

BRIEF REPORTS

Being Popular Can Be Healthy or Unhealthy: Stress, Social Network Diversity, and Incidence of Upper Respiratory Infection

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Diverse social contacts are generally associated with better health. However, diverse contacts can increase exposure to infectious agents. This should increase risk for disease, particularly among those whose host resistance is otherwise compromised (e.g., stressed individuals). In this prospective study, healthy college students who completed questionnaires assessing social network diversity and stressful life events were subsequently interviewed weekly for 12 weeks to track incidence of upper respiratory infections (URIs). URI episodes were defined by a symptom criterion and by clinically verified self-reported illness. Stress and diversity of social contacts interacted; diversity was associated with more illnesses among those with more stressful life events and slightly fewer illnesses among those with fewer stressful life events. Associations remained after controlling for neuroticism.

Key words: stress, life events, social networks, upper respiratory infection

The hypothesis that multiple ties to friends, family, work, and community are beneficial in terms of physical health has gained substantial support recently. Particularly provocative is epidemiologic evidence that those who have more diversified social networks—that is, people who are married; people who interact with family members, friends, neighbors, and fellow workers; and people who belong to social and religious groups—live longer (House, Landis, & Umberson, 1988), are more likely to survive myocardial infarction (Berkman, 1995), and are less likely to suffer a recurrence of cancer (Helgeson, Cohen, & Fritz, 1998) than their counterparts with fewer types of social relationships. A study of host resistance to upper respiratory infections (URIs) found that

persons with more diverse networks were less likely to develop a cold when they were experimentally exposed to a cold-causing virus (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997). Even so, having a diverse social network may not always be a good thing. For example, it is likely that diverse social networks are associated with face-to-face contact with a broad range of people and hence an increased risk of exposure to a range of infectious agents.

Several studies provide support for increased numbers of URIs with increased exposure to others. Dingle, Badger, and Jordan (1964) found that individuals from larger families averaged more physician-verified colds per year than people from smaller families. Graham, Woodward, Ryan, and Douglas (1990) found that children prone to respiratory illness were more likely to attend day care, have siblings less than 14 years of age, and have mothers who regularly attended social or religious meetings. In a prospective study, Clover, Abell, Becker, Crawford, and Ramsey (1989) found that individuals from families reporting high levels of cohesion (emotional bonding) were more likely than their less-enmeshed counterparts to experience an incidence of laboratory-documented influenza B infection. The authors suggested that families reporting low cohesion levels may have touched less, kissed less, and shared eating and drinking utensils less, thus minimizing their viral exposure.

It is likely that the exposure effects of social contact occur primarily among vulnerable members of the population—those whose host resistance to infectious agents is otherwise compromised. Because psychological stress is associated with compromised host resistance to viral infectious illness (e.g., Cohen, Tyrrell, & Smith, 1991; Stone et al., 1992), those with elevated stress levels should be particularly susceptible to the increased risk of exposure associated with social diversity. Although there have

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been no direct studies of the interaction of social diversity and stress in predicting URIs, two studies have investigated the interaction between stress and support network size. In the first (DeLongis, Folkman, & Lazarus, 1988) study, participants reported the number of people whom they perceived as sources of emotional support. Participants also rated their hassles and somatic symptoms (primarily URI symptoms) daily for 20 days. The greater the number of people in one's support network, the greater was the within-subject association between same-day increases in both hassles and physical symptoms. In a second study, Turner Cobb and Steptoe (1996) assessed the number of people that participants could count on for social support and then monitored participants daily for 15 weeks to track and verify URI (by signs of illness). After the follow-up period, participants retrospectively reported distress from life events occurring during the follow-up. Under low stress, those reporting smaller support networks were more likely to experience a URI episode than those with larger networks. Under high stress, this advantage disappeared—illness risk for those with larger networks rose to the same level as those with smaller networks.

These studies provide a hint about the relationship between social networks and risk for URI among vulnerable people, but they are limited. This is so primarily because, although the number of supportive others provides a rough estimate of exposure, this type of social contact index is limited to supportive network members and usually confined to few close social domains (e.g., family, friends). People are often in close physical contact with many nonsupportive people and also interact in domains not tapped by support network questionnaires (e.g., church or sports). Whereas the Turner Cobb and Steptoe (1996) study had a clean URI assessment, the DeLongis et al. (1988) study included other psychosomatic symptoms such as backache and swollen ankles and may not have been addressing (they did not claim to) URI at all. Neither the DeLongis et al. study nor the Turner Cobb and Steptoe study assessed stressful events prospectively. This leads to the possibility that stressful events (or reports) might be affected by earlier illness. For example, those with larger networks who were ill might have been more likely to have interpersonal conflicts, or to perceive they did, clouding interpretation of the results.

The study reported here is prospective, with stress and network diversity assessed in healthy people before the 12-week URI-tople,leie,healekTur-weekhsweeksmaller-301ew1-386.01ew1di-40rehe 01ew1d,

to be consensually negative, and the respondent was not asked to provide an impact rating. A negative life-events score was derived for each participant by adding the number of events they reported that were negative (either consensual or participant rated). Because the distribution was substantially skewed, we coded events as below or above the median number of events (two events).

Social network diversity. The Social Network Index (Cohen et al., 1997) assesses participation in 12 types of social relationships. These include relationships with a spouse, parents, parents-in-law, children, other close family members, close neighbors, friends, workmates, schoolmates, fellow volunteers (e.g., charity or community work), members of groups without religious affiliations (e.g., social, recreational, or professional), and members of religious groups. One point is assigned for each relationship (possible score of 12) for which respondents indicate that they speak (in person or on the phone) to someone in that relationship at least once every 2 weeks.

Neuroticism. Neuroticism has been directly associated with reports of stress levels and reports of symptoms without a physiological basis (e.g., Cohen & Williamson, 1991; Pennebaker, 1982). Because we relied on participant reports of stress and participant judgment to determine when they were sick, we statistically controlled for the effect of neuroticism on reported URI occurrence. We assessed neuroticism during the laboratory visit with the 10-item Neuroticism subscale from the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1964). Responses were summed, yielding a neuroticism score ranging from 0–10. This scale was found to be moderately reliable ($\alpha = .67$).

Standard demographic control variables. Age was scored as a continuous variable. Sex was scored as a dichotomous variable. Race was

that earlier work focused on the size of support networks, whereas our analyses are based on a broader concept of network contact that includes supporters and nonsupporters alike. We find it interesting that, in theory, diverse networks represent a greater risk than more narrow (e.g., support) ones because they involve interaction

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