Social Connection and Well-Being—Selected Research

“Social relationships and physiological determinants of longevity across the human life span,” Yang Clair Yang, et al

ABSTRACT: Two decades of research indicate causal associations between social relationships and mortality, but important questions remain as to how social relationships affect health, when effects emerge, and how long they last. Drawing on data from four nationally representative longitudinal samples of the US population, we implemented an innovative life course design to assess the prospective association of both structural and functional dimensions of social relationships (social integration, social support, and social strain) with objectively measured biomarkers of physical health (C-reactive protein, systolic and diastolic blood pressure, waist circumference, and body mass index) within each life stage, including adolescence and young, middle, and late adulthood, and compare such associations across life stages. We found that a higher degree of social integration was associated with lower risk of physiological dysregulation in a dose–response manner in both early and later life. Conversely, lack of social connections was associated with vastly elevated risk in specific life stages. For example, social isolation increased the risk of inflammation by the same magnitude as physical inactivity in adolescence, and the effect of social isolation on hypertension exceeded that of clinical risk factors such as diabetes in old age. Analyses of multiple dimensions of social relationships within multiple samples across the life course produced consistent and robust associations with health. Physiological impacts of structural and functional dimensions of social relationships emerge uniquely in adolescence and midlife and persist into old age.

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Background: The quality and quantity of individuals' social relationships has been linked not only to mental health but also to both morbidity and mortality.

Objectives: This meta-analytic review was conducted to determine the extent to which social relationships influence risk for mortality, which aspects of social relationships are most highly predictive, and which factors may moderate the risk.

Data Extraction: Data were extracted on several participant characteristics, including cause of mortality, initial health status, and pre-existing health conditions, as well as on study characteristics, including length of follow-up and type of assessment of social relationships.

Results: Across 148 studies (308,849 participants), the random effects weighted average effect size was OR = 1.50 (95% CI 1.42 to 1.59), indicating a 50% increased likelihood
of survival for participants with stronger social relationships. This finding remained consistent across age, sex, initial health status, cause of death, and follow-up period. Significant differences were found across the type of social measurement evaluated ($p<0.001$); the association was strongest for complex measures of social integration (OR $= 1.91$; 95% CI 1.63 to 2.23) and lowest for binary indicators of residential status (living alone versus with others) (OR $= 1.19$; 95% CI 0.99 to 1.44).

**Conclusions:** The influence of social relationships on risk for mortality is comparable with well-established risk factors for mortality.

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**Objective:** This study assessed the moderating role of 2 types of confidante relationships in mitigating the negative health impact of transitions involving spousal loss in late life (widowhood and divorce/separation).

**Method:** The sample included 707 respondents who participated in the 1992 and 2004 waves of the Wisconsin Longitudinal Study (WLS, 2007) all of whom were married at Time 1 and by Time 2 experienced either an end of the marriage resulting from widowhood or divorce/separation or remained continuously married to the same spouse. The majority of the sample was female ($n = 457$) and 64.3 years old on average. Three indicators of physical health were examined, including somatic depressive symptomatology, self-rated health, and number of sick days in the preceding year.

**Results:** Moderated regression analyses showed that the availability of a friend as confidante at Time 2 played a significant moderating role in the link between marital transitions and health outcomes, buffering the health impact of widowhood. Specifically, among those who became widowed between the 2 waves, those who had available a friend as confidante at Time 2 reported significantly lower somatic depressive symptoms, better self-rated health, and fewer sick days in bed during the preceding year than those who reported not having a friend as confidante. No support was obtained for the moderating role of having a family member as confidante at Time 2 in the link from marital transitions to health.

**Conclusions:** These results highlight the need to develop means to maintain and enhance confiding friendships among widowed older adults.

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“Loneliness is a Major Health Risk for Older Adults,” summary of talk by psychologist John Cacioppo at American Association for the Advancement of Science, Feb. 2014. Research by Cacioppo and his colleagues has identified three core dimensions to healthy relationships: intimate connectedness, which comes from having someone in your life you feel affirms who you are; relational connectedness, which comes from having face-to-face contacts that are mutually rewarding; and collective connectedness, which comes from feeling that you’re part of a group or collective beyond individual existence.


**Study objectives:** To examine if social networks with children, relatives, friends, and confidants predict survival in older Australians over 10 years after controlling for a range of demographic, health, and lifestyle variables.

**Design:** The Australian longitudinal study of aging

**Participants:** 1477 persons aged 70 years or more living in the community and residential care facilities.

**Main results:** After controlling for a range of demographic, health, and lifestyle variables, greater networks with friends were protective against mortality in the 10 year follow up period. The hazard ratio for participants in the highest tertile of friends networks compared with participants in the lowest group was 0.78 (95%CI 0.65 to 0.92). A smaller effect of greater networks with confidants (hazard ratio = 0.84; 95%CI = 0.71 to 0.98) was seen. The effects of social networks with children and relatives were not significant with respect to survival over the following decade.

**Conclusions:** Survival time may be enhanced by strong social networks. Among older Australians, these may be important in lengthening survival.

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“Loneliness in Older Persons A Predictor of Functional Decline and Death,”

https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/1188033

**Abstract**

**Background** Loneliness is a common source of distress, suffering, and impaired quality of life in older persons. We examined the relationship between loneliness, functional decline, and death in adults older than 60 years in the United States.

**Methods** This is a longitudinal cohort study of 1604 participants in the psychosocial module of the Health and Retirement Study, a nationally representative study of older persons. Baseline assessment was in 2002 and follow-up assessments occurred every 2 years until 2008. Subjects were asked if they (1) feel left out, (2) feel isolated, or (3) lack companionship. Subjects were categorized as not lonely if they responded hardly ever to all 3 questions and lonely if they responded some of the time or often to any of the 3 questions. The primary outcomes were time to death over 6 years and functional decline over 6 years on the following 4 measures: difficulty on an increased number of activities of daily living (ADL), difficulty in an increased number of upper extremity tasks, decline in mobility, or increased difficulty in stair climbing. Multivariate analyses adjusted for
demographic variables, socioeconomic status, living situation, depression, and various medical conditions.

**Results** The mean age of subjects was 71 years. Fifty-nine percent were women; 81% were white, 11%, black, and 6%, Hispanic; and 18% lived alone. Among the elderly participants, 43% reported feeling lonely. Loneliness was associated with all outcome measures. Lonely subjects were more likely to experience decline in ADL (24.8% vs 12.5%; adjusted risk ratio [RR], 1.59; 95% CI, 1.23-2.07); develop difficulties with upper extremity tasks (41.5% vs 28.3%; adjusted RR, 1.28; 95% CI, 1.08-1.52); experience decline in mobility (38.1% vs 29.4%; adjusted RR, 1.18; 95% CI, 0.99-1.41); or experience difficulty in climbing (40.8% vs 27.9%; adjusted RR, 1.31; 95% CI, 1.10-1.57). Loneliness was associated with an increased risk of death (22.8% vs 14.2%; adjusted HR, 1.45; 95% CI, 1.11-1.88).

**Conclusion** Among participants who were older than 60 years, loneliness was a predictor of functional decline and death.

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“Loneliness triggers cellular changes that can cause illness, study shows”
University of Chicago Press release November 23, 2015

Loneliness is more than a feeling: For older adults, perceived social isolation is a major health risk that can increase the risk of premature death by 14 percent. Researchers have long known the dangers of loneliness, but the cellular mechanisms by which loneliness causes adverse health outcomes have not been well understood. Now a team of researchers, including UChicago psychologist and leading loneliness expert John Cacioppo, has released a study shedding new light on how loneliness triggers physiological responses that can ultimately make us sick.

The paper, which appears Nov. 23 in the *Proceedings of the National Academy of Sciences*, shows that loneliness leads to fight-or-flight stress signaling, which can ultimately affect the production of white blood cells.

Along with Cacioppo, the research team includes Steven W. Cole of UCLA and John P. Capitanio of the California National Primate Research Center at the University of California, Davis. The study examined loneliness in both humans and rhesus macaques, a highly social primate species.

Previous research from this group had identified a link between loneliness and a phenomenon they called "conserved transcriptional response to adversity" or CTRA. This response is characterized by an increased expression of genes involved in inflammation and a decreased expression of genes involved in antiviral responses. Essentially, lonely people had a less effective immune response and more inflammation than non-lonely people.

For the current study, the team examined gene expression in leukocytes, cells of the immune system that are involved in protecting the body against bacteria and viruses.

As expected, the leukocytes of lonely humans and macaques showed the effects of CTRA—an increased expression of genes involved in inflammation and a
decreased expression of genes involved in antiviral responses. But the study also revealed several important new pieces of information about loneliness' effect on the body.

First, the researchers found that loneliness predicted future CTRA gene expression measured a year or more later. Interestingly, CTRA gene expression also predicted loneliness measured a year or more later. Leukocyte gene expression and loneliness appear to have a reciprocal relationship, suggesting that each can help propagate the other over time. These results were specific to loneliness and could not be explained by depression, stress or social support.

Next, the team investigated the cellular processes linking social experience to CTRA gene expression in rhesus macaque monkeys at the California National Primate Research Center, which had been behaviorally classified as high in perceived social isolation. Like the lonely humans, the "lonely like" monkeys showed higher CTRA activity. They also showed higher levels of the fight-or-flight neurotransmitter, norepinephrine.

Previous research has found that norepinephrine can stimulate blood stem cells in bone marrow to make more of a particular kind of immune cell—an immature monocyte that shows high levels of inflammatory gene expression and low levels of antiviral gene expression. Both lonely humans and "lonely like" monkeys showed higher levels of monocytes in their blood.

More detailed studies of the monkey white blood cells found that this difference stemmed from expansion of the pool of immature monocytes. In an additional study, monkeys repeatedly exposed to mildly stressful social conditions (unfamiliar cage-mates) also showed increases in immature monocyte levels. These analyses have finally identified one reason why CTRA gene expression is amplified in the white blood cell pool: increased output of immature monocytes.

Finally, the researchers determined that this monocyte-related CTRA shift had real consequences for health. In a monkey model of viral infection, the impaired antiviral gene expression in "lonely like" monkeys allowed simian immunodeficiency virus (the monkey version of HIV) to grow faster in both blood and brain.

Taken together, these findings support a mechanistic model in which loneliness results in fight-or-flight stress signaling, which increases the production of immature monocytes, leading to up-regulation of inflammatory genes and impaired anti-viral responses. The "danger signals" activated in the brain by loneliness ultimately affect the production of white blood cells. The resulting shift in monocyte output may both propagate loneliness and contribute to its associated health risks.

The team plans to continue research on how loneliness leads to poor health outcomes and how these effects can be prevented in older adults.

*Compiled by Beth Baker, “With a Little Help from Our Friends—Creating Community as We Grow Older,” www.bethbaker.net*