



A prospective study of associations among helping, health, and longevity



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ABSTRACT

How does helping behavior contribute to the health and the longevity of older helpers? From an evolutionary perspective, the ultimate cause may be rooted in ancestral parenting and grandparenting. These activities may have generalized to a neural and hormonal caregiving system that also enabled prosocial behavior beyond the family. From a psychological perspective, helping others may be associated with healthy aging, which, in turn, contributes to longevity as a proximate cause. Yet little is known about the extent to which mediating factors such as the health benefits of helping behaviors translate into enhanced longevity, particularly in regard to grandparenting. To fill this gap, we conducted mediation analyses (structural equation models) to examine whether grandparenting and supporting others in the social network contributed directly or indirectly (through better health 5–6 years later) to the longevity of older helpers. We drew on longitudinal data from the Berlin Aging Study ($N = 516$), in which older adults in Berlin, Germany, were interviewed at baseline (1990–1993, mean age at entry = 85 years) and continuously followed up until 2009. Results suggest that the associations of both grandparenting and supporting others with enhanced longevity are mediated by better prospective health (indirect effect). The effect of helping was not fully mediated, however—helping was also directly associated with increased longevity independently of the health indicators measured. The results were robust against effects of the helper's preexisting health status and sociodemographic characteristics of participants, their children, and grandchildren. We conclude that better prospective health contributes to the link between helping and longevity, but does not fully account for it. Other potential contributing mechanisms remain to be identified. As populations age across the globe, identifying mechanisms that foster health in old age can help to highlight potential targets for public health interventions.

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1. Introduction

Many societies around the globe are aging (Glaser et al., 2014). In Europe, for instance, the fast-growing segment of the population is the group aged 65 years or older. This group accounted for 15% of the total population in 2010, projected to rise to 25% by 2050 (WHO, 2012). At the same time, the total fertility rate (TFR) has dropped from 2.3 children per woman in 1970 to 1.6 in 2014 (Eurostat, 2016),

and a growing proportion of the population is childless. One key issue raised by this dramatic demographic transformation is how healthy aging can be promoted in older adults.

One strategy for staying active in old age is to provide childcare for grandchildren or—especially for childless individuals—to support others in the social network. Both forms of helping behavior have been found to be associated with reciprocal benefits in terms of better health or a longer lifespan (Anderson et al., 2014; Hilbrand et al., 2017). Yet most previous work investigating helping behavior has focused on the association to either health or longevity but not both. Furthermore, it commonly is assumed that the beneficial effect of helping on health mediates the beneficial impact of helping

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on longevity, but this mediation hypothesis has not been tested systematically. We fill this gap by examining the indirect and direct paths between helping, health, and longevity. In a first step, we derive potential *ultimate* causes for these paths from evolutionary theory. Ultimate causes explain why and how a specific mechanism may have evolved over hundreds of generations. In a second step, we complement this line of reasoning by presenting theory and previous empirical findings from the behavioral sciences. These offer a possible *proximate* explanation for how specific behaviors or circumstances impact individuals within their lifespan. In a third step, we test how both grandparental caregiving and supporting others beyond biological descendants translate into proximate health effects and eventually into longevity benefits.

By grandparenting and grandparental caregiving, we refer to non-custodial, non-intensive grandparental caregiving, defined as time spent looking after a grandchild of any age (Glaser et al., 2014). By supporting and helping others, we mean the provision of regular, but not extensive, instrumental or emotional support to members of the helper's social network beyond biological descendants.

1.1. Evolutionary perspective: why helping behavior within and beyond the family may have increased human lifespan

From an evolutionary perspective, it is hypothesized that helping behavior within and beyond kin is ultimately rooted in ancestral parenting and grandparenting (Brown et al., 2011; Chisholm et al., 2016; Hrdy, 2009) and is one of the driving forces underlying human longevity (Hawkes and Coxworth, 2013; Kim et al., 2014). Specifically, the grandmother hypothesis proposes that ancestral as well as contemporary post-reproductive women who help to raise their grandchildren enhance their own inclusive fitness by improving the reproductive success of their children (Hawkes et al., 1997, 1998; Sear and Coall, 2011). Inclusive fitness (Hamilton, 1964) refers to the transmission of a person's genes into future generations via the person's own actions and those of kin who partially share the same genes (e.g., biological relatives). Thus, the longer ancestral post-reproductive grandmothers were alive and helped with childcare, the better their descendants' survival chances (Hrdy, 2001; Sear and Mace, 2008) and the more likely it was that helping behavior and longevity benefits would be transmitted into the future. As post-reproductive women have physiologically fully functional systems (except fertility), it is hypothesized that the inclusive fitness benefits of grandmothers slowed down somatic aging in humans across hundreds of generations (Hawkes and Coxworth, 2013). Grandparenting, especially grandmothering, is thus seen as conferring a selective advantage that drives human longevity at an ultimate level (Kim et al., 2014).

Does the selective advantage of helping within the family also generalize to helping beyond the family, and if so, how could it be explained? One possibility is that through the neural circuitry involved in parenting (see Numan, 2006), prosocial behavior may have generalized across evolution into a neural and hormonal caregiving system (Chisholm et al., 2016; Brown et al., 2011). This caregiving system could be the ultimate foundation of caregiving toward non-kin. On a proximate level, this system operates through emotional processes (Preston and de Waal, 2002), and it seems reasonable to assume that emotional pathways could link helping behavior to regulatory physiological systems (e.g., stress-related neuro-hormonal systems, see Brown and Okun, 2014). This link may, in turn, be one of the proximate mechanisms that couple health and longevity within an individual's lifespan.

Beyond this evolutionary line of reasoning, there are other potential explanations for associations between helping, health, and longevity. We next turn to one account from psychology. In our

view, it complements rather than competes with evolutionary theorizing.

1.2. Psychological perspective: why older adults may benefit from helping

Socioemotional selectivity theory (SST) predicts that people will shift their goals from accumulating knowledge and skills at younger ages to maintaining social bonds at older ages (Carstensen, 1995). This shift in orientation is associated with healthy aging (Baltes and Carstensen, 1996). Moreover, studies have shown that strengthening relationships with loved ones is key to maintaining quality of life in terminally ill patients, regardless of age (Van der Maas et al., 1991; Wilson et al., 2004). Because physiological and cognitive aging signal the finiteness of life, older adults may be motivated to focus on their social bonds and thus engage in more prosocial behaviors.

Increased helping behavior in older adults may thus indicate a shift toward socioemotional goals (e.g., maintaining social bonds through helping). This shift has been shown to be positively correlated with wellbeing (Baltes and Carstensen, 1996) and stress regulation—which may be a proximate mechanism explaining the concurrent benefits in health and longevity. Indeed, in a recent study of stress-related mortality hazards in adults with a mean age of 71 years, Poulin et al. (2013) found that helping behavior toward friends, neighbors, or relatives who did not live with them overrides the link between stress and mortality: In non-helpers, stress predicted mortality with a hazard ratio of 1.3; in helpers, it did not predict mortality (hazard ratio = 0.96).

Yet most previous work has investigated helping behavior and its direct effects on either health or survival, but not the links between all three constructs. In this article, we therefore aim to isolate the indirect effect of helping on longevity via health. Before presenting our empirical analyses, we briefly review findings from the behavioral sciences on the interplay between helping, health, and longevity.

1.3. Benefits for the older helper: findings from the behavioral sciences

The non-intensive provision of childcare has been shown to be positively associated with grandparents' cognitive functioning (Arpino and Bordone, 2014), subjective wellbeing (Mahne and Huxhold, 2015), and lower risk of depression (Grundy et al., 2012). Can older adults without children or grandchildren gain similar benefits from, for instance, supporting members of their social network?

Research on helping behavior beyond the nuclear family has yielded a large body of literature indicating that providing voluntary support for others has beneficial effects on a the supporter's health outcomes in a variety of respects (e.g., Brown et al., 2008; Kahana et al., 2013; Morrow-Howell et al., 2003; Musick et al., 1999; Tanskanen and Danielsbacka, 2016). Concerning older adults in particular, Anderson et al. (2014) reviewed 73 studies and found that, for people aged 50 years and older, volunteering was consistently associated with reduced symptoms of depression, better self-reported health, fewer functional limitations, or enhanced longevity (for similar results, see Okun et al., 2013). The literature thus suggests that helping behavior has health or longevity benefits. However, it remains unclear whether longevity benefits are the result of the health benefits (indirect effects) or whether helping is directly associated with longevity. Moreover, some boundaries to the beneficial effects of helping have been identified.

Full-time grandparental caregiving, for instance, can be highly stressful, depleting grandparents' material and psychological

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