

Informal Caregiving: A Reappraisal of Effects on Caregivers

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For decades caregiver distress (psychological and physical) has been considered an inevitable outcome of providing care for family members, loved ones, and others who require assistance. This negative assessment of informal caregiving pervades not only peer-reviewed scientific articles, but also caregiving-relevant agency reports, fact sheets, policy recommendations, advice columns, and media discussions. Our review critically examines this assessment in light of important methodological limitations of supporting studies, and considers theory and research that suggest an alternative appraisal of caregiving. We find that the case for an overall negative evaluation of caregiver effects is, for the most part, unjustified. Indeed, recent data suggest that giving may yield beneficial health and well-being outcomes, including reduced mortality for informal caregivers. An alternative, more balanced view of caregiving has important implications for research and theory, caregiver assessment and intervention, and public policy.

There are literally thousands of scientific investigations that have attempted to assess the impact of informal (unpaid) caregiving on the caregiver. Over the past three decades, data from these studies have suggested that individuals who tend to the needs of their elderly, sick, or disabled relatives, loved ones, and friends can feel burdened, and are at risk for psychological stress, health disorders, and increased mortality (Baronet, 1999; Pinquart & Sorensen, 2003, 2007; Schulz & Monin, 2012; Schulz & Sherwood, 2008; Vitaliano, Zhang, & Scanlan, 2003). Not surprisingly, this negative assessment of informal caregiving has played a

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role in shaping relevant social policy, appearing as a “mantra” in fact sheets (e.g., the Family Caregiver Alliance [FCA]) and research summaries (e.g., Centers for Disease Control and Prevention [CDC, 2008]) linked to the federal government’s National Family Caregiver Support Program (NFCSP). Of course, such documents acknowledge the possibility of positive caregiver outcomes, but the modal message is that caregiving is harmful to caregivers. As a response to the widely reported negative consequences of informal caregiving, the NFCSP provides assistance to caregivers that includes individual counseling, support groups, and respite care, all designed to ameliorate caregiver emotional and health issues.

In the review that follows, we examine the widely reported negative assessment of the caregiver’s experience in light of important methodological limitations of caregiving studies, theoretical perspectives from evolutionary biology that highlight the adaptive value of caring for others, mounting empirical data demonstrating positive health and well-being correlates of caregiving, and recent animal models of caregiving motivation. Together, these arguments, models, and data are, at least on the surface, inconsistent with what one would expect if “caregiving exacts a tremendous toll on caregivers’ health and well-being” (CDC, 2008), and “has all the features of a chronic stress experience” (Schulz & Sherwood, 2008). Our review suggests that the chronic stress model of informal caregiving may be in need of revision. Toward that end, we offer an alternative view, grounded in the evolution and neurophysiology of mammalian parental care, and capable of accommodating both positive and negative caregiver outcomes. Finally, we consider implications of a more balanced perspective on caregiver outcomes for (1) the conduct of scientific studies of informal caregiving, (2) the design of effective caregiver assessment and intervention programs, and (3) public policy related to informal caregiving. An overarching aim of our review is to provide the kind of information that, through translation to social policy and community action, will help caregivers and care recipients alike lead healthier, happier, and longer lives.

Characterizing Caregiving and Caregivers

Definitions of caregiving have varied considerably from study to study (Ory, Yee, Tennstedt, & Schulz, 2000). As used in this review, the term *caregiving* refers to helping behavior that provides, or is intended to provide aid or assistance to individuals in need. This working definition is inclusive enough to encompass *informal* caregiving (see below), as well as other categories of prosocial behavior and motivation. An informal “caregiver is an unpaid individual (a spouse, significant other, family member, friend, or neighbor) involved in assisting others who are unable to perform certain activities on their own” (FCA, 2011). More restrictive definitions have been proposed. In a widely cited example, Biegel, Sales, and Schulz (1991) argue that informal caregivers provide extraordinary, uncompensated, long-term (months or years) assistance to others carried out predominantly

in the home, investing significant amounts of time and energy, and performing tasks that may be physically, emotionally, socially, or financially demanding.

Definitions matter, for science *and* public policy. In contrast to the FCA definition, the Biegel et al. characterization emphasizes the costly and potentially stressful nature of the care provided, leaving little room to examine *whether* helping a loved one is perceived as costly, stressful, and/or harmful to the caregiver. Conceivably, all work that is extraordinary, or uncompensated, or long lasting, or energy draining and demanding could elevate stress and compromise health, whether or not the work involves caregiving. Public policy, and ultimately the public good, are better served by studies that do not restrict samples of caregivers to those who are already stressed or suffering, which obscures the difference between the effects of helping and the effects of other uncontrolled variables.

Negative Messaging

The conclusion, stated or implied, that caregiving is harmful to the caregiver is prevalent not only in the research literature (e.g., Schulz & Monin, 2012; Schulz & Sherwood, 2008; Vitaliano et al., 2003), but also in reports and other documents issued by entities that are publicly or privately funded, and directed to individuals and groups in a position to shape public policy directly or indirectly—public officials, community and business leaders, healthcare providers and insurers, informal caregivers, legal specialists, educators, and the clergy. Consider the CDC (2008) assessment, still readily accessible on their website:

Caregiving exacts a tremendous toll on caregivers' health and well-being, and accounts for significant costs to families and society as well. Family caregiving has been associated with increased levels of depression and anxiety as well as higher use of psychoactive medications, poorer self-reported physical health, compromised immune function, and increased mortality . . . Over half (53%) of caregivers indicate that their decline in health compromises their ability to provide care. (p. 10)

The message that caregiving produces undesirable outcomes for caregivers permeates a recent AARP (American Association of Retired Persons) "update" on the value and costs of informal caregiving. The report, designed specifically to inform and influence funding policies for informal caregiving, has this to say about caregiving's impact on the physical and emotional health of caregivers:

An extensive body of research finds that providing care to a chronically ill family member or close friend can have profound negative effects on the caregiver's own physical and psychological health, increase social isolation, and adversely impact quality of life and well-being. (Feinberg, Reinhard, Houser, & Choula, 2011, p. 7)

Finally, and not surprisingly, negative messaging with respect to informal caregiving has spilled over into the popular media, showing up routinely on self-help websites—for example, "Caregiving Can Be Harmful to Your Health" (Mandel, 2006)—and occasionally in popular news outlets such as the New York Times:

It's practically become an article of faith that . . . caring for an elderly relative is so stressful, relentless and draining that it takes a toll on your well-being. Some studies have shown that it can increase your risk of depression and heart disease, impair your immune system, even contribute to death. (Span, 2011, p. 2)

Article of Faith?

Despite widespread acceptance, the idea that caregiving has a negative impact on caregiver physical and psychological health is, in our view, overstated and potentially misleading, a sweeping causal generalization that goes well beyond the data that gave rise to it. We are not suggesting that findings of negative caregiver effects are phantoms or are unimportant. It would be foolhardy to overlook the obvious fact that *something* associated with informal caregiving—people, situations, events—can affect caregivers adversely. The difficulty lies in determining what that “something” is. Informal caregiving research designs confound the act of caregiving with a host of uncontrolled extraneous variables and, therefore, are incapable of pinpointing the actual *causes* of caregiver distress. Moreover, with few exceptions, most of these studies provide no *direct* assessment of positive correlates of caregiving. Despite these methodological limitations, ensuing reports and interpretations often appear skewed in the direction of negative caregiver outcomes.

Confounds. In caregiving research, the act of providing care is typically confounded with a host of variables, including precaregiving conditions that differentiate caregivers from noncaregivers—for example age, gender, socioeconomic status, health, and assortative mating (Christakis & Allison, 2009; Fredman, Cauley, Hochberg, Ensrud, & Doros, 2010; Schulz & Monin, 2012; Schulz & Sherwood, 2008)—and conditions concomitant with providing care, such as similar health behaviors and shared exposure to stressors (Christakis & Allison, 2009); continuous exposure to an ailing loved one with serious health problems or disease (Brown et al., 2009; Schaller, Gervais, Yager, & Chen, 2010); objective or perceived financial hardship (Hanratty, Holland, Jacoby, & Whitehead, 2007); conflict in the caregiver's family (Scharlach, Li, & Dalvi, 2006); and the increasing workload that transitioning into a caregiving role entails (e.g., Doty, Jackson, & Crown, 1998). Each of these variables, by itself or in combination with others, has been shown to be a risk factor for physical and/or psychological stress, independent of caregiving.

As an example of one potential confound—selection bias—consider data from a longitudinal investigation that compares those who transition into a caregiving role with those who do not (Burton, Zdaniuk, Schulz, Jackson, & Hirsch, 2003). The longitudinal component, and especially inclusion of participants who were assessed prior to becoming caregivers, set this study apart from the vast majority of investigations that report differences between caregivers and noncaregivers.

A major advantage of the Burton et al. study is that it can identify differences between noncaregivers who subsequently become caregivers and noncaregivers who do not become caregivers over the course of the study.

In reporting their results, Burton et al., emphasize their main finding, that transitioning into a demanding caregiver role is associated with increased depression, poorer self-reported health, and increased health risk behaviors (e.g., forgetting to take medications). Yet, their baseline data reveal important differences between the former and latter groups, *when members of both groups were still noncaregivers*. Compared to continuous noncaregivers, individuals who would go on to become caregivers were, at baseline, significantly older and poorer, engaged in significantly more health risk behaviors, and showed significantly lower levels of self-mastery; those who would become caregivers also showed higher levels of depression and poorer health (nonsignificant trends).

More recent, similarly designed investigations of transitions to caregiving also show evidence of baseline differences in theoretically important variables, including age, employment status, and health and well-being. Compared to continuing noncaregivers, individuals who would become caregivers were significantly older and less likely to be employed (Lawton, Moss, Hoffman, & Perkinson, 2000; Lee & Gramotnev, 2007), and showed significantly lower levels of psychological well-being and higher levels of stress (Lee & Gramotnev, 2007). Data like these suggest that cause-effect inferences regarding the *unique* effects of caregiving are, at best, premature; differences between caregivers and noncaregivers may reflect, at least in part, individual differences that existed *prior to* the initiation of caregiving activities.

Positive data embedded in reports of negative effects. Beyond confounds, close examination of data from reports of negative caregiver effects sometimes (surprisingly) reveals phenomena that are inconsistent with an overall negative appraisal of caregiving. For example, according to a recent national caregiver survey, proportionately more caregivers (17%) than the general population (13%) reported that they were in fair-to-poor health (National Alliance for Caregiving, 2009), on the surface, at least, evidence to suggest that caregiving has a detrimental effect on health (though possible confounds are legion). But the 17% caregiver figure also means that the *majority* of respondents experience something *better* than fair-to-poor health. In fact, when asked how caregiving has affected their health, most (74%) respond that caregiving has had no impact, and 8% report that caregiving has made their health better; 17% say that caregiving has made it worse.

Bouldin and Andresen (2009) compared caregivers of individuals showing evidence of Alzheimer's or dementia (AZ/D caregivers) with caregivers of individuals who showed no evidence of these cognitive impairments (No AZ/D caregivers). Not surprisingly, the AZ/D caregivers were significantly more likely

than their No AZ/D counterparts to report that providing care created or aggravated health problems and stress. More interesting, however, is the fact that in each group a substantial majority of caregivers reported that they were in “excellent, very good, or good” general health (> 83%), and very satisfied/satisfied with their lives (>93%).

Skewed interpretations. Whenever attitudes, beliefs, or even scientific theories are well entrenched, there is always a danger that confounding factors or equivocal data will be ignored or downplayed. In our view, this has happened in some of the most important and pivotal assessments of caregiving. As an example, consider a prospective study that has been cited repeatedly by researchers, health practitioners, and agencies as evidence that caregiving is a risk factor for mortality (Schulz & Beach, 1999). The findings are straightforward and quite consistent with chronic stress models of health (e.g., Vitaliano et al., 2011): Spousal caregivers who report caregiving-related strain (assessed dichotomously—“yes” or “no”) “are 63% more likely to die within 4 years than noncaregivers” . . . “To our knowledge, this is the first study to show that caregiving is an independent risk factor for mortality” (Schulz & Beach, 1999, pp. 2118–2219).¹

The question is: Independent of what? The noncaregiver control group, used as the referent group in statistical analyses, consisted of individuals whose spouse was not disabled. But the caregiver groups—strained and not strained—consisted of individuals whose spouses *were* disabled. Such a design confounds caregiver status with spousal disability, limiting what can be inferred from mortality differences between caregiver and noncaregiver groups. In other words, having a disabled spouse can be a stressful experience by itself, contributing to feelings of grief or anticipatory bereavement, whether or not the person experiencing grief or stress is a caregiver (Brown et al., 2009). Yet, the potential impact of this confound on the internal validity of the study was not mentioned in the Schulz and Beach report.

More importantly, the Schulz and Beach study included a group of noncaregivers whose spouses were disabled, arguably a more telling comparison group because it controlled for spousal disability. But this noncaregiver group’s death ratio was identical to the ratio for the strained caregivers, providing no support for the purported link between caregiving and elevated mortality. Surprisingly, this and other anomalies were not mentioned.

Conclusions. Reports of associations between caregiving and measures of caregiver distress are ubiquitous, but as Baumgarten (1989) noted 25 years ago,

¹ To our knowledge, to date, there are only two other investigations that purport to demonstrate a link between caregiving and elevated caregiver mortality. One (Christakis & Allison, 2006) shows that hospitalization of a spouse predicts increased mortality in the partner, but provides no independent assessment of caregiving status in the partner. The other (Fredman et al., 2008) reported overall death rates of 0.20 and 0.22 for caregivers and noncaregivers, respectively, not consistent with the hypothesis that caregiving is linked to increased mortality.

relevant studies are plagued by a host of research design limitations ranging from lack of appropriate noncaregiver control groups to failure to assess caregiver outcomes prospectively. Even if these methodological issues are ignored, caregiver status accounts for little of the variance in caregiver outcomes, less than 8% according to a widely cited meta-analytic review (Pinquart & Sorensen, 2003). Some large-scale, cross-sectional studies utilizing representative samples find no evidence of negative caregiver outcomes (e.g., Robison, Fortinsky, Kleppinger, Shugrue, & Porter, 2009), and there are sensitive longitudinal investigations of transitions into caregiving that report weak negative outcomes (Hirst, 2005), or none at all (Lawton et al., 2000; Lee & Gramotnev, 2007). Studies of caregiver physical health suffer from many of the same design limitations that beset investigations of caregiver psychological distress, and negative health outcomes associated with caregiving tend to be modest and inconsistent (Pinquart & Sorensen, 2003, 2007; Schulz & Monin, 2012; Vitaliano et al., 2003). Finally, potentially positive aspects of caregiving are often ignored or not assessed. Other considerations argue against unqualified endorsement of a negative appraisal of informal caregiving's effects on caregivers. Scientific contributions from a variety of disciplines suggest that helping others in need is part and parcel of what it means to be human. If so, it would be surprising to find that helping others—even high-cost helping, as occurs in many instances of informal caregiving—should be charged mainly with negativity for the helper. If anything, one might expect the opposite. We turn now to a consideration of longstanding and diverse scientific theories and research (including investigations of informal caregiving) that have explored and revealed the positive aspects of giving to others.

Are We Natural Caregivers?

Theories

There are several independent lines of scientific inquiry that suggest humans are caregivers by nature. Evolutionary theories of altruism hold that sensitivity to the needs of others, and caring for others, are as fundamental to human nature as are self-directed, survival oriented tendencies. Gene-centered evolutionary arguments, including *kin selection theory* (Hamilton, 1964), the theory of *reciprocal altruism* (Trivers, 1971), and more recent proposed integrations of kin selection and reciprocal altruism theories, such as *stakeholder theory* (Roberts, 2005),² and selective *investment theory* (Brown & Brown, 2006)³ clearly point

² Roberts' theory holds that altruism can be favored by natural selection when the costs of behaving altruistically are outweighed by the altruist's stake in the benefits that accrue to the recipient.

³ Selective investment theory holds that close social bonds, based on fitness interdependence, evolved to facilitate high-cost giving. Fitness interdependence exists when two or more individuals depend on one another for reproductive success.

in this direction. So do contemporary group selection alternatives (e.g., Sober & Wilson, 1998). While there are striking contrasts among these theories, they are all premised on the idea that humans, and certain other social animals, have evolved mechanisms for responding compassionately toward those in need under well-specified conditions—for example, when the individual in need is a close biological relative (kin selection theory) or a potential reciprocator (reciprocal altruism theory), or when caregiver and recipient are linked by common survival and reproductive goals and outcomes, whether due to shared genes, direct or indirect reciprocity, or some other mechanism (stakeholder theory, selective investment theory).

Classic as well as more recent *proximate* theories of caregiving motivation also highlight the evolved, inherent nature of caregiving. For example, the British psychiatrist John Bowlby (1969), famous for his theory of infant-caregiver attachment, argued that the motivation for caregiving was orchestrated by an innate system “designed to promote proximity and protection” when the caregiver perceives that a vulnerable other is in danger (Cassidy, 1999, p. 10). Although Bowlby focused on *parental* caregiving, some of his followers have extended these ideas beyond the parent-child domain, arguing that the caregiving system is the motivational “core of all empathic, compassionate reactions to another person’s needs” (Mikulincer & Shaver, 2012, p. 40).

If there is an evolved, inherent caregiving system, then it should be manifested in the neural architecture of social animals. During the past 10 years neuroscientists have begun to identify pathways and neurochemicals that make possible and help orchestrate mammalian caregiving behavior. For example, Numan (2006, 2012) has identified neural circuitry that underlies maternal behavior in rats, and may be important in the regulation of more generalized forms of prosocial behavior in other mammalian species, including humans. Extrapolating from Numan’s account, Brown and colleagues (Brown, Brown, & Preston, 2012) have argued that a dedicated neurobiological system, shaped by evolution to direct maternal care, is selectively recruited in both humans and nonhumans to motivate many forms of helping behavior. Later in the article we explore the central features of this model, including its potential relevance for understanding the consequences of informal caregiving.

Evidence

There is considerable evidence that is consistent with the natural caregiver hypothesis. Archeological findings provide hints that early human ancestors, including Neanderthals and even *Homo erectus*, may have cared for individuals suffering from disabilities (Spikins, Rutherford, & Needham, 2010). And neuroimaging studies show that recognizing and responding to the distress of others

appear to recruit phylogenetically ancient homeostatic regulatory mechanisms (e.g., Immordino-Yang, McColl, Damasio, & Damasio, 2009).

Studies of human identical and fraternal twins have shown that compassion-related qualities (including empathy and altruism) are heritable (e.g., Knafo & Israel, 2010), and genetic mapping studies have identified specific genes associated with these qualities in humans (Knafo & Israel, 2010) and in common chimpanzees and bonobos (International Alt/Self Map Consortium, 2007). Behavioral studies of infants are particularly revealing. In summarizing work with Warneken, Vaish, and others, Tomasello, Dweck, Silk, Skyrms, and Spelke (2009) report that human infants 18 months of age and younger are sensitive to adults in need, are motivated to help them, and actually do try and help them. There are reasons to suggest that these sensitivities and behaviors are naturally emerging phenomena that do not depend heavily on learning for their initial expression, including early onset across cultures, and the apparent failure of rewards and encouragement to increase infant helping (in some cases, they appear to undermine it).

Neuroscience investigations of social behavior also underscore the proposition that humans are natural caregivers. There is, indeed, neural hardwiring—cortical, subcortical (especially the limbic system), autonomic (especially the parasympathetic division's vagus nerve)—that makes possible and regulates caregiving behaviors (Lamm, Decety, & Singer, 2011; Numan, 2012; Porges & Carter, 2012). In addition, neuropeptides, especially the mammalian hormones oxytocin, arginine vasopressin, and, progesterone appear to play important roles in regulating social behaviors (Brown et al., 2009; Carter, 1998). For example, in rodents and certain other animal species oxytocin appears to facilitate parental care, social preferences, and the formation of social bonds (Carter, 1998; Lim & Young, 2006). Human studies also show a relationship between (intranasal administration of) oxytocin and elements of prosocial behavior (e.g., empathy, trust, generosity), but results to date have been variable and context-specific (Bartz et al., 2011).

Both oxytocin and progesterone may play important roles in regulating stress. For example, oxytocin appears to downregulate HPA (hypothalamic-pituitary-adrenal) axis activity (Carter, 1998), decrease blood-pressure, (Petersson, Alster, Lundeberg, & Uvnas Moberg, 1996), reduce activation of the amygdala and its functional connectivity to the brainstem (Kirsch et al., 2005), and interfere with the circulation of proinflammatory substances and inflammation (Clodi et al., 2008; Jankowski et al., 2010; Szeto et al., 2008). Progesterone also appears to be implicated in the downregulation of HPA axis activity and reduction of anxiety (Wirth & Schultheiss, 2006). If high-cost caregiving hinges on suppressing self-preserving avoidance reactions to stressors (Brown & Brown, 2006), the neuropeptides we have mentioned, and their receptor genes, “may lie at the core of the caregiving behavioral system” (Poulin, Holman, & Buffone, 2012).

Observations and Predictions

If humans are caregivers by nature, due at least in part to the evolution of caregiving motivational architecture (e.g., empathy, compassion), then we would expect to find elements of this architecture in nonhuman social animals, which we do. For example, compassionate sensitivity, and even cross-species nurturance, have been documented in social carnivores (dogs, wolves, lions), common chimpanzees, bonobos, and gorillas (de Waal, 2009; Hrdy, 2009; Tomasello et al., 2009). And empathic distress in response to the suffering of another has been observed in mice and traced to particular genes (Chen, Panksepp, & Lahvis, 2009). The documentation of caregiving motivation and behavior in nonhuman species is consistent with arguments that such behaviors have a long mammalian evolutionary history, perhaps emerging from genetic programs that support maternal care of offspring (Brown et al., 2012; Hrdy, 2009; Numan, 2006, 2012; Porges & Carter, 2012).

We would also expect that, in ancestral environments, caregivers must have been selective, tending to favor close genetic relatives, reciprocal altruists, or more generally, interdependent individuals as “recipients.” Such selectivity would have been essential for reducing the threat of genetic exploitation. Accordingly, mechanisms that predispose *selective* giving may have been preserved by natural selection. The literature is consistent with this hypothesis (Brown & Brown, 2006; Goetz, Keltner, & Simon-Thomas, 2010), though the human evidence focuses more on self-reported compassionate tendencies than on caregiving behavior itself.

Finally, we would expect that the proximate consequences of caregiving, at least in ancestral environments, would not have been solely or even largely negative. It is difficult to imagine that the human species, so highly dependent for survival on help from others, would have persisted if the psychological and physical costs associated with helping had not been compensated by at least some beneficial consequences. In the next two sections we consider empirical data that are consistent with this expectation, discussing, first, links between giving and measures of psychological well-being, and, second, between giving, health, and longevity. Our review is hardly exhaustive (many additional studies could have been included), but we think representative of work that reveals positive aspects of helping those in need.

Giving and Psychological Well-Being

Numerous studies outside the realm of informal caregiving have shown that providing assistance to another is associated with improvement in the helper's mood (Yinon & Landau, 1987), relationship satisfaction (e.g., Kogan et al., 2010), and subjective well-being (e.g., Dunn, Aknin, & Norton, 2008; Weinstein & Ryan, 2010). Giving to others is also linked to reductions in the helper's negative

affective states, including sadness and distress (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997) and depressive symptoms associated with spousal loss (Brown, Brown, House, & Smith, 2008). These studies, some of which manipulate helping systematically through random assignment, suggest that helping others can affect aspects of the helper's well-being in a positive manner, but they do not assess the effects of helping in the context of informal caregiving.

However, there *are* studies of informal caregiving that report parallel findings. For example, in spousal caregivers there are reports of helping-related reductions in anxiety and depression (Beach, Schulz, Yee, & Jackson, 2000), and increases in well-being (Lundh, 1999). Positive associations between informal caregiving and caregiver well-being can be found even in the most challenging situations. For example, in a large-scale survey, Hunt, Levine, and Naiditch (2005) reported that young caregivers (8–18 years of age) tend to feel more appreciated than noncaregiver controls. And Picot (1995) found that African American women who provided care for elderly dementia patients (mostly relatives) reported generally high levels of rewarding experiences associated with caregiving. In a longitudinal assessment of individuals who provided care to partners with AIDS, the caregivers reported experiencing positive moods at a frequency that matched their negative moods, except near the time of their partners' death (Folkman, 1997). And in a large-scale survey of individuals averaging over 40 hours per week of end-of-life care, Wolff, Dy, Frick, and Kasper (2007) found that a clear majority indicated that providing assistance “enables me to appreciate life more” (69.4%), “makes me feel good about myself” (70.2%), and “makes me feel useful and needed” (76%). Contrast these figures with the proportion that characterized caregiving as burdensome, causing them “emotional stress” (28.9%), “physical strain” (18.4%), and “financial hardship” (14%).

Giving, Health, and Longevity

From an evolutionary perspective, staying alive is important not only for producing offspring, but also for continuing to care for them and for others who may carry copies of the caregiver's genes (Levitis & Lackey, 2010), or whose reproductive success is otherwise intertwined with that of the caregiver (Brown & Brown, 2006). Therefore, it is conceivable that helping interdependent others should be associated with better health and delayed mortality for the helper.

Documented links between social integration and social support on the one hand, and physical health and longevity on the other (Cohen & Janicki-Deverts, 2009; Holt-Lunstad, Smith, & Layton, 2010), are certainly consistent with the hypothesis that helping others may lead to better health and delayed mortality for the helper, as are findings that show an inverse relationship between volunteering and mortality (Okun, WanHeung Yeung, & Brown, 2013; Okun, August, Rook, &

Newsom, 2010; Oman, 2007). But there are more direct assessments of helping that highlight its potential role in enhancing physical health and delaying mortality.

Based on evolutionary accounts of altruism, and on findings of beneficial effects of behaving prosocially, Brown and colleagues (Brown, Nesse, Vinokur, & Smith, 2003) made a prediction that would have been, and may still be, counterintuitive to many informal caregiving researchers: Providing assistance to others will be inversely correlated with the helper's mortality, *independent of support received by the helper*. In their study, Brown et al. analyzed longitudinal data from 423 couples in the Changing Lives of Older Couples sample, a multiwave prospective investigation of spousal bereavement. Results showed that self-reported helping behaviors predicted a 30–60% reduction in mortality risk for the helper, and that these associations could not be accounted for by measures of support received from others, equity, social contact, concurrent physical health, health behaviors, mental health, demographics, or personality. A follow-up investigation conducted by an independent research team—Brown, Consedine, and Magai (2005)—reported similar findings for morbidity in a large sample of elderly adults.⁴

Many participants in the Brown et al. (2003) investigation of mortality were informal caregivers, and this was likely the case for the Brown et al. study of morbidity as well. However, neither study focused specifically on the potential impact of *informal caregiving* on mortality or health. Therefore, Brown and her colleagues set out to determine whether helping in the context of informal caregiving would also show an inverse relationship with mortality. Using data from the Health and Retirement Study, a nationally representative sample of over 3000 individuals making the transition to retirement, Brown et al. (2009) showed that more informal caregiving hours (>14 per week) were associated with longer survival of caregivers over a 7-year period, independent of care recipient characteristics (behavioral and cognitive) and other demographic and health variables.

The demonstration of a link between caring for others and reduced mortality is not unique to the work of Brown and her colleagues. In an assessment of mortality and self-reported health of the entire population of Northern Ireland, O'Reilly, Connolly, Rosato, and Patterson (2008) reported reduced mortality for informal caregivers relative to noncaregivers, controlling for a variety of demographic, socioeconomic, and health variables. In contrast to Brown et al. (2009), the caregiver advantage became weaker with increased caregiver hours, but remained significant even at the highest level of caregiver hours reported (50+ per week). More recently, Fredman et al. (2010) have confirmed a link between informal caregiving and reduced mortality risk. Their study found that elderly female caregivers had a significantly lower risk of mortality over 8 years than did noncaregivers, independent of levels of general and

⁴ W. Brown and S. Brown are unrelated and unacquainted.

caregiving-related stress, and controlled for various demographic and health variables.

Conclusions

Beneficial correlates of giving have been demonstrated empirically in a wide variety of contexts, including that of informal caregiving, and using various research designs, samples, and measures of giving. Such effects include improvements in the psychological well-being, physical health, and longevity of those who assist others. Especially interesting and provocative are reports of links between informal caregiving and caregiver health and longevity. These outcomes have been demonstrated using prospective designs and national or representative samples, and they tend to be robust in the face of statistical controls for possible confounds including demographic variables, personality traits, relationship variables, pre-existing health and mental health, and behavioral and cognitive limitations of the care recipient.

A word of caution is in order. Informal caregiving studies that reveal positive caregiver effects are often vulnerable to the same methodological shortcomings that plague studies demonstrating negative effects, rendering causal inferences problematic. That said, findings of caregiving-related improvements in the psychological and physical health of informal caregivers are entirely consistent with theory and research (some of it experimental) that implicate, and in some cases demonstrate, a connection between helping and the helper's health and well-being.

Negative and Positive Caregiver Effects: Attempts at Synthesis

The existence of seemingly contradictory caregiver outcomes—positive and negative—begs for a Hegelian synthesis, a set of ideas or a model that not only accommodates what appear to be polar opposites, but specifies conditions under which each kind of outcome is to be expected. Below we discuss two important contemporary models of caregiver outcomes that address both positive and negative caregiver effects, directly or indirectly. We identify possible shortcomings of each model, and then consider an alternative approach derived from a neurophysiological model of mammalian caregiving.

The Caregiver Strain Hypothesis

Schulz and Monin (2012) try to resolve the paradox by arguing that negative caregiver effects in mortality and health (both physical and psychological) should be greatest when duration and intensity of caregiving, and magnitude of care-recipient suffering are at their greatest—that is, when caregivers are most likely to be “strained” and perceive they have little control over care-recipient

outcomes. “Conversely, studies that show positive effects of caregiving likely reflect caregiving experiences that afford high levels of control over care-recipient outcomes such as suffering and favorable effort-reward ratios” (pp. 192–193).

The caregiver strain hypothesis is, in essence, a chronic stress model of negative caregiver outcomes, inspired by the work and ideas of Hans Selye (1976), and sometimes referred to as the “wear and tear” hypothesis (Townsend, Noelker, Deimling, & Bass, 1989): Caregiver physical and psychological strain can lead to unpredictability and loss of control which, in turn, can result in stress, depression, illness, and even death (see also Pearlin, Mullan, Semple, & Skaff, 1990; Vitaliano et al., 2002, 2003). The model’s key strength is its potential utility for explaining and generating testable hypotheses related to negative health outcomes for caregivers.

The caregiver strain model does not appear well equipped to handle positive caregiver outcomes. Low levels of caregiver strain might be expected to produce better outcomes than high levels, but even low levels of strain should not yield better outcomes than *no* caregiver strain. Put differently, low-strain caregivers would be expected to show fewer signs of psychological and physical distress than high-strain caregivers, but not fewer than noncaregivers who, by definition, experience no caregiver strain. And yet, that is precisely the conundrum faced by advocates of the caregiver strain hypothesis in the face of demonstrations of positive caregiver outcomes.

There are also findings that show just the opposite of what the caregiver strain model predicts: (i) beneficial caregiver outcomes despite *high* levels of caregiver hours (O’Reilly et al., 2008), and (ii) a *direct* relationship between duration of caregiving and beneficial caregiver outcomes (Brown et al., 2009; Fredman et al., 2008; Parveen & Morrison, 2012). A recent investigation (Choi et al., 2012) used the statistical technique of “group-based trajectory modeling” to identify patterns of change over time (1, 4, 8, and 12 months) in groups of caregivers of patients diagnosed with malignant brain tumors. In stark contrast with the caregiver strain model, Choi and colleagues found significant *improvement* over time in caregiver depression and anxiety, and improvement or no change over time in caregiver burden. And in an epidemiological study designed to assess the impact of prolonged caregiving on incidence of breast cancer, Kroenke et al. (2004) reported that caregiving had no adverse effect. In fact, “high levels of self-reported stress associated with adult care were related to a borderline lower incidence of breast cancer,” and “high numbers of hours of adult caregiving [>14] were related to lower levels of certain endogenous sex steroid hormones [estradiol, testosterone], portending a possible lower future risk of breast cancer” (p. 1024).

There are also studies of caregiver *cognitive performance* that are not consistent with the caregiver strain hypothesis. For example, Bertrand et al. (2011) found that continuous caregivers performed better in tests of memory and processing speed than controls who had never assumed the role of caregiver. These are

not the kinds of findings one would expect if caregiving has come “to be viewed as an ideal platform for studying the health effects of chronic stress exposure” (Schulz & Monin, 2012, p. 179).

Finally, some of the strongest proponents of chronic stress models of caregiving have made the clearest case against them:

Conceptual models of caregiving and health suggest that health effects should unfold in a cascading fashion. Caregivers first experience distress and depression, which are followed by physiologic changes and impaired health habits that ultimately lead to illness and possibly to death. Although researchers have demonstrated the predicted effects for isolated components of this model, they have not shown how illness progresses sequentially or how one condition, such as depression, leads to changes in health habits or physiology. (Schulz & Sherwood, 2008, p. 26)

The Healthy Caregiver Hypothesis

Some investigators (e.g., Bertrand et al., 2011; Fredman et al., 2010), presumably not satisfied with (lack of) caregiver strain as an explanation of positive caregiver outcomes—especially reduced mortality and better cognitive functioning—have proposed a complementary explanation, the so-called healthy caregiver hypothesis. The idea is that physically healthier individuals are the ones most likely to assume the role of caregiver and continue in that role, resulting in “better health outcomes in caregivers than noncaregivers of similar age” (Bertrand et al., 2011). Effectively, those who become caregivers may already have a health advantage over those who do not, and the advantage may widen because caregivers tend to be more physically active than noncaregivers, reducing the risks of functional and cognitive decline.

Although the healthy caregiver hypothesis is logically appealing, empirical validation is, at best, mixed. To our knowledge, of those prospective studies that have tested the hypothesis—Burton et al. (2003); Lee and Gramotnev (2007); McCann, Hebert, Bienias, Morris, and Evans (2004)—only the McCann et al. findings offer support. In their study, participants who became caregivers were indeed healthier at baseline (before they had become caregivers) than were individuals who remained in a noncaregiving role at follow-up. However, there is a possible confounding of noncaregiver controls with care recipients. It turns out that multiple members of a household could be classified as caregivers or noncaregivers at baseline, and this status could *change* subsequent to baseline. One possible consequence is that the health status of the continuing noncaregiver control group may have been compromised because more of this group’s members became care recipients. Effectively, in the final analysis, caregivers could appear “healthier” simply by virtue of the fact that the noncaregiving controls became “sicker.”

In our view, the empirical status of the healthy caregiver hypothesis has yet to be settled; needed are prospective studies designed specifically to resolve the

issue. We also wonder about the real-world plausibility and generalizability of the healthy caregiver hypothesis. For example, given the dearth of relevant empirical studies, it seems reasonable to speculate that propinquity, a sense of obligation, and time flexibility (e.g., due to unemployment or retirement) may also play a role in determining who and who does not become a caregiver. Clearly, there is a need for research investigating individual and family decision-making related to caregiver selection.

An Alternative Approach

The healthy caregiver hypothesis is a tentative and, to date, empirically questionable account of *positive* effects of caregiving. Even if the healthy caregiver hypothesis proves viable, teaming it with an already strained caregiver strain hypothesis may be ill advised. We think there may be more explanatory power in an approach that places caregiving in an evolutionary context. Viewed through an evolutionary prism, caregiving experiences, interacting with a variety of contextual and organismic variables, generate emotional cues such as perceived stress, anxiety, depression, empathic concern, love, and joy that can guide behavioral choices along adaptive lines. Rather than viewing negative caregiver emotions as dysfunctional responses, an evolutionary perspective emphasizes their biological sensitivity to context (Del Giudice, Ellis, & Shirtcliff, 2011), such as helping individuals reduce or avoid giving to another when there is high risk for exploitation, or when resources (physical or psychological) are limited or in danger of being depleted. Conversely, positive feelings associated with caregiving—for example, feelings of closeness, sympathy, compassion, love—may function as cues for initiating, maintaining, or increasing caregiving behavior.

Such cues inform people about the success, or likely success of their attempts to solve adaptive problems. Adaptive problems are, in effect, challenges posed by nature to individual survival and reproduction (e.g., securing food, water, protection, and a suitable mate), and, the survival of mates, offspring, and other related and unrelated individuals (e.g., allocating vital resources to children, other family members, friends, or strangers). Solving adaptive problems such as these often involves motivational conflicts and tradeoffs. For example, a part of us may want to provide care for an elderly parent in need, but another part may recoil at the idea because doing so risks exploitation by other family members, creates a financial or time burden for ourselves, or limits resources that could be allocated to our own children. Such motivational dilemmas are likely to be a major source of psychological stress, and may well be the rule rather than the exception in caregiving situations. We can reasonably assume that humans (and certain other social species) evolved motivational mechanisms to resolve such dilemmas in ways that did not compromise inclusive fitness (Brown & Brown, 2006; Sober & Wilson, 1998).

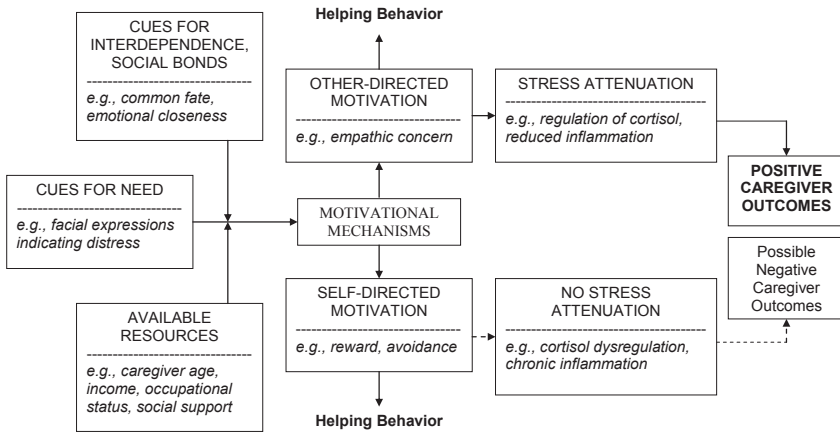


Fig. 1. Major components of a model of caregiving system motivation (after Brown, Brown, & Preston, 2012).

As noted earlier in the article, Brown et al. (2012) developed a model of human caregiving motivation premised on these ideas, grounded in theory and research on mammalian parental caregiving, and designed to help understand psychological and neural mechanisms that drive well-documented positive caregiver outcomes. Figure 1 shows the major components of the model: Perceiving need or distress in another can activate motivational mechanisms that are responsible for helping. Motivation for helping can be other-directed, characterized, for example, by empathic concern, or motivated by such factors as reward seeking, avoidance of negative feeling states, or a sense of obligation.

In developing the model, our major concern has been with *other-directed* motivation. Careful consideration of work on neural circuitry that regulates maternal behavior in rodents, as well as evidence from studies of neuropeptides that appear to play a context-specific role in facilitating prosocial behavior in a variety of species (including our own), suggest that there is a distinct neural system, rooted in the evolution of parental care, that, under certain conditions, is responsible for prioritizing the needs of others, regulating stress, and facilitating high-cost giving (Brown & Brown, 2006; Preston, 2013; Brown et al., 2012; Numan, 2006, 2012). We hypothesize that it is this other-directed (caregiving) motivational system, independent of but interacting with approach/avoidance systems, that is responsible for positive caregiver outcomes such as increased well-being and resistance to disease. The proposed mechanism for these outcomes is the regulation of a variety of bodily states, especially stress and immunity, brought about by interactions among neuropeptides (e.g., oxytocin, progesterone) and neural circuitry, especially the

medial preoptic area of the hypothalamus, which, under certain conditions, appears to act as a switch that turns on maternal motivation (Numan, 2006).

Moderating variables. As should be clear from Figure 1, motivational mechanisms that can lead to helping behavior respond not only to the caregiver's perception of need in another, but also to perceptions of interdependence and closeness with that individual (Brown & Brown, 2006), and to the availability of caregiving resources, including safety and security, adequate time and income, and the existence of others who can assist or provide backup. There is empirical justification for including these moderating variables in the model. As for *interdependence* and *social bonds*, there are data suggesting that measures of caregiver well-being are linked (i) generally to the perceived strength or quality of caregiver-recipient relationships that existed prior to onset of recipient problems (e.g., Lopez, Lopez-Arrieta, & Crespo, 2005; Williamson & Shaffer, 2001); and (ii) specifically to perceived *interdependence* with the care recipient (Poulin et al., 2010). Deriving their hypotheses from selective investment theory (Brown & Brown, 2006), Poulin et al. found, as hypothesized, that providing active help predicts negative affect only for caregivers who perceive themselves to be low in interdependence with their spouse; helping predicts positive affect for caregivers who perceive high levels of spousal interdependence. In the case of *resources*, there is evidence to suggest that older age and low socioeconomic status—constraints on resource availability—partially or completely mediate negative health outcomes associated with caregiving; caregivers who are younger, better educated, and have more net worth generally show no adverse health effects related to caregiving (Jenkins, Kabeto, & Langa, 2009; Pinquart & Sorensen, 2007).

Neurohormonal mechanisms underlying caregiver outcomes. The model proposes that activation of other-directed motivation for helping involves the release of hormones such as oxytocin and progesterone, each of which has been implicated in the facilitation of helping behavior, stress regulation, and immunity. More specifically, cues for interdependence or close social bonds trigger neuroendocrine responses, such as release of oxytocin into the medial preoptic area of the hypothalamus, producing other-directed emotional/motivational states, accompanied by prosocial emotions such as feelings of empathic concern. Downstream consequences of this process may include the release of progesterone, a neuroprotective hormone that contributes to homeostasis of a variety of bodily systems (Bitzer, 2009), including the immune system (Jain, Kannan, Prouty, & Jain, 2004; Tamura et al., 2011). We hypothesize that it is the stress- and immunity-regulating properties of these neurohormonal events that account for positive caregiver outcomes—well-being, health, and longevity.⁵

⁵ The release of progesterone may be critical because it is neuroprotective and regulates a variety of bodily systems (Bitzer, 2009), including the immune system (Jain et al., 2004; Tamura et al., 2011).

Our model does not directly address negative caregiver outcomes—for example, a sense of burden, poor health, or increased mortality. However, it is clear that some caregiving situations may be dangerous, exploitative, or otherwise threatening, contributing to caregiver stress. Also, implied in the model, and stated explicitly in arguments for the evolutionary basis of the model, is the idea that self versus other motivational conflicts may produce or exacerbate stress. There is growing evidence to suggest that the kinds of neurohormonal events we have described in connection with other-directed motivation can modulate the effects of these and other stressors in ways that promote the giver's well-being and health. In contrast, it is not clear that reward-seeking or avoidance motivational systems, *by themselves*, can produce such effects.

Findings from recent behavioral studies with humans underscore this point. For example, in a longitudinal study of social support in university students, Crocker, Canevello, Breines, and Flynn (2010) found that other-directed (“compassionate”) motivation predicted reduction over time in anxiety and dysphoria; self-directed motivation had the opposite effect. And Konrath, Fuhrel-Forbis, Lou, and Brown (2011) found that volunteers had a reduced risk of mortality compared to nonvolunteers, but the effect was significant only for participants who showed evidence of other-directed reasons for helping. Those who volunteered for self-interested reasons had a mortality risk similar to that of nonvolunteers.

Conclusions

We have seen that caregiving research studies, agency reports, fact sheets, and policy statements tend to be negative in tone, highlighting a plethora of undesirable outcomes that await would be family caregivers. In our view, however, there are too many serious limitations in studies that report negative caregiver consequences to justify an overall negative evaluation of informal caregiving. A careful perusal of the research literature suggests that a more balanced perspective is warranted and long overdue. Positive caregiver data are sometimes embedded—but not necessarily discussed—in published reports of negative caregiving outcomes. More important, there are now many studies, some of them large-scale longitudinal investigations, that demonstrate caregiving-related enhancements in caregiver health, well-being, and longevity. These positive findings are consistent with classic as well as more recent evolutionary theories of altruism, and with recent animal models that propose (i) a neurohormonal basis for caregiving motivation and behavior along with (ii) possible mechanisms for understanding links between caregiving, on the one hand, and health and well-being, on the other. The theoretically and empirically defensible proposition that individuals may derive physical and psychological health benefits from helping family members in need has important implications for research and theory, caregiver assessment and intervention, and public policy.

Implications for Research and Theory

We agree with others (e.g., Schulz & Sherwood, 2008) that there are serious methodological limitations associated with research on caregiver effects, especially the relative paucity of longitudinal comparisons of well-specified and matched caregiver and noncaregiver samples. But regardless of design (cross-sectional or longitudinal), the potential importance of the empirical contribution, or the quality of publication outlet, caregiving researchers, by and large, have missed opportunities to acknowledge (i) the potential impact on internal validity of important confounding variables, and (ii) the existence of positive caregiver data embedded in reports of negative caregiver effects. In our view, chronic stress explanations of caregiving have been overplayed in the face of repeated null, inconsistent, or contradictory findings, and alternative accounts have been downplayed or ignored.

These methodological limitations and explanatory biases have undoubtedly contributed to what we see as a widespread and skewed assessment of the impact of informal caregiving. But the imbalance is reversible, and there are encouraging signs that more researchers than before are generating evidence to suggest that caring for others may benefit the caregiver. Data from numerous studies indicate that caregivers do not manifest the degree of distress and immunological compromise expected by chronic stress (caregiver strain) accounts of caregiving. Quite the contrary: When researchers include outcome measures that reflect positive affect and well-being, they typically find that family members and loved ones show moderate-to-high levels of satisfaction with their role as caregivers.

Recent evidence for positive caregiver outcomes has raised new questions and issues that require further investigation and explication. For example, Brown et al. (2009) and O'Reilly et al. (2008) both found that caregivers had a lower risk of mortality than noncaregivers. However, the effect of amount of care provided (caregiving hours per week) manifested differently in each study: In Brown et al. the magnitude of the effect increased with increased caregiving hours, but in O'Reilly et al. it decreased. We need to know what accounts for this discrepancy.

We also need more and better data than we have now on who becomes a caregiver, and why. Currently, there are conflicting views on this matter. Some investigators (e.g., Bertrand et al. 2011; Fredman et al., 2010) argue that those who step into the caregiver role are healthier than those who do not. Other investigators argue just the opposite (e.g., Lee & Gramotnev, 2007). Conceivably both positions could be right, depending on characteristics of the caregiver and caregiving circumstances. For example, it is possible that individuals who do not become caregivers until they are elderly are, in fact, healthier than age-matched noncaregivers. But the situation may reverse for those who take on caregiving responsibilities at a younger age. Only well-designed longitudinal studies that

assess such characteristics and track individuals before they become caregivers can hope to clarify this matter.

As we have seen, the effects of caregiving are not as straightforward as previously thought; caregiving appears to be associated with both benefits and costs. Theories of caregiving will need to keep pace. As stand-alone models, neither the caregiver strain nor the healthy caregiver hypothesis seems particularly well suited for handling *both* the benefits and the costs of caregiving. The caregiving system motivation model (Brown et al., 2012) is equipped to accommodate both aspects of caregiving, but not without further development and testing. Several questions need theoretical and empirical clarification. For example: What are the relative roles of stress reduction and positive affect in influencing positive caregiver outcomes? What are the effects of declining caregiver-recipient interdependence on caregiving motivation? Will we see differential effects of caregiving, depending on the motivation (other-directed vs. self-interested) of the caregiver? As noted earlier, this hypothesis has received preliminary support in studies of university students and volunteers (Crocker et al., 2010; Konrath et al., 2011), but it has not been investigated in the context of informal caregiving. If support for this hypothesis is forthcoming, then a related question is whether it is possible to facilitate other-directed motivation in informal caregivers. There are data outside the realm of informal caregiving that are promising in this regard. For example, Weng et al. (2013) found that short-term compassion training was associated with increases in other-directed motivation (empathic concern) and altruistic behavior, possibly because of greater engagement of neural systems implicated in understanding the suffering of others.

Implications for Caregiver Assessment and Intervention

Reliable and valid assessment of caregiver reactions to the caregiving experience is important both for research purposes—for example, determining the effectiveness of caregiver interventions—and for selecting appropriate counseling and support services for individual caregivers in need. Our review makes clear that a large percentage of caregivers derive satisfaction from their caregiving experiences. Moreover, there is some suggestion that positive and negative caregiver experiences are related, but separate constructs (Lin, Fee, & Wu, 2012). Accordingly, it makes sense for caregiver assessment to include ways of measuring not only caregiver distress, but also positive affect and satisfaction (FCA, 2006).

Caregiver intervention studies to date have yielded mixed results (Lopez-Hatmann, Wens, Verhoeven, & Remmen, 2012; Zarit & Femia, 2008), with some having null or even negative effects on measures of caregiver well-being (Acton & Kang, 2001). A major contributing factor may be what Zarit and Femia (2008) have called a mismatch between treatment and caregiver's needs. As they put it: "A trial that enrolls caregivers who don't need help in a specific area provides treatment

for a problem that doesn't exist" (p. 50). A major advantage of developing and utilizing assessment protocols that are sensitive to positive as well as negative caregiver effects is that of streamlining caregiving interventions, making them better able to target those caregivers truly in need of counseling, support, and resources.

Finally, selective investment theory, our caregiving system model, and corroborative data highlight the importance of relationship variables—especially perceived interdependence and social bonds—in activating and maintaining caregiving motivation (Brown & Brown, 2006; Brown et al., 2012; Poulin et al., 2010). If these relationship variables are, as theory and research suggest, important links in the causal chain leading to other-directed motivation, then they may be important targets for caregiver assessment and intervention.

Measuring perceived interdependence and social bonds between caregivers and recipients, especially early on, may prove useful in predicting, preventing, and treating negative caregiver outcomes. Indeed, some instances of "caregiver burnout" may be understood in terms of low or declining levels of fitness interdependence and/or weak social bonds between caregiver and recipient. Consistent with selective investment theory, efforts to build or restore positive interdependence, or induce emotional closeness, may facilitate other-directed motivation. Such efforts might include having caregivers and recipients perform activities together (e.g., take walks; play games; exchange photos, jokes, or stories; sing songs; dance; watch television), come together for a common cause (e.g., participate mutually in preparing meals, folding clothes, building a model airplane, arranging a photo album, or developing a family history), or take turns asking and answering questions that encourage self-disclosure and identification of commonalities (for examples, see Sedikides, Campbell, Reeder, & Elliot, 1999). Naturally, the range of particular activities will be constrained by the physical and psychological limitations of both care recipients and their caregivers.

Implications for Public Policy

Our review suggests that giving to others can enhance the health and well-being of the caregiver. But it would be a fundamental error to conclude from our comments that positive caregiver outcomes occur automatically, in the absence of a fertile medium. Quite the contrary: As Figure 1 shows, our caregiving model highlights "available resources" as an important moderating variable in activating other-directed motivation, the hypothesized bridge to caregiver health and well-being.

Our emphasis on the importance of caregiver resources is not unique. Advocates for caregivers have argued persuasively that assessing and providing for their needs is good not only for them, but also for the social and economic interests of local communities, states, and nations (Feinberg et al., 2011). Of course, funding

public or private initiatives that address the needs of caregivers adequately, now and in the future, will be challenging. Potential stumbling blocks include the current socio-politico-economic climate, as well as demographic trends that translate to growing numbers of individuals in need, and fewer potential caregivers (Marks & Lambert, 1997). Nevertheless, if we recognize that investing in caregivers benefits not only them and the individuals they assist, but also society as a whole, then every effort should be made to enhance the availability and accessibility of meaningful caregiving-related resources.

At a bare minimum, people who anticipate embracing the role of informal caregiver require access to *informational* resources in order to know what awaits them, beginning with an *accurate* appraisal of the costs and benefits of caregiving. Currently, nongovernmental institutional stakeholders as well as federally funded agencies issue reports and fact sheets that emphasize the negative aspects of caregiving. In view of the serious limitations of studies reporting negative caregiver effects, and the recent demonstrations of positive outcomes (including reduced mortality) in large-scale longitudinal investigations, such reports are not only misleading, but also discouraging to individuals faced with the prospect of providing needed care to relatives and loved ones. Depictions of caregiving for dissemination to practitioners and the general public should make fewer sweeping generalizations about informal caregiving, and emphasize more the particular contexts that are likely to involve exposure to significant stress—for example, describing the toll that Alzheimer's Disease can take on the families of patients.

More specifically, statements focused on the consequences of caregiving should acknowledge the imperfect state of relevant scientific knowledge, and should include only results from well-designed and replicable investigations. As opposed to merely nodding to the possibility that there may be positive benefits for those who provide care, it would be more accurate to report that theory and data suggest that caregiving can also yield health benefits for caregivers. This could be important information for individuals who are considering whether to pay the enormous professional health care costs for a loved one at the end of life, or to take the "burden" on themselves and help care for their loved one at home. Advice directed to potential and actual caregivers should emphasize that a decision to provide informal care to a loved one is not necessarily harmful to the caregiver, and that caregiving can also be a positive experience for caregivers.

Ultimately, the responsibility for shaping policy that truly benefits the public in a cost-effective way begins with researchers themselves. We are the ones who design the studies that promise to reveal, in an objective manner, the nature of caregiving and its consequences. Our obligation is not only to devise appropriately controlled studies, but also communicate clearly their limitations, and present viable alternative interpretations of findings. We also act as keen observers, critical reviewers, gatekeepers, disseminators of research findings, and consultants. In the interest of promoting good science, improving the lot of caregivers and their

recipients, and serving the general public, it is incumbent on us to resist the myopia that can be induced by doctrinaire adherence to prevailing paradigms. Policy statements that are grounded in better science (as opposed to empirical studies with more intuitive results) may not only facilitate better health and relationships within families, but in doing so, could free up more health care resources for those in the greatest need, who either require support that cannot be given by family members, or who have no family or friends to rely on for care.

References

- Acton, G., & Kang, J. (2001). Interventions to reduce the burden of caregiving for an adult with dementia: A meta-analysis. *Research in Nursing and Health, 24*, 349–360.
- Baronet, A. M. (1999). Factors associated with caregiver burden in mental illness: A critical review of the research literature. *Clinical Psychology Review, 19*, 819–841.
- Bartz, J. A., Zaki, J., Bolger, N., & Ochsner, K. N. (2011). Social effects of oxytocin in humans: Context and person matter. *Trends in Cognitive Science, 15*, 301–309.
- Baumgarten, M. (1989). The health of persons giving care to the demented elderly: A critical review of the literature. *Journal of Clinical Epidemiology, 42*, 1137–1148.
- Beach, S. R., Schulz, R., Yee, J. L., & Jackson, S. (2000). Negative and positive health effects of caring for a disabled spouse: Longitudinal findings from the Caregiver Health Effects Study. *Psychology and Aging, 15*, 259–271.
- Bertrand, R. M., Saczynski, J. S., Mezzacappa, C., Hulse, M., Ensrud, K., & Fredman, L. (2011). Caregiving and cognitive function in older women: Evidence for the healthy caregiver hypothesis. *Journal of Aging and Health, 24*, 48–66.
- Biegel, D. E., Sales, E., & Schulz, R. (1991). *Family caregiving in chronic illness: Alzheimer's disease, cancer, heart disease, mental illness, and stroke*. Newbury Park, CA: Sage Publications.
- Bitzer, J. (2009). Progesterone, progestogens and psychosomatic health of the climacteric woman. *Maturitas, 62*, 330–333.
- Bouldin, E. D., & Andresen, E. (2009). *Caregiving across the United States: Caregivers of persons with Alzheimer's Disease or dementia in Illinois, Louisiana, Ohio, and the District of Columbia*. Gainesville: University of Florida, Florida Office on Disability and Health.
- Bowlby, J. (1969). *Attachment and loss: Vol. I. Attachment*. New York: Basic Books.
- Brown, S. L., & Brown, R. M. (2006). Selective Investment Theory: Recasting the functional significance of close relationships. *Psychological Inquiry, 17*, 1–29.
- Brown, S. L., Brown, R. M., House, J., & Smith, D. (2008). Coping with spousal loss: The potential buffering effects of self-reported helping behavior. *Personality & Social Psychology Bulletin, 34*, 849–861.
- Brown, S. L., Brown, R. M., & Preston, S. (2012). A model of human caregiving motivation. In S. L. Brown, R. M. Brown, & L. A. Penner (Eds.), *Moving beyond self-interest: Perspectives from evolutionary biology, neuroscience, and the social sciences* (pp. 75–88). New York: Oxford University Press.
- Brown, S. L., Fredrickson, B. L., Wirth, M. M., Poulin, M. J., Meier, E. A., Heaphy, M. D., Cohen, M. D., & Schultheiss, O. C. (2009). Social closeness increases salivary progesterone in humans. *Hormones and Behavior, 56*, 108–111.
- Brown, S. L., Nesse, R. M., Vinokur, A. D., & Smith, D. M. (2003). Providing social support may be more beneficial than receiving it: Results from a prospective study of mortality. *Psychological Science, 14*, 320–327.
- Brown, S. L., Smith, D. M., Schulz, R., Kabeto, M. U., Ubel, P. A., Poulin, M., Yee, J., Kim, C., & Langa, K. M. (2009). Caregiving behavior is associated with decreased mortality risk. *Psychological Science, 20*, 488–494.

- Brown, W. M., Consedine, N. S., & Magai, C. (2005). Altruism relates to health in an ethnically diverse sample of older adults. *Journals of Gerontology: Series B: Psychological Sciences & Social Sciences*, *60B*, 143–152.
- Burton, L. C., Zdaniuk, B., Schulz, R., Jackson, S., & Hirsch, C. (2003). Transitions in spousal caregiving. *The Gerontologist*, *43*, 230–241.
- Carter, C. S. (1998). Neuroendocrine perspectives on social attachment and love. *Psychoneuroendocrinology*, *23*, 779–818.
- Cassidy, J. (1999). The nature of the child's ties. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 3–20). New York: Guilford.
- Centers for Disease Control and Prevention. (2008). *Assuring healthy caregivers, a public health approach to translating research into practice: The RE-AIM framework*. Neenah, WI: Kimberly-Clark Corporation.
- Chen, Q., Panksepp, J. B., & Lahvis, G. P. (2009). Empathy is moderated by genetic background in mice. *PLoS ONE*, *4*, e4387.
- Choi, C-W. J., Stone, R. A., Kim, K. H., Ren, D., Schulz, R., Given, C. W., Given, B. A., & Sherwood, P. R. (2012). Group-based trajectory modeling of caregiver psychological distress over time. *Annals of Behavioral Medicine*, *44*, 73–84.
- Christakis, N., & Allison, P. D. (2006). Mortality after the hospitalization of a spouse. *New England Journal of Medicine*, *354*, 719–730.
- Christakis, N. A., & Allison, P. D. (2009). Inter-spousal mortality effects: Caregiver burden across the spectrum of disabling disease. In D. M. Cutler & D. A. Wise (Eds.), *Health at older ages: The causes and consequences of declining disability among the elderly*. Chicago: University of Chicago Press.
- Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*, 481–494.
- Clodi, M., Vila, G., Geyerregger, R., Riedl, M., Stulnig, T., Struck, J., Luger, T., & Luger, A. (2008). Oxytocin alleviates the neuroendocrine and cytokine response to bacterial endotoxin in healthy men. *American Journal of Physiological Endocrinology Metabolism*, *295*, E686–E691.
- Cohen, S., & Janicki-Deverts, D. (2009). Can we improve our physical health by altering our social networks? *Psychological Science*, *4*, 375–378.
- Crocker, J., Canevello, A., Breines, J. G., & Flynn, H. (2010). Interpersonal goals and change in anxiety and dysphoria in first-semester college students. *Journal of Personality and Social Psychology*, *98*, 1009–1024.
- Del Giudice, M., Ellis, B. J., & Shirlcliff, E. A. (2011). The Adaptive Calibration Model of stress responsivity. *Neuroscience and Biobehavioral Reviews*, *35*, 1562–1592.
- de Waal, F. (2009). *The age of empathy*. New York: Harmony Books.
- Doty, P., Jackson, M. E., & Crown, W. (1998). The impact of female caregivers' employment status on patterns of formal and informal eldercare. *The Gerontologist*, *38*(3), 331–341.
- Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008). Spending money on others promotes happiness. *Science*, *319*, 1687–1688.
- Family Caregiver Alliance. (2006). *Caregiver Assessment: Principles, Guidelines and Atrategies for Change*. (Downloaded August 5, 2012 from <http://www.caregiver.org>).
- Family Caregiver Alliance. (2011). *Selected Caregiver Statistics*. (Downloaded August 4, 2012 from <http://www.caregiver.org/caregiver/jsp/home.jsp>).
- Feinberg, L., Reinhard, S. C., Houser, A., & Choula, R. (2011). *Valuing the invaluable: 2011 update—The growing contributions and costs of family caregiving*. Washington, DC: AARP Public Policy Institute.
- Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science and Medicine*, *45*, 1207–1221.
- Fredman, L., Cauley, J. A., Hochberg, M., Ensrud, K. E., & Doros, G. (2010). Mortality associated with caregiving, general stress, and caregiving-related stress in elderly women: Results of caregiver-study of osteoporotic fractures. *Journal of the American Geriatrics Society*, *58*, 937–943.

- Fredman, L., Cauley, J. A., Satterfield, S., Simonsick, E., Spencer, S. M., Ayonayon, H. A., et al. (2008). Caregiving, mortality, and mobility decline: The health, aging, and body composition (health abc) study. *Archives of Internal Medicine*, *168*, 2154–2162.
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An evolutionary analysis and empirical review. *Psychological Bulletin*, *136*, 351–374.
- Hamilton, W. D. (1964). The genetic evolution of social behavior: I and II. *Journal of Theoretical Biology*, *7*, 1–52.
- Hanratty, B., Holland, P., Jacoby, A., & Whitehead, M. (2007). Financial stress and strain associated with terminal cancer—a review of the evidence. *Palliative Medicine*, *21*, 595–607.
- Hirst, M. (2005). Carer distress: A prospective, population-based study. *Social Science and Medicine*, *61*, 697–708.
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine* *7*, e1000316.
- Hrdy, S. B. (2009). *Mothers and others: The evolutionary origins of mutual understanding*. Cambridge, MA: Belknap Press.
- Hunt, G., Levine, C., & Naiditch, L. (2005). Young caregivers in the U.S.: Findings from a national survey. National Alliance for Caregiving. (Downloaded January 20, 2013 from <http://www.caregiving.org>).
- Immordino-Yang, M. H., McColl, A., Damasio, H., & Damasio, A. (2009). Neural correlates of admiration and compassion. *Proceedings of the National Academy of Sciences*, *106*, 8021–8026.
- International Alt/Self Map Consortium. (2007). A same gene for altruism and selfishness in primates. *Medical Sciences*, *23*, 440–444.
- Jain, S., Kannan, K., Prouty, L., & Jain, S. (2004). Progesterone, but not 17 β -estradiol, increases TNF- α secretion in U937 monocytes. *Cytokine*, *26*, 102–105.
- Jankowski, M., Bissonauth, V., Gao, L., Gangal, M., Wang, D., Danalache, B., Wang, Y., Stoyanova, E., Cloutier, G., Blaise, G., & Gutkowska, J. (2010). Anti-inflammatory effect of oxytocin in rat myocardial infarction. *Basic Research in Cardiology*, *105*, 205–218.
- Jenkins, K. R., Kabeto, M. U., & Langa, K. M. (2009). Does caring for your spouse harm one's health? Evidence from a United States nationally-representative sample of older adults. *Ageing & Society*, *29*, 277–293.
- Kirsch, P., Esslinger, C., Chen, Q., Mier, D., Lis, S., Siddhanti, S., Gruppe, H., Mattay, V. S., Gallhofer, B., & Meyer-Lindenberg, A. (2005). Oxytocin modulates neural circuitry for social cognition and fear in humans. *The Journal of Neuroscience*, *25*, 11489–11493.
- Knafo, A., & Israel, S. (2010). In M. Mikulincer, & P. R. Shaver (Eds.), *Prosocial emotions, motives, and behavior: The better angels of our nature* (pp. 149–167). Washington, DC: American Psychological Association.
- Kogan, A., Impett, E. A., Oveis, C., Hui, B., Gordon, A. M., & Keltner, D. (2010). When giving feels good: The intrinsic benefits of sacrifice in romantic relationships for the communally motivated. *Psychological Science* *21*, 1918–1924.
- Konrath, S., Fuhrel-Forbis, A., Lou, A., & Brown, S. (2011). Motives for volunteering are associated with mortality risk in older adults. *Health Psychology*, *31*, 87–96.
- Kroenke, C. H., Hankinson, S. E., Schernhammer, E. S., Colditz, G. A., Kawachi, I., & Holmes, M. D. (2004). Caregiving stress, endogenous sex steroid hormone levels, and breast cancer incidence. *American Journal of Epidemiology*, *159*, 1019–1027.
- Lamm, C., Decety, J., & Singer, T. (2011). Meta-analytic evidence for common and distinct neural networks associated with directly experienced pain and empathy for pain. *NeuroImage* *54*, 2492–2502.
- Lawton, M. P., Moss, M., Hoffman, C., & Perkinson, M. (2000). Two transitions in daughters' caregiving careers. *The Gerontologist*, *40*, 437–448.
- Lee, C., & Gramotnev, H. (2007). Transitions into and out of caregiving: Health and social characteristics of mid-age Australian women. *Psychology and Health*, *22*, 193–209.
- Levitis, D., & Lackey, L. B. (2010). *To Care or to Fight: Must Primate Males Choose?* (Downloaded August 6, 2012 from <http://www.demogr.mpg.de/papers/working/wp-2010-032.pdf>).

- Lim, M. M., & Young, L. J. (2006). Neuropeptidergic regulation of affiliative behavior and social bonding in animals. *Hormones and Behavior*, *50*, 506–517.
- Lin, I-F., Fee, H. R., & Wu, H-S. (2012). Negative and positive caregiving experiences: A closer look at the intersection of gender and relationship. *Family Relations*, *61*, 343–358.
- Lopez, J., Lopez-Arrieta, J., & Crespo, M. (2005). Factors associated with the positive impact of caring for elderly and dependent relatives. *Archives of Gerontology and Geriatrics*, *41*, 81–94.
- Lopez-Hartmann, M., Wens, J., Verhoeven, V., & Remmen, R. (2012). The effect of caregiver support interventions for informal caregivers of community-dwelling frail elderly: A systematic review. *International Journal of Integrated Care*, *12*. (Downloaded January 19, 2013 from <http://www.ijic.org>).
- Lundh, U. (1999). Family carers 2: Sources of satisfaction among Swedish carers. *British Journal of Nursing* *8*, 647–652.
- Mandel, D. (2006). *Caregiving Can Be Harmful to Your Health*. (Downloaded August 5, 2012 from <http://www.turnyourinnerlight.com/Caregiving.html>).
- Marks, N. F., & Lambert, J. D. (1997). *Family caregiving: Contemporary trends and issues*. University of Wisconsin-Madison: Center for Demography and Ecology.
- McCann, J. J., Hebert, L. E., Bienias, J. L., Morris, M. C., & Evans, D. A. (2004). Predictors of beginning and ending caregiving during a 3-year period in a biracial community population of older adults. *American Journal of Public Health*, *94*, 1800–1806.
- Mikulincer, M., & Shaver, P. R. (2012). In S. L. Brown, R. M. Brown, & L. A. Penner (Eds.), *Moving beyond self-interest: Perspectives from evolutionary biology, neuroscience, and the social sciences* (pp. 39–52). New York: Oxford University Press.
- National Alliance for Caregiving. (2009). *Caregiving in the U.S.* (Downloaded August 5, 2012 from <http://www.caregiving.org/pdf/research/CaregivingUSAllAgesExecSum.pdf>).
- Numan, M. (2006). Hypothalamic neural circuits regulating maternal responsiveness toward infants. *Behavioral Cognitive Neuroscience Review*, *5*, 163–190.
- Numan, M. (2012). Neural circuits regulating maternal behavior. In S. L. Brown, R. M. Brown, & L. A. Penner (Eds.), *Moving beyond self-interest: Perspectives from evolutionary biology, neuroscience, and the social sciences* (pp. 89–108). New York: Oxford University Press.
- Okun, M. A., August, K. J., Rook, K. S., & Newsom, J. T. (2010). Does volunteering moderate the relation between functional limitations and mortality? *Social Science and Medicine*, *71*, 1662–1668.
- Okun, M. A., Yeung, E. W., & Brown, S. (2013). Volunteering by older adults and risk of mortality: A meta-analysis. *Psychology & Aging*, *28*, 564–577.
- Oman, D. (2007). Does volunteering foster physical health and longevity?. In S. G. Post (Ed.), *Altruism and health: Perspective from empirical research* (pp. 15–32). New York: Oxford University Press.
- O'Reilly, D., Connolly, S., Rosato, M., & Patterson, C. (2008). Is caring associated with an increased risk of mortality? A longitudinal study. *Social Science & Medicine*, *67*, 1282–1290.
- Ory, M. G., Yee, J. L., Tennstedt, S. L., & Schulz, R. (2000). The extent and impact of dementia care: Unique challenges experienced by family caregivers. In R. Schulz (Ed.), *Handbook of dementia caregiving: Evidence-based interventions for family caregivers* (pp. 1–32). New York: Springer.
- Parveen, S., & Morrison, V. (2012). Predictors of caregiver gains: A longitudinal study. *British Journal of Health Psychology*, *17*, 711–723.
- Pearlin, L., Mullan, J., Semple, S., & Skaff, M. (1990). Caregiving and the stress process: An overview of concepts and their measures. *The Gerontologist*, *30*, 583–594.
- Petersson, M., Alster, P., Lundeberg, T., & Uvnas-Moberg, K. (1996). Oxytocin causes a long-term decrease of blood pressure in female and male rats. *Physiology & Behavior*, *60*, 1311–1315.
- Picot, S. J. F. (1995). Choice and social exchange theory and the rewards of African American caregivers. *Journal of National Black Nurses' Association*, *7*, 29–40.
- Pinquart, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: A metaanalysis. *Psychology and Aging*, *18*, 250–267.

- Pinquart, M., & Sörensen, S. (2007). Correlates of physical health of informal caregivers: A meta-analysis. *Journal of Gerontology: Social Sciences*, *62*, 126–137.
- Porges, S., & Carter, C. S. (2012). In S. L. Brown, R. M. Brown, & L. A. Penner (Eds.), *Moving beyond self-interest: Perspectives from evolutionary biology, neuroscience, and the social sciences* (pp. 53–71). New York: Oxford University Press.
- Poulin, M. J., Brown, S. L., Ubel, P. A., Smith, D. M., Jankovic, A., & Langa, K. M. (2010). Does a helping hand mean a heavy heart? Helping behavior and well-being among spouse caregivers. *Psychology and Aging*, *25*, 108–117.
- Poulin, M. J., Holman, E. A., & Buffone, A. (2012). The neurogenetics of nice: Receptor genes for oxytocin and vasopressin interact with threat to predict prosocial behavior. *Psychological Science*, *23*, 446–452.
- Preston, S. D. (2013). The origins of altruism in offspring care. *Psychological Bulletin*. Advance online publication. doi: 10.1037/a0031755
- Roberts, G. (2005). Cooperation through interdependence. *Animal Behaviour*, *70*, 901–908.
- Robison, J., Fortinsky, R., Kleppinger, A., Shugrue, N., & Porter, M. (2009). A broader view of family caregiving: Effects of caregiving and caregiver conditions on depressive symptoms, health, work, and social isolation. *Journal of Gerontology: Social Sciences*, *64*, 788–798.
- Schaller, M., Miller, G. E., Gervais, W. M., Yager, S., & Chen, E. (2010). Mere visual perception of other people's disease symptoms facilitates a more aggressive immune response. *Psychological Science*, *21*, 649–652
- Scharlach, S., Li, W., & Dalvi, T. B. (2006). Family conflict as a mediator of caregiver strain. *Family Relations*, *55*, 625–635.
- Schulz, R., & Beach, S. (1999). Caregiving as a risk factor for mortality: The Caregiver Health Effects Study. *Journal of the American Medical Association*, *282*, 2215–2219.
- Schulz, R., & Sherwood, P. R. (2008). Physical and mental health effects of family caregiving. *American Journal of Nursing*, *108*, 23–27.
- Schulz, R., & Monin, J. K. (2012). The costs and benefits of informal caregiving. In S. L. Brown, R. M. Brown, & L. A. Penner, (Eds.), *Moving beyond self-interest: Perspectives from evolutionary biology, neuroscience, and the social sciences* (pp. 178–198). New York: Oxford University Press.
- Sedikides, C., Campbell, W. K., Reeder, G. D., & Elliot, A. J. (1999). The Relationship Closeness Induction Task. *Representative Research in Social Psychology*, *23*, 1–4.
- Selye, H. (1976). *The stress of life*. New York: McGraw-Hill.
- Sober, E., & Wilson, D. S. (1998). *Unto others: The evolution and psychology of unselfish behavior*. Cambridge, MA: Harvard University Press.
- Span, P. (2011). *Caregiving's Hidden Benefits*. (Downloaded August 5, 2012 from <http://newoldage.blogs.nytimes.com/2011/10/12/caregivings-hidden-benefits/>).
- Spikins, P.A., Rutherford, H. E., & Needham, A. P. (2010). From hominid to humanity: Compassion from the earliest archaic to modern humans. *Time and Mind* *3*, 303–325.
- Szeto, A., Nation, D., Mendez, A., Domínguez-Bendala, J., Brooks, L., Schneiderman, N., & McCabe, P. (2008). Oxytocin attenuates NADPH-dependent superoxide activity and IL-6 secretion in macrophages and vascular cells. *American Journal of Physiological Endocrinology Metabolism*, *295*, E1495–E1501.
- Tamura, I., Toshiaki, T., Lee, L., Kizuka, F., Taniguchi, K., Maekawa, R., Asada, H., & Sugino, N. (2011). Differential effects of progesterone on COX-2 and Mn-SOD expressions are associated with histone acetylation status of the promoter region in human endometrial stromal cells. *Journal of Clinical Endocrinology Metabolism*, *96*, E1073–E1082.
- Tomasello, M., Dweck, C., Silk, J., Skyrms, B., & Spelke, E. (2009). *Why we cooperate*. Cambridge, MA: The MIT Press.
- Townsend, A., Noelker, L., Deimling, G., & Bass, D. (1989). Longitudinal impact of inter-household caregiving on adult children's mental health. *Psychology and Aging*, *4*, 393–401
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, *46*, 35–57.

- Vitaliano, P. P., Scanlan, J. M., Zhang, J., Savage, M. V., Hirsch, I., & Siegler, I. C. (2002). A path model of chronic stress, the metabolic syndrome, and coronary heart disease. *Psychosomatic Medicine, 64*, 418–435.
- Vitaliano, P. P., Zhang, J., & Scanlan, J. M. (2003). Is caregiving hazardous to one's physical health? A meta-analysis. *Psychological Bulletin, 129*, 946–972.
- Weinstein, N., & Ryan, R. M. (2010). When helping helps: Autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology, 98*, 222–244.
- Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C., Rogers, G. M., & Davidson, R. J. (2013). Compassion training alters altruism and neural responses to suffering. *Psychological Science, 24*, 1171–1180.
- Williamson, G. M., & Shaffer, D. R. (2001). Relationship quality and potentially harmful behaviors by spousal caregivers: how we were then, how we are now. The Family Relationships in Late Life Project. *Psychology and Aging, 16*, 217–226.
- Wirth, M. M., & Schultheiss, O. C. (2006). Effects of affiliation arousal (hope of closeness) and affiliation stress (fear of rejection) on progesterone and cortisol. *Hormones and Behavior, 50*, 786–95.
- Wolff, J. L., Dy, S. M., Frick, K. D., & Kasper, J. D. (2007). End of life care: Findings from a national survey of informal caregivers. *Archives of Internal Medicine, 167*, 40–46.
- Yinon, Y., & Landau, M. (1987). On the reinforcing value of helping behavior in a positive mood. *Motivation and Emotion, 11*, 83–93.
- Zarit, S., & Femia, E. (2008). Behavioral and psychosocial interventions for family caregivers. *American Journal of Nursing, 108*, 47–53.

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