glaser & Glaser, 1995). Social support may facilitate better health behaviors because it decreases the amount of stress that an individual experiences. Second, social support may

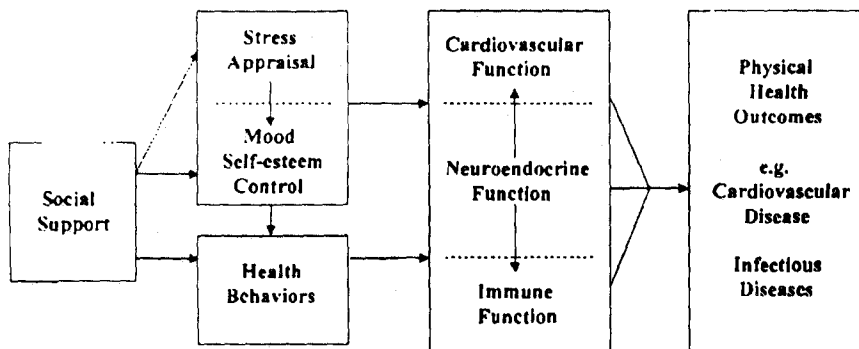


Fig. 1. Simplified model of how social support may influence physical health outcomes. Dotted lines within the boxes separate distinct pathways within the various systems.

directly motivate individuals to engage in more healthy practices. For instance, close family members may place pressures on an individual to exercise or stop smoking. It is also possible that having adequate social support communicates the fact that one is loved, and this may lead to better health behaviors by increasing the motivation to care for oneself.

IS SOCIAL SUPPORT RELATED TO PHYSIOLOGICAL PROCESSES?

The model shown in Figure 1 indicates that social support ultimately influences health outcomes via relevant biological pathways. In a recent review, we examined the evidence linking social support to physiological processes that might influence disease risk (Uchino, Cacioppo, & Kiecolt-Glaser, 1996). In particular, we focused on the cardiovascular, endocrine, and immune systems as potential pathways by which social support might influence health.

Most of the studies we examined investigated the association between social support and cardiovascular function. There were more than 50 such studies and most focused on blood pressure. Blood pressure is an important variable because over time, elevations in blood pressure can be a risk factor for cardiovascular diseases. In fact, there is increasing concern about the potential risk of elevated blood pressure even below the range that is normally considered hypertensive (MacMahon et al., 1990). Overall, we found in our review of studies that individuals with high levels of social support had lower blood pressure than individuals with lower levels of social support.

It is noteworthy that there was also evidence linking social support to better blood pressure regulation in hypertensive patients. Most of these studies were interventions that utilized the patient's spouse as a source of support to help the patient control his or her blood pressure. These intervention studies provide direct evidence for the health relevance of social support and suggest that recruiting familial sources of support may be a particularly effective (and cost-effective) intervention strategy.

Finally, recent studies suggest that social support can reduce the magnitude of cardiovascular changes during stressful circumstances, a finding consistent with the model in Figure 1. For instance, Gerin, Pieper, Levy, and Pickering (1992) compared physiological reactivity of subjects who participated in a debate task when a supportive person (an individual who agreed with the participant) was or was not present. The presence of the supportive person was associated with lower blood pressure and heart rate changes during the task. The ability of social support to reduce cardiovascular changes during stress is important because it has been hypothesized that heightened physiological reactivity to stress may increase the risk for the development of cardiovascular disorders (Manuck, 1994). The finding of lowered cardiovascular reactivity when social support is available may also have implications for individuals who have existing cardiovascular disease, as heightened cardiovascular changes when psychological stressors are experienced can induce a temporary imbalance of oxygen supply and demand in the heart (Krantz et al., 1991). This imbalance can lead to potentially dangerous cardiac conditions in such at-risk populations.

In our review of the literature, we also examined 19 studies that tested the possibility that social support may be related to aspects of immune function. An

association between social support and immunity would be important because the immune system is responsible for the body's defense against infectious and malignant (cancerous) diseases. In general, the available studies suggest that social support is related to a stronger immune response. For instance, natural killer cells are an important line of defense against virus-infected and some tumor cells. In our review, several studies found that individuals with high levels of social support had stronger natural killer cell responses (i.e., ability to kill susceptible tumor cells) than individuals with lower levels of social support.

The associations between social support and immune function are consistent with the results of a recent study by Cohen, Doyle, Skoner, Rabin, and Gwaltney (1997), who examined whether social support predicted susceptibility to the common-cold virus. In this study, consenting participants were directly exposed to common-cold viruses (i.e., via nasal drops) and quarantined for 5 days. Individuals who had more diverse social networks (i.e., relationships in a variety of domains, such as work, home, and church) were less likely to develop clinical colds than individuals with less diverse networks. The authors discussed the possibility that having a diverse social network may be particularly beneficial as support may be obtained from a variety of sources.

It is important to note that many of the studies that found an association between social support and immune function were conducted with older adult populations. Aging is associated with decreased immunity, and infectious diseases are a major source of morbidity and mortality in older adults. Thus, the lowered immune function in older individuals with low social support may be a finding with particular health relevance.

One important way in which social support may influence the immune system is via the release of endocrine hormones. Environmental factors such as stress can lead to the release of hormones (i.e., catecholamines and cortisol) that in turn influence the immune system. This is possible because many cells of the immune system have hormone receptors that can augment or inhibit the cells' function when activated by specific endocrine hormones. Unfortunately, there is not much research examining if social support is related to endocrine function. However, preliminary evidence from the MacArthur studies of successful aging suggests that higher levels of social support may be linked to lower levels of catecholamines and cortisol in men (Seeman, Berkman, Blazer, & Rowe, 1994). These data are consistent with the research linking social support to alterations in the cardiovascular system because endocrine hormones such as catecholamines directly influence cardiovascular function.

CONCLUSIONS

The available evidence is consistent with the possibility that social support may influence physical health outcomes via relevant physiological processes. What is less clear in this literature is exactly how these changes occur. As shown in Figure 1, there are a number of potential pathways, including changes in negative mood states or health behaviors, but direct evidence bearing on the validity of these pathways is presently lacking. A few studies we reviewed did look for a health-behavior pathway, along with psychological pathways involving depression and perceived stress. Although preliminary, these studies found that

these factors could not account for the association between social support and physiological function. Unfortunately, many of these studies utilized cross-sectional designs that provide a less sensitive test of the pathways linking social support to physiological function than do longitudinal designs. This point underscores the importance of conducting longitudinal studies that examine how these dynamic processes involving social support, physiology, and actual health outcomes unfold over time.

An additional issue that warrants further attention is the conditions under which social relationships are most beneficial. Not all close relationships are uniformly positive (consider, e.g., marital conflict). This is an important consideration because negative interactions can interfere with effective social support. In addition, having many supportive friends and family could be beneficial, but it may also entail obligations to be a support provider. At least in some circumstances, being a support provider can be a significant source of stress (e.g., the demands of caregiving activities). These issues highlight the importance of investigating how the relative balance of positive and negative aspects of close relationships influences physiological function and subsequent health outcomes.

Overall, however, we believe that the research reviewed has significant implications for present notions of health and well-being. Would it be possible to utilize this research in combination with standard medical approaches in preventing and treating physical disease? Several interventions suggest the promise of such an approach. Spiegel, Bloom, Kraemer, and Gottheil (1989) found that breast cancer patients randomly assigned to a support group lived almost twice as long as patients simply given routine oncological care. There is also indirect evidence of beneficial effects from general psychosocial interventions that include social-support intervention (Linden, Stossel, & Maurice, 1996). For instance, Fawzy et al. (1993) evaluated the effects of a 6-week structured group intervention that provided education, problem-solving skills, stress management, and social support to cancer patients. A 6-year follow-up revealed that only 9% of individuals in the structured group intervention had died, compared with 29% of individuals in the no-intervention condition. These studies suggest the potential promise of future interventions aimed at utilizing social relationships to promote positive health outcomes.

Recommended Reading

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Note

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Critical Thinking Questions

1. Briefly describe the model presented in Figure 1. According to this model, how does social support relate to physical health?
2. What empirical evidence is there for the protective benefits of social support?
3. The authors suggest that social relationships may be more beneficial to health under some circumstances than others. What do they have in mind?