Emotion
2012, Vol. 12, No. 5, 1129–1140

1528-3542/11/$12.00 DOI: 10.1037/a0025011

Greater Emotional Empathy and Prosocial Behavior in Late Life

Jocelyn A. Sze
University of California, Berkeley

Anett Gyurak
Stanford University

Madeleine S. Goodkind and Robert W. Levenson
University of California, Berkeley

Emotional empathy and prosocial behavior were assessed in older, middle-aged, and young adults. Participants watched two films depicting individuals in need, one uplifting and the other distressing. Physiological responses were monitored during the films, and participants rated their levels of emotional empathy following each film. As a measure of prosocial behavior, participants were given an additional payment they could contribute to charities supporting the individuals in the films. Age-related linear increases were found for both emotional empathy (self-reported empathic concern and cardiac and electrodermal responding) and prosocial behavior (size of contribution) across both films and in self-reported personal distress to the distressing film. Empathic concern and cardiac reactivity to both films, along with personal distress to the distressing film only, were associated with greater prosocial behavior. Empathic concern partially mediated the age-related differences in prosocial behavior. Results are discussed in terms of our understanding both of adult development and of the nature of these vital aspects of human emotion.

Keywords: emotional empathy, prosocial behavior, emotion, physiological responses, aging

Our capacity to respond to others in need is an important aspect of the human condition, helping us form social bonds, facilitating harmonious group relations, and enhancing the "greater good" (Eisenberg & Fabes, 1998; Hoffman, 2000). Researchers have focused primarily on two responses to others in need: emotional empathy (i.e., having an emotional reaction to the other's plight) and prosocial behavior (i.e., acting to help those in need). Emotional empathy and prosocial behavior are linked conceptually and empirically, in that emotional empathy is thought to be a motivating factor for subsequent helping behavior (Batson, 1990; Eisenberg et al., 1989; Krebs, 1975; Stocks, Lishner, & Decker, 2009).

These capacities increase in early development. A meta-analysis of 179 studies concluded that older children exhibit more emotional empathy and more prosocial behavior in response to needy others than do younger children (Eisenberg & Fabes, 1998). However, empirical studies of changes in emotional empathy and prosocial behavior in adult development are rare. Instead, most research has focused on either of the following: (a) age differences in cognitive empathy (i.e., the ability to recognize and interpret the emotions of others), for which there are well-documented declines with age (Ruffman, Henry, Livingstone, & Phillips, 2008), or (b) age differences in trait empathy, for which there are indications of mild declines in cognitive aspects and relative stability in emotional aspects (Bailey, Henry, & von Hippel, 2008; Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008; Schieman & Van Gundy, 2000). To address this gap, in the present study we examined emotional empathy and prosocial behavior in a sample ranging from young to older adulthood.

Emotional Empathy

Emotional empathy has been defined as an emotional response produced by witnessing another person in need and is thought to involve both subjective and physiological components. The subjective components include empathic concern, or feelings of warmth and concern toward the other, and personal distress, or feelings of distress and discomfort (Batson, Darley, & Coke, 1978; Eisenberg et al., 1988). Empathic concern and personal distress are similar in that they are both manifestations of the vicariously induced arousal generated from apprehension of the other's emotional state or general situation (Eisenberg & Miller, 1987). They differ in that empathic concern is thought to rely on higher-level cognitive processes such as perspective taking, whereas personal distress is thought to rely on lower-level processes such as emotional reactivity and contagion (Eisenberg, 2000; Lamm, Batson, & Decety, 2007).

Along with producing subjective arousal, there is evidence that witnessing others in need is physiologically activating. Most studies have focused on electrodermal and cardiovascular measures as physiological indices of emotional empathy (Eisenberg & Fabes, 1990; Krebs, 1975; Zahn-Waxler, Cole, Welsh, & Fox, 1995). A positive association has consistently been found between emo-

This article was published Online First August 22, 2011.

Jocelyn A. Sze, Madeleine S. Goodkind, and Robert W. Levenson, Department of Psychology, University of California, Berkeley; Anett Gyurak, Department of Psychology, Stanford University.

We thank Sandy Lwi for her help in data collection. This research was supported by a grant from the National Institute of Aging (R37-AG017766).

Correspondence concerning this article should be addressed to Robert W. Levenson, Institute of Personality and Social Research, Department of Psychology, University of California, 4143 Tolman Hall, MC 5050, Berkeley, CA 94720-5050. E-mail: boblev@socrates.berkeley.edu

tional empathy and skin conductance (Blair, 1999; Craig & Lowery, 1969; Lanzetta & Englis, 1989). The association between emotional empathy and cardiac activation has been less consistent, with some studies reporting a positive association (Craig & Lowery, 1969; Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000; Krebs, 1975) and others reporting a negative association (e.g., Eisenberg et al., 1989; see Eisenberg & Fabes, 1990). To resolve these inconsistencies, researchers have proposed a curvilinear relationship between cardiac activation and emotional empathy, with heart rate decelerations occurring in mildly distressing situations characterized by other-oriented emotions and heart rate accelerations occurring in highly distressing situations (Eisenberg & Fabes, 1990).

Prosocial Behavior

Prosocial behavior has been defined as voluntary, intentional behavior that results in benefits for another individual or group (Eisenberg, 1982; Staub, 1979). In laboratory studies, prosocial behavior is typically measured by behavioral indicators of helping or self-reported intent to help (Batson, Fultz, & Schoenrade, 1994; Eisenberg et al., 1989; Zahn-Waxler et al., 1995). Prosocial behavior can be motivated by a number of factors including social desirability, tax incentives, and self-enhancement (Eisenberg et al., 1989; Kahneman & Knetsch, 1992) as well as by emotional empathy.

Emotional Empathy and Prosocial Behavior

Research has highlighted the special role that emotional empathy can play in motivating prosocial behavior (Batson, 1987; Coke, Batson, & McDavis, 1978; Eisenberg, 2003; Eisenberg et al., 1989; Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994; Eisenberg & Miller, 1987; Toi & Batson, 1982). One explanation of this motivation emphasizes emotion regulation; acting on behalf of a needy other reduces the arousal induced by experiencing that person in need (Schaller & Cialdini, 1988). Another view emphasizes calibration, with people using their level of emotional empathy to infer the severity of the other person's situation and the degree to which they value that person's welfare, which in turn influences their decision as to whether or not to help (Batson et al., 1989; Baumann, Cialdini, & Kenrick, 1985; Krebs, 1975; Toi & Batson, 1982).

Emotional Development in Adulthood

Several prominent theories of adult development propose that despite age-related declines in cognitive domains, age-related gains may be seen in socioemotional domains such as emotional responding (Izard, 1977; Magai, 2008) and prioritizing social and generative goals (Carstensen, Fung, & Charles, 2003; Erikson, 1982). For example, Magai (2008) argues that aging enhances the interconnections among emotional, cognitive, and behavioral subsystems, facilitating the development of more complex emotions and greater empathy to the emotional needs of others. Socioemotional selectivity theory proposes that as aging individuals perceive their time left in life as increasingly limited, they shift their motivations away from future-oriented goals and toward social and emotionally meaningful ones (Carstensen et al., 2003). According to Erikson (1982), generativity (i.e., expanding the focus of concern beyond oneself) is a predominant developmental challenge of middle to late adulthood. Evolutionary perspectives suggest that because young people in foraging societies consume more than they produce, cooperation between generations is critical for survival. In this context, there is a particular need for older adults to provide emotional support and mediate conflicts (Gurven & Kaplan, 2009).

Age Differences in Emotion and Emotional Empathy

Empirical studies have found age-related differences in emotional responding that are consistent with these theoretical accounts. Studies of age differences in emotional reactivity have generally found age-related increases in subjective, behavioral, and physiological reactivity in situations that signal the need for helping or reparation, such as contexts involving loss (Kunzmann & Gruhn, 2005; Seider, Shiota, Whalen, & Levenson, 2010), suffering (Kliegel, Jäger, & Phillips, 2007), and injustice (Charles, 2005; Phillips, Henry, Hosie, & Milne, 2008).

There is also evidence that aging is associated with a shift toward more affiliative emotions, which may also relate to greater concern for others. For example, when watching a video of emotionally ambiguous behavior, older adults were more likely to report the protagonist as feeling sad, while younger adults were more likely to report the protagonist as feeling angry (Charles, Carstensen, & McFall, 2001). Similarly, when discussing a problematic area in their marriage, older couples exhibited relatively more affection (an affiliative emotion) and relatively less disgust and anger (both nonaffiliative emotions) than middle-aged couples (Carstensen, Gottman, & Levenson, 1995).

Age Differences in Prosocial Behavior

Studies suggest that generativity is a key component to successful aging (Antonovsky & Sagy, 1990; Erikson, 1982; Fisher, 1995). Consistent with this, older adults have been found to endorse more generative goals (e.g., helping others and making an impact) and other-focused problem solving (e.g., strategies directed at maintaining relationships and taking other' needs into account) than do younger adults (Hoppmann, Coats, & Blanchard-Fields, 2007). Weiner and Graham (1989) found that self-reported levels of pity and willingness to help characters in hypothetical situations increased with age. Additionally, in recalling autobiographical information, middle-aged and older adults emphasized more themes of generativity than did younger adults (McAdams, St. Aubin, & Logan, 1993).

The Present Study

Based on these theoretical and empirical literatures, we hypothesized that both emotional empathy and prosocial behavior in response to individuals in need would increase with age. Given the link between emotional empathy and prosocial behavior, we also hypothesized that differences in emotional empathy would account at least in part for age-related increases in prosocial behavior. To test these hypotheses, we showed older, middle-aged, and young participants two films, one depicting an uplifting theme and one depicting a distressing theme. Using films with different themes

provided an opportunity to assess generalizability. We assessed emotional empathy by determining the magnitude of subjective and physiological responses to the films. After viewing the films, participants were given the opportunity to donate to two different charities related to the films. We assessed prosocial behavior by determining the size of the donations. Because differences between age differences in prosocial behavior might be explained by factors other than age differences in emotional empathy, we included a number of additional measures (income, social desirability, perceptions of charities, past donation behavior, and trait empathy) that enabled us to evaluate alternative explanations.

Method

Participants

Seventy older participants (age range, 60–80 years, $M = 66.43$, $SD = 5.40$), 72 middle-aged participants (age range, 40–50 years, $M = 44.58$, $SD = 2.90$), and 71 young participants (age range, 20–30 years, $M = 23.07$, $SD = 2.65$) were recruited using flyers and online postings in the local community and from a research participant database administered by the University of California, Berkeley. Participants had to be in good health and sufficiently mobile to travel to the laboratory. The recruitment was designed to ensure that gender and ethnicity were stratified evenly across the three age groups. In terms of gender, 67% of the participants were women and 33% were men. In terms of ethnicity, the sample was 68% percent Caucasian American, 12% Asian American, 8% African American, 4% Latino American, and 6% other. Participants reported their annual household income using the following income brackets (1 = < $10,000; 2 = $10,000–$19,999; 3 = $20,000–$29,999; 4 = $30,000–49,999; 5 = $50,000–74,999; 6 = $50,000–74,999; 7 = $100,000–200,000; 8 = over $200,000). As would be expected, the groups differed in income, with older and middle-aged participants reporting higher incomes than young participants. Descriptive statistics and pairwise comparisons among age groups for income are presented in Table 1.

Participants were paid $50 for completing a questionnaire package and participating in a 2.5-hr laboratory session. Unbeknownst to them, they would also receive an additional $10 at the end of the experiment, with the option of keeping the money or donating some or all of it to two different charities (see *Procedure*).

Apparatus

Audiovisual. A partially concealed video camera focused on the participant's upper body and face. The output of the camera was routed through video time-code generators that added visible and invisible computer-readable timing information on the signal before it was recorded in DVD and VHS formats. As is our practice in all studies, participants were informed before the start of the session about the video recording and then asked for consent for varying levels of usage (e.g., research only, public showings) at the end of the experiment.

Physiology. Continuous recordings of seven physiological measurements of autonomic nervous system activity were measured using a system consisting of either a Grass Model 7 polygraph or a BIOPAC polygraph and a computer equipped for processing multiple channels of analog information (130 participants were assessed using the Grass Model 7 polygraph, and 83 participants were assessed using the BIOPAC polygraph). Physiology was monitored and averaged on a second-by-second basis for each of the following measures using computer programs written by one of the authors (Levenson): (a) heart rate (Beckman miniature electrodes with Redux paste or Vermed SilveRest EKG pregelled electrodes were placed in a bipolar configuration on opposite sides of the participant's chest; the interbeat interval was calculated as the interval, in milliseconds, between successive R waves), (b) finger pulse amplitude (a UFI photoplethysmograph attached to the second finger of the nondominant hand recorded the volume of blood in the finger, and the trough-to-peak amplitude of the finger pulse was measured), (c) finger pulse transmission time [the time interval in milliseconds was measured between the R wave of the electrocardiogram

Table 1
Group Means and Standard Deviations for Demographic Variables and Covariates

	Mean (*SD*)			Age effect		
	Young	Middle-aged	Older	*F*	*p* value	η^2
Income (1–8)	2.17[a] (2.04)	2.99[b] (1.90)	3.29[b] (1.83)	5.11	<.01	.05
Confidence in donations	4.49 (.90)	4.64 (.85)	4.66 (.79)	1.37	.26	.01
Charity perceptions						
Surfers charity	3.70 (.73)	4.11 (.75)	3.96 (.80)	2.54	.08	.02
Darfur charity	3.66 (.83)	3.83 (.84)	3.64 (.93)			
Past donation ($)	92.36[a] (146.68)	815.67[b] (2056.76)	1628.40[b] (3002.31)	8.34	<.01	.08
Trait empathy						
EC	3.76[a] (.70)	4.02 (.67)	4.07[b] (.55)	3.61	<.05	.03
PD	2.58[a] (.72)	2.21[b] (.69)	2.23 (.69)	4.03	<.05	.04
PT	3.66 (.67)	3.68 (.75)	3.67 (.70)	<1	.98	.00
Social desirability	4.64 (2.28)	4.99 (2.02)	4.86 (2.11)	<1	.77	.00
Baseline empathic concern	1.70[a] (.73)	2.14[b] (.93)	2.27[b] (.97)	6.80	<.01	.06
Baseline personal distress	1.28 (.49)	1.23 (.52)	1.18	1.01	.37	.01

Note. EC, PD, PT = Empathic Concern, Personal Distress, and Perspective Taking subscales of the Interpersonal Reactivity Index. Within each row, different subscripts denote significantly different means at $p < .05$.

(EKG) and the upstroke of the peripheral pulse at the finger site, recorded from the distal phalanx of the ring finger of the nondominant hand] with the photoplethysmograph, (d) ear pulse transmission time (a UFI photoplethysmograph attached to the right earlobe recorded the volume of blood in the ear, and the time interval in milliseconds was measured between the R wave of the EKG and the upstroke of peripheral pulse at the ear site), (e) systolic blood pressure and (f) diastolic blood pressure (an occluding cuff was placed on middle phalange of the middle finger of the nondominant hand and blood pressure was measured on each heartbeat using an Ohmeda Finapress 2300), and (g) skin conductance [a constant-voltage device was used to pass a small voltage between two Beckman or BIOPAC electrodes (filled with an electrolyte of sodium chloride in Unibase) attached to the palmar surface of the middle phalanges of the ring and index fingers of the nondominant hand].

Several other physiological responses were also monitored (finger temperature, respiration period, and general somatic activity), but cardiac and electrodermal measures were chosen as the focus of the present study because of the long history of using these measures in research on prosocial and empathic responding (Eisenberg & Fabes, 1990; Eisenberg et al., 1989; Krebs, 1975; Zahn-Waxler et al., 1995).

Donation boxes. Two locked donation boxes (15 × 8 × 6 cm, with slots large enough to insert dollar bills) were placed on a cabinet at the far-end of the room across from the participant. The boxes were labeled with "Surfers Healing" and "Darfur." Participants were not informed about the donation procedure until the end of the experiment; no participant asked about or commented on the boxes.

Measures

Self-reported emotional experience. Upon arriving at the laboratory and immediately after each film (see below), participants used a five-point Likert-type scale (1 = *not at all*; 5 = *extremely*) to indicate the degree to which they were feeling each of 18 emotion items (afraid, amused, angry, ashamed, calm, compassionate, disgusted, disturbed, embarrassed, enthusiastic, interested, moved, proud, sad, sympathetic, surprised, upset, and worried). Based on previous research (Batson, 1987; Eisenberg et al., 1988), three of the items measuring empathic concern ("sympathetic," "moved," "compassionate") and three measuring personal distress ("disturbed," "upset," "worried") were averaged to compute mean scores for each. Reliabilities among the empathic concern and personal distress items were high for both of the films used (alphas for uplifting film: empathic concern = .85, personal distress = .87; for distressing film: empathic concern = .92, personal distress = .89). An "uplifting" score was derived from two items (enthusiastic, proud) and was used as a manipulation check (see below) of presumed differences between the uplifting and distressing films. Reliabilities among the uplifting items were adequate for both films (alphas for uplifting film = .72; for distressing film = .57). The remaining nine emotion items were not included in the analysis.

Physiology. Using the second-by-second data obtained for each physiological measure, means for each film and for each participant were calculated. As noted earlier, in the current research we focused on cardiac and electrodermal measures. We computed a composite measure of autonomic activation by averaging the standardized means of the following variables: cardiac interbeat interval, finger pulse amplitude, pulse transmission time to the finger, pulse transmission time to the ear (the standardized scores of these measures were multiplied by −1 so that higher numbers would indicate greater activation), systolic blood pressure, diastolic blood pressure, and skin conductance. Reactivity scores were computed by subtracting the average level for the prefilm baseline period (the 30 seconds before the warning that the film was about to start) from the average level during the film. We have used these kinds of physiological reactivity composites in our previous work (e.g., Gross & Levenson, 1997; Mauss et al., 2005; Sturm et al., 2006; Werner et al., 2007). Composites of this sort reduce the number of physiological dependent variables, thus helping control for Type I error. However, to ensure that the use of the autonomic composite did not distort the findings, we also conducted follow-up analyses at the level of individual physiological variables. To be consistent with previous research on empathy, which largely used cardiac interbeat interval/heart rate as its physiological dependent measure, we highlighted analyses using only cardiac interbeat interval.

Prosocial behavior. The total dollar amounts (from $0–$10) donated by each participant to each of the two charitable organizations associated with the films (see below for description of this procedure) provided indices of prosocial behavior.

Beliefs about donation and perceptions of charities. At the end of the experiment, participants were asked to rate (1 = *not at all*; 5 = *extremely*) the following: (a) a single item that asked the extent to which they believed that money placed in the donation boxes would actually be donated to the charities (this served as a manipulation check for the donation task); and (b) two sets of four items that asked the extent to which each charity was well-managed and underfunded and the extent to which their causes were hopeful and helpful (this served as a measure of perceptions toward the charities). The four charity-related items were combined to create a single index of charity perceptions. Reliabilities among the four items were adequate for both films (for uplifting film: $\alpha = .68$; for distressing film: $\alpha = .66$).

Self-reported past donation behavior. To provide an index of past donation behavior, participants reported the total dollar amount of donations they had given to charities in the past 12 months.

Trait empathy. Trait empathy was assessed using three subscales of the Interpersonal Reactivity Index (Davis, 1980): empathic concern (e.g., "When I see someone being taken advantage of, I feel kind of protective toward them"), personal distress (e.g., "Being in a tense emotional situation scares me"), and perspective taking (e.g., "I try to look at everybody's side of a disagreement before I make a decision"). Internal consistencies were adequate for all three subscales (alphas: empathic concern = .80, personal distress = .78, perspective taking = .82).

Social desirability. Social desirability was assessed using the 10-item version of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). Social desirability can directly influence prosocial behavior; thus, it was important to control for it in our analyses. Internal consistency for this version was adequate ($\alpha = .64$).

Procedure

Three to seven days before their laboratory visit, participants were asked to complete a questionnaire packet including measures of personality and emotional experience. On arrival to the laboratory, participants were greeted by a female experimenter and seated in a chair in a 3 × 6 m experimental room. Participants were informed that they were participating in a study of emotion, during which their physiological reactions would be monitored and behavioral reactions would be videotaped. After signing the consent form and having the physiological sensors attached, participants completed the baseline self-reported emotional experience questionnaire. The experimental protocol that followed consisted of a series of tasks designed to assess a number of aspects of emotional and empathic functioning. For the present study, we are focusing on the task administered at the end of the protocol, in which participants viewed the two films portraying individuals in need (to assess emotional empathy) and subsequently had an opportunity to contribute to two related charities (to assess prosocial behavior).

Empathy films. Each participant viewed an "uplifting" and a "distressing" film, both of which portrayed individuals in need, and both of which were designed to elicit emotional empathy. The uplifting film began with a brief introduction to childhood autism followed by images of children with autism learning how to surf at a nonprofit camp called Surfers Healing (116 s in length). The film depicted the empowerment and joy experienced by the children with autism while surfing. The distressing film began with a brief introduction to the Darfur crisis followed by images of men, women, and children who are wounded and emaciated receiving aid from relief workers (117 s in length). The film depicts the horror and inhumane conditions being experienced by the people of Darfur.

The two films were shown in counterbalanced order. Each film was preceded by a 1-min resting period, during which participants were asked to clear their mind, relax, and focus on an X in the center of the video screen. Fifty-three seconds into the resting period, a written message appeared above the X indicating that the film was about to start. Immediately after each film, participants completed the self-reported emotional experience questionnaire described above.

Prosocial behavior. After participants finished viewing the two films, the assistant and the experimenter entered the room. The assistant removed the physiological sensors and the experimenter gave the participant a $50 check that constituted the agreed-upon payment for the study and a consent form to complete regarding use of the video recording. Participants were also given 10 one-dollar bills and an information sheet about two actual charitable organizations associated with the individuals portrayed in the two films (Surfers Healing, which provides surfing camps for children with autism, and Not On Our Watch, which provides aid to Darfur). The experimenter explained:

"As an added thank you, we are offering you an extra $10 in compensation, on top of your original $50 compensation. You can choose to keep all of the extra $10, or donate some or all of the $10 to either or both of the charities described on this sheet, related to the two films you just saw. We want to emphasize that whether you donate is entirely anonymous and voluntary—we are no longer videotaping, and if you do decide to donate, please do so once we are outside of the room—the donation boxes are in the back of the room [*experimenter points to the boxes*]. Donations submitted through this study are periodically sent to the two charities described on this sheet. After you're all set in here, please meet me outside for two wrap-up questionnaires."

To reduce pressures of social desirability, the experimenter and assistant then exited the room, leaving the participant alone to make the donation decision privately. After the participant exited, the experimenter administered the questionnaire assessing beliefs about the donation and the charities. Participants were then debriefed and thanked. After the participant left, the experimenter unlocked and opened the donation boxes and logged the amount donated to each charity. Consistent with what participants were told, all contributions were donated anonymously to the two charities.

Results

Overall Analytic Strategy

An initial series of data analyses were conducted to evaluate the effects of the counterbalanced orderings of films. These analyses revealed no significant main effects or interactions involving order for any of our dependent variables. Thus, we collapsed across film order and conducted our analyses using 3 × 2 × 2 (Age × Sex × Film/Charity) ANOVAs and ANCOVAs with age and gender treated as between-subjects factors and film/charity treated as a within-subject factor. When continuous covariates were used, they were centered on the grand mean as recommended by Aiken and West (1991). For ease of interpretation, estimated marginal means (corrected for any covariates) are reported for all ANCOVA analyses. When a significant main effect was found for age with no significant Age × Film/Charity interaction, we conducted a polynomial trend analysis and tested whether a linear or quadratic pattern best captured the effect of age. Because polynomial trend analyses capture only overall patterns of group differences in a dependent variable, we also conducted Bonferroni-adjusted post hoc tests to identify specific differences between groups. When a significant interaction effect of Age × Film/Charity was found, we conducted analyses to examine the effects of age separately for each Film/Charity. The $p < .05$ rejection level was used for all statistical tests.[1]

Emotional Empathy

Our analyses of emotional empathy were derived from self-reported emotional reactivity and autonomic reactivity to the two

[1] There were no main effects for gender (*F*s ranged from .06 to 2.44) or significant interactions of gender with age and charity or age and film (*F*s ranged from .14 to 1.91) for the majority of our participant characteristics or for any of our laboratory measures. The only gender effect observed was for the trait empathic concern subscale of the IRI, with women reporting greater empathic concern than men, $F(1, 207) = 5.87$, $p < .05$. In a meta-analysis of sex differences in empathy, Eisenberg and Lennon (1983) found that greater empathy in women than in men has been reliably demonstrated in studies using self-report trait measures but not in controlled laboratory studies using measures such as subjective, facial, and physiological responding.

films. Analyses of self-report data were conducted using baseline levels of self-reported emotion as a covariate. As noted earlier, analyses of physiological data were conducted using reactivity scores (change from prefilm baseline). Means, SDs, effect sizes, and pairwise comparisons among age groups for emotional empathy are presented in Table 2.

Manipulation Check

Confirming our a priori designations of the two films as "uplifting" and "distressing," simple *t* tests revealed a higher uplifting score (enthusiastic, proud) for the uplifting film ($M = 2.88$ $SD = 1.23$) compared with the distressing film ($M = 1.15$, $SD = .47$), $t(211) = 20.53$, $p < .01$. Additionally, more personal distress was reported during the distressing film ($M = 3.59$, $SD = 1.19$) than during the uplifting film ($M = 1.28$ $SD = .70$), $t(211) = 25.31$, $p < .01$.

Age Differences in Emotional Empathy

Empathic concern. There was a significant main effect of age, $F(2, 202) = 15.06$, $p < .01$. As predicted, results indicated a significant age-related linear relationship, contrast estimate = .57, $p < .01$. Specifically, older participants reported the greatest empathic concern, middle-aged participants reported intermediate levels, and young participants reported lowest levels. The quadratic term of age was not significant, contrast estimate = −.09, $p = .39$. There was also a significant main effect of film, $F(1, 202) = 100.37$, $p < .01$, resulting from higher reports of empathic concern during the distressing film than the uplifting film; however, the Age × Film/Charity interaction was not significant, $F(2, 202) = 2.95$, $p = .06$.

Personal distress. There was a significant Age × Film/Charity interaction, $F(2, 202) = 5.36$, $p < .01$. Analyzing the results separately for each film, for the uplifting film, there was no main effect of age, $F(2, 208) < 1$. For the distressing film, there was a significant main effect of age, $F(2, 208) = 5.52$, $p < .01$, and a significant age-related linear relationship, contrast estimate = .63, $p < .01$. Specifically, older participants reported the greatest personal distress, middle-aged participants reported intermediate levels, and young participants reported the lowest levels. The quadratic term of age was not significant, contrast estimate = −.05, $p = .75$. Thus, for personal distress, age-related increases in reactivity were specific to the distressing film.

Physiological reactivity. There was a main effect of age, $F(2, 206) = 3.89$, $p < .05$, and a significant age-related linear relationship, contrast estimate = .11, $p < .01$. Specifically, older adults exhibited greater autonomic activation than younger adults, with middle-aged adults not differing from either age group. The quadratic term of age was not significant, contrast estimate = −.06, $p = .52$. There was no main effect of film, indicating similar levels of autonomic activation to both films, and no Age × Film/Charity interaction, Fs < 1.

Exploratory analyses conducted on the individual physiological measures were generally consistent with the overall age-related linear increase in autonomic reactivity found for the composite variable. Reactivity in interbeat interval (the measure predominantly used in research on empathy), along with three other measures (finger pulse transmission time, skin conductance, and systolic blood pressure), showed significant age-related linear increases across both films (ps < .05). For the other three measures (finger pulse amplitude, ear pulse transmission time, and diastolic blood pressure), age differences did not reach significance. Group means of physiological responding in individual measures are reported in Table 3.

Summary. The results for emotional empathy indicated age-related increases, with older participants exhibiting the highest

Table 2
Means and Standard Deviations by Group and Film for Measures of Emotional Empathy and Prosocial Behavior

	Mean (*SD*)			Effect size[a]			Pairwise comparisons (*p*)		
	Young	Middle-aged	Older	Film	Age	F × A	Young vs. Middle-aged	Older vs. Middle-aged	Older vs. Young
Empathic Concern									
Uplifting film	2.84 (.93)	3.56 (.95)	4.10 (.86)	.33**	.13**	.03	.004**	ns	<.001**
Distressing film	3.74 (1.07)	4.22 (1.02)	4.51 (.84)						
Personal Distress									
Uplifting film	1.22 (.73)	1.23 (.64)	1.35 (.65)	.74**	.08**	.05**	—	—	—
Distressing film	3.20 (1.22)	3.50 (1.18)	4.03 (1.04)				ns	.045*	.00**
Physiological Activation									
Uplifting film	−.10 (.39)	.02 (.41)	.05 (.42)	.00	.00	.04*	ns	ns	.022*
Distressing film	−.09 (.38)	−.01 (.47)	.07 (.50)						
Prosocial Behavior									
Uplifting film	1.46 (2.09)	1.69 (2.31)	1.74 (2.91)	.12**	.04*	.00	ns	.078	.013*
Distressing film	2.63 (2.63)	3.04 (3.04)	3.84 (3.81)						

Note. Empathic concern and personal distress results are reported after controlling for baseline levels of empathic concern and personal distress, respectively. Physiological activation scores reflect z-scored mean differences from baseline and are composites of seven physiological responses: inter-beat interval, finger pulse amplitude, finger pulse transmission time, ear pulse transmission time, systolic blood pressure, diastolic blood pressure, and skin conductance. Prosocial behavior is reported in dollars donated. Where the Age × Film/Charity interaction was significant, pairwise comparisons reflect age comparisons separately by film. Dashes (—) indicate that analyses were not conducted because of a lack of significant age effects.

[a] Effect sizes are partial eta squares (η^2).

* $p < .05$. ** $p < .01$.

Table 3
Group Means of Physiological Responding in Individual Channels (Corrected for Pre-Film Baseline Levels)

	Young		Middle-aged		Older	
Measure	Mean	*SE*	Mean	*SE*	Mean	*SE*
Cardiac inter-beat interval (ms)						
Uplifting film	888.35	4.67	874.91	4.62	876.94	4.75
Distressing film	894.39	5.22	880.59	134.51	877.90	5.29
Finger pulse amplitude (A/U units)						
Uplifting film	13.08	.56	12.56	.55	13.52	.58
Distressing film	12.92	.72	12.56	.72	13.58	.74
Finger pulse transit time (ms)						
Uplifting film	281.53	1.30	281.15	1.30	278.76	1.36
Distressing film	282.57	1.43	281.44	1.43	280.74	1.47
Ear pulse transit time (ms)						
Uplifting film	219.26	1.42	222.73	1.43	221.78	1.45
Distressing film	220.18	1.30	220.24	1.30	222.07	1.31
Systolic blood pressure (mm|Hg)						
Uplifting film	152.63	1.06	154.04	1.01	155.74	1.01
Distressing film	153.71	.89	153.18	.86	155.36	.87
Diastolic blood pressure (mm|Hg)						
Uplifting film	91.73	.65	92.97	.65	92.39	.64
Distressing film	92.40	.48	92.34	.48	92.59	.48
Skin conductance (μmhos)						
Uplifting film	2.93	.04	2.91	.03	2.92	.04
Distressing film	3.00	.04	2.95	.04	2.97	.04
Temperature (°Fahrenheit)*						
Uplifting film	81.23	.03	81.36	.03	81.26	.03
Distressing film	81.08	.04	81.17	.04	81.12	.04
Respiration period (sec)*						
Uplifting film	3.84	.11	3.95	.11	3.82	.11
Distressing film	3.76	.10	4.19	.10	4.08	.10
Somatic activity (A/D units)*						
Uplifting film	.80	.05	.74	.05	.77	.05
Distressing film	.77	.05	.65	.05	.68	.05

Note. Asterisks indicate measures that were not included in the cardiovascular and electrodermal physiological composite.

levels of reported empathic concern and physiological (in both cardiac and electrodermal variables) activation, middle-aged participants exhibiting intermediary levels, and young participants exhibiting lowest levels across the uplifting and distressing films. The same pattern emerged for personal distress but was limited to the distressing film only.

Prosocial Behavior

Manipulation Check

Donation task. As can be seen in Table 1, participants were very confident that the donations would be given to the charities. There were no age differences in these ratings, $F(2, 206) = 1.37$, $p = .26$.

Charity perceptions. As can be seen in Table 1, participants generally had moderately positive perceptions about the charities. There were no significant age differences in these ratings, $F(2, 206) = 2.54$, $p = .08$, and there was no Age × Film/Charity interaction, $F(2, 206) = 2.62$, $p = .08$. There was a significant main effect for charity, $F(1, 206) = 16.38$, $p < .01$, such that all groups rated the Surfers Healing charity more positively than the Darfur charity, consistent with the uplifting and distressing themes of their associated films.

Age Differences in Prosocial Behavior

Prosocial behavior. There was a significant main effect of age, $F(2, 207) = 4.59$, $p < .05$. As predicted, results indicated a significant linear trend among the three age groups, contrast estimate = .78, $p < .01$. Specifically, older participants exhibited the greatest prosocial behavior, middle-aged participants were intermediate, and young participants showed the lowest levels. The quadratic term of age was not significant, contrast estimate = .24, $p = .36$. There was also a significant main effect of charity, $F(1, 207) = 28.17$, $p < .01$, resulting from lower donations to the Surfers Healing charity (associated with the uplifting film) than to the Darfur charity (associated with the distressing film); however, the Age × Film/Charity interaction was not significant, $F(2, 207) < 1$. Means, SDs, effect sizes, and pairwise comparisons among age groups for prosocial behavior are presented in Table 2.

Age-Related Increases in Prosocial Behavior: Explanatory Variables

Results indicated age differences in prosocial behavior that largely paralleled those found for emotional empathy, with older adults exhibiting the highest levels, middle-aged adults intermediary levels, and young adults lowest levels. To examine possible

factors contributing to these age differences, we conducted two multiple regression models examining two different kinds of variables: emotional empathy to the films and general participant characteristics. Because there was no Age × Film/Charity interaction for prosocial behavior, we collapsed across the Film/Charity factor by using the total amount donated to both charities.

Does emotional empathy explain age differences in prosocial behavior? Given the link between emotional empathy and prosocial behavior found in previous research (e.g., Batson, 1990; Eisenberg et al., 1989; Krebs, 1975; Stocks, Lishner, & Decker, 2009), we sought to evaluate whether age differences in emotional empathy contributed to age differences in prosocial behavior. First, we examined zero-order and partial-order correlations between subjective aspects of emotional empathy, physiological aspects of emotional empathy (overall physiological composite and interbeat interval), and prosocial behavior (i.e., total donation). As Table 4 indicates, prosocial behavior was associated with higher levels of emotional empathy in self-reported empathic concern (for both films) and in personal distress (for the distressing film only), along with greater interbeat interval reactivity (for both films). Prosocial behavior was not associated with the overall physiological composite. Thus, we constructed a multiple regression analysis of prosocial behavior (total donation) in which baseline empathic concern and personal distress were entered into the first step, the significant emotional empathy predictors (described above) entered in the second step, and age entered in the third step. In the final model, empathic concern to the distressing film, interbeat interval reactivity to the uplifting film, and age were significant predictors of prosocial behavior (see Table 5).

Because both empathic concern and interbeat interval were associated with age and with prosocial behavior, we conducted Sobel tests (1982) to evaluate whether they were significant mediators of the association between age and prosocial behavior. These tests revealed that empathic concern was a significant mediator of age differences in prosocial behavior ($z = 2.79$, $p < .01$), but interbeat interval was not ($z = .64$, *ns*).

Table 4
Zero-Order and Partial-Order Correlations of Prosocial Behavior to Laboratory Measures of Prosocial Behavior of the Total Sample

Laboratory measures	Prosocial behavior
Empathic concern	
Uplifting film	.16*
Distressing film	.30**
Personal distress	
Uplifting film	.11
Distressing film	.24**
Physiological activation	
Uplifting film	.08
Distressing film	.04
Inter-beat interval	
Uplifting film	.14*
Distressing film	.16*

Note. Correlations with empathic concern and personal distress to the films are partial correlations, controlling for baseline empathic concern and baseline personal distress, respectively. Correlations with physiological activation are zero-order correlations.
* $p < .05$. ** $p < .01$.

Do participants' characteristics explain age differences in prosocial behavior? In addition, we examined a number of participant characteristics that could have influenced prosocial behavior: income, social desirability, trait empathy,[2] charity perceptions, and past donation behavior. The logic behind selecting these variables was that participants might have contributed more if they (a) had more discretionary income, (b) believed it was the socially desirable thing to do, (c) had higher levels of trait empathy, (d) had more positive views toward the charities, and/or (e) had donated more to charities in the past. To test these alternative explanations, we conducted a multiple regression analysis of prosocial behavior (total donation) in which all these participant characteristics were entered in the first step in addition to baseline empathic concern and personal distress, the emotional empathy predictors entered in the second step, and age entered in the third step. As Table 5 indicates, in the full model, trait empathic concern and past donation behavior were significant predictors of prosocial behavior. Controlling for these participant characteristics, empathic concern to the distressing film, interbeat interval reactivity to the uplifting film, and age remained significant predictors of prosocial behavior. In summary, differences in several participant characteristics were clearly important but did not fully account for age-related increases in prosocial behavior.

Discussion

Using a sample of older, middle-aged, and young adults who viewed two kinds of films portraying individuals in need, we found support for our hypotheses that (a) emotional empathy increased with age, (b) prosocial behavior increased with age, and (c) aspects of emotional empathy (empathic concern) partially account for age-related increases in prosocial behavior. In terms of the first hypothesis, we found evidence in both self-reported and physiological domains for age-related increases in emotional empathy. Much of this evidence generalized across both the uplifting and distressing films; however, the age-related increases in self-reported personal distress were only found in response to the distressing films. In terms of the second hypothesis, we found evidence for age-related increases in prosocial behavior in the form of greater charitable giving. This evidence generalized across both the uplifting and distressing films. In terms of the third hypothesis, we found evidence that age-related differences in empathic concern partially accounted for age-related differences in prosocial behavior. Finally, we examined a number of participant characteristics that might have accounted for found age differ-

[2] Age differences in trait empathy were not a primary focus of the present study; however, these measures are helpful in characterizing our sample. As can be seen in Table 1, results revealed significant age differences in the trait empathic concern subscale of the IRI. Pairwise comparisons among the three age groups revealed that older adults reported more trait empathic concern than young adults ($p < .05$), with middle-aged adults not differing significantly from either group. This is in contrast to a recent cross-sectional study that found no age differences in trait affective empathy (Bailey et al., 2008). In addition, there were significant age differences in the trait personal distress subscale, with younger adults reporting greater trait levels of personal distress than middle-aged adults, and older adults not differing significantly from either group. Finally, there were no age differences in the trait perspective taking subscale.

Table 5
Standardized Regression Coefficients Predicting Prosocial Behavior (Total Laboratory Donations)

Variable	Age only model	Emotional empathy model	Participant characteristics model
Participant characteristics: β			
Income	—	—	.02
Social desirability	—	—	−.05
Charity perceptions	—	—	−.01
Past donation	—	—	.15*
Trait EC	—	—	.20*
Trait PD	—	—	.10
Trait PT	—	—	−.06
Emotional empathy covariates: β			
Baseline EC	—	−.03	−.06
Baseline PD	—	−.02	−.05
Emotional empathy predictors: β			
Film EC—uplifting	—	−.06	−.10
Film EC—distressing	—	.27*	.26*
Film PD—distressing	—	.08	.07
IBI—uplifting	—	.14*	.15*
IBI—distressing	—	.04	.03
R^2 increment	—	.12	.078
F increment	—	5.31**	3.46**
Df	—	200	189
F	—	3.84**	2.31**
Age: β			
O vs. Y and M	.21**	.20*	.20*
Y vs. M and O	−.05	−.02	.00
R^2 increment with Age	.057	.040	
F increment with Age	6.30**	4.15*	3.49**
Df	210	198	187
F	6.30**	4.01**	2.51**

Note. O, M, and Y = Older, Middle-aged, and Young participants, respectively. Trait EC, PD, and PT = Empathic Concern, Personal Distress, and Perspective Taking subscales of the IRI. Baseline and Film EC and PD = Empathic Concern and Personal Distress at baseline and to the films. Dashes (—) indicate that variables were not entered into the model. Predictor variables were centered on the grand mean as recommended by Aiken & West (1991).
* $p < .05$. ** $p < .01$.

ences. Trait empathy and past donation history were significant predictors of prosocial behavior, but even after controlling for these factors, age-related increases remained significant.

Our evidence for age-related increases in emotional empathy and prosocial behavior was quite robust, generalizing across emotional domains (i.e., both self-report and physiology), physiological systems (both cardiovascular and electrodermal), and contexts (both in the laboratory and in reported recent charitable contributions outside the laboratory). Although most age-related increases in emotional empathy and prosocial behavior were exhibited across both films, there were some findings that were specific as to film. Age-related increases in personal distress were only found for the distressing film. The basis for this specificity may be found in the nature of the two films. Whereas the Surfers Healing film depicts individuals afflicted by a particular form of psychopathology, the individuals in the film are clearly shown having fun and overcoming their limitations. The Darfur film is quite different, depicting individuals in distress who are clearly suffering and seem quite helpless. Distress is a powerful stimulus for empathic and prosocial responding (Hoffman, 1975; Zahn-Waxler, Friedman, & Cummings, 1983). We believe that sensitivity to the combination of distress and need (as embodied in the Darfur film) is particularly intensified with age. This would be consistent with prior findings of heightened sensitivity among older adults to situations characterized by loss that engender sadness and pity (Kunzmann & Gruhn, 2005; Palmore, 1974; Seider, Shiota, Whalen, & Levenson; Weiner & Graham, 1989).

Emotional Empathy and Prosocial Behavior

Contemporary theories of empathy often afford importance to processes of emotional activation within the observer. This activation can be fairly automatic, representing a form of mimicry (Preston & de Waal, 2003) or result from more complex processing (Eisenberg & Miller, 1987; Singer, 2006). This activation can play an important role in motivating subsequent behaviors, including prosocial acts that may have benefits for both the observer (e.g., reducing arousal) and for the person in need. Empathic concern and cardiac reactivity to both films, along with personal distress to the distressing film only, were all associated with greater prosocial behavior. Whereas earlier studies have demonstrated that similar connections exist in early development (Eisenberg & Miller, 1987), the present study indicates that they also exist in late-life adult development. Moreover, the partial media-

tion of age differences in donations by aspects of self-reported empathic concern suggests that some aspects of this relationship may actually strengthen as we age.

Aging and Empathy

Our findings of age-related increases in emotional empathy and prosocial behavior represent a quite different trajectory from the age-related declines that have been found in cognitive empathy (Ruffman et al., 2008), trait empathy (Eisenberg & Miller, 1987), as well as in many areas of general cognitive (Salthouse, 2004) and physical (Liu & Lapane, 2009) functioning. At the very least, age-related increases in emotional empathy and prosocial behavior argue against reducing aging to simply a process of loss. Increased emotional empathy and prosocial behavior with age may reflect a number of other changes that are thought to come with age, including the following: (a) increased emotional reactivity to situations signaling the need for helping or reparation (Charles, 2005; Kliegel et al., 2007; Kunzmann & Gruhn, 2005; Phillips et al., 2008; Seider et al.); (b) increased salience of loss (Palmore, 1974); (c) shifts away from self- and future-oriented goals to social and emotionally meaningful ones (Carstensen et al., 2003; Erikson, 1982; Fisher, 1995; Vaillant, 2003); and (d) an evolutionarily adaptive (Gurven & Kaplan, 2009) and developmentally appropriate (Erikson, 1982; Fisher, 1995; Vaillant, 2003) emphasis on social contribution and generativity in later life. Viewed in this light, our findings are far from isolated, but rather lend empirical support to a diverse set of theories about the nature of emotionality, motivation, and late-life development.

Limitations and Strengths

One important limitation of the present study included our use of a cross-sectional design, which makes found age differences in emotional empathy and prosocial behavior vulnerable to cohort and survivorship effects. For example, members of our older cohort grew up during the post-WWII era, and their experiences with suffering and distress might have led to their having a greater capacity for emotional empathy and prosocial behavior to others in need.

Other limitations include the following: (a) our measure of income (we had no measure of satisfaction with income, which can show age differences; Francoeur, 2002); and (b) our limited measures of prosocial behavior (only monetary giving inside and outside the laboratory).

In the realm of strengths, to our knowledge this is the first study of age differences in emotional empathy and prosocial behavior that has combined the following: (a) examining three age groups; (b) assessing both subjective and physiological aspects of emotional empathy; (c) utilizing objective behavioral measures of prosocial behavior; (d) including films of people in need with multiple themes; (e) evaluating the contribution of emotional empathy to age differences in prosocial behavior in these age groups; and (f) evaluating a number of viable alternative explanations for found age differences.

A Concluding Thought

Understanding the trajectories of change in emotional empathy and prosocial behavior in normal aging greatly enriches our understanding both of adult development and of the nature of these vital aspects of human emotion. Characterizing the kinds of age-related increases in emotional empathy and prosocial behavior that were found in this study as "good" may seem simple and obvious. After all, emotional empathy and prosocial behavior are widely viewed as constituting an important part of the social glue that enables us to form and maintain lasting interpersonal bonds (Schonert-Reichl, 1993), act in the interest of the greater good, and promote positive feelings in self (Dunn, Aknin, & Norton, 2008; Moll et al., 2006) and others. However, as with most things emotional, there is another side. Age-related increases in emotional empathy and prosocial behavior toward others in need can contribute to older adults' greater susceptibility to deception and fraud (Tueth, 2000). Thus, the recipe for successful aging in this particular domain of emotional functioning will require maximizing those aspects of empathy and prosocial behavior that contribute to the greater social good and minimizing those that do not.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Newbury Park, CA: Sage Publications.

Antonovsky, A., & Sagy, S. (1990). Confronting developmental tasks in the retirement transition. *Gerontologist, 30,* 362–368. doi:10.1093/geront/30.3.362

Bailey, P., Henry, J. D., & von Hippel, W. (2008). Empathy and social functioning in late adulthood. *Aging and Mental Health, 12,* 499–503. doi:10.1080/13607860802224243

Batson, C. D. (1987). Prosocial motivation: Is it ever truly altruistic? In L. Berkowitz, (Ed.), *Advances in experimental social psychology, 20* (pp. 65–122). San Diego, CA: Academic Press. doi:10.1016/S0065-2601(08)60412-8

Batson, C. D. (1990). How social an animal? The human capacity for caring. *American Psychologist, 45,* 336–346. doi:10.1037/0003-066X.45.3.336

Batson, C. D., Batson, C. D., Griffitt, C. A., Barrientos, S., Brandt, J. R., Sprengelmeyer, P., & Bayly, M. J. (1989). Negative-state relief and the empathy–altruism hypothesis. *Journal of Personality and Social Psychology, 56,* 922–933.

Batson, C. D., Darley, J. M., & Coke, J. (1978). Altruism and human kindness: Internal and external determinants of helping behavior. In L. A. Pervin and M. Lewis (Eds.), *Perspectives in interactional psychology* (111–140). New York, NY: Plenum Press.

Batson, C. D., Fultz, J., & Schoenrade, P. A. (1994). Distress and empathy: Two qualitatively distinct vicarious emotions with different motivational consequences. In B. Puka (Ed.), *Reaching out: Caring, altruism and prosocial behavior* (57–75). New York, NY: Garland Publishing.

Baumann, D. J., Cialdini, R. B., & Kenrick, D. T. (1985). *Altruism as hedonism: Helping and self-gratification as equivalent responses. Contemporary readings in social psychology.* Chicago, IL: Nelson-Hall.

Blair, R. J. R. (1999). Psychophysiological responsiveness to the distress of others in children with autism. *Personality and Individual Differences. 26,* 477–485. doi:10.1016/S0191-8869(98)00154-8

Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion. 27, (*2003), 103–123. doi:10.1023/A:1024569803230

Carstensen, L. L., Gottman, J. M., & Levenson, R. W. (1995). Emotional behavior in long-term marriage. *Psychology and Aging, 10,* 140–149. doi:10.1037/0882-7974.10.1.140

Charles, S. T. (2005). Viewing injustice: Greater emotion heterogeneity with age. *Psychology and Aging, 20,* 159–164. doi:10.1037/0882-7974.20.1.159

Charles, S. T., Carstensen, L. L., & McFall, R. M. (2001). Problem-solving in the nursing home environment: Age and experience differences in emotional reactions and responses. *Journal of Clinical Geropsychology, 7,* 319–330. doi:10.1023/A:1011352326374

Coke, J. S., Batson, C. D., & McDavis, K. (1978). Empathic mediation of helping: A two-stage model. *Journal of Personality and Social Psychology, 36,* 752–766. doi:10.1037/0022-3514.36.7.752

Craig, K. D., & Lowery, H. J. (1969). Heart-rate components of conditioned vicarious autonomic responses. *Journal of Personality and Social Psychology, 11,* 381–387. doi:10.1037/h0027250

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of pathology. *Journal of Consulting Psychology, 24,* 349–354. doi:10.1037/h0047358

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology, 10,* 85.

Dunn, E., Aknin, L., & Norton, M. (2008). Spending money on others promotes happiness. *Science, 319,* 1687–1688.

Eisenberg, N. (1982). *The development of prosocial behavior.* New York, NY: Academic Press.

Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annual Reviews in Psychology, 51,* 665–697. doi:10.1146/annurev.psych.51.1.665

Eisenberg, N. (2003). Prosocial behavior, empathy, and sympathy. In M. H. Bornstein, L. Davidson, C. L. M. Keyes, & K. A. Moore (Ed.), *Well-being: Positive development across the life course* (253–265). Mahwah, NJ: Erlbaum.

Eisenberg, N., & Fabes, R. A. (1990). Empathy: Conceptualization, measurement, and relation to prosocial behavior. *Motivation and Emotion, 14,* 131–149. doi:10.1007/BF00991640

Eisenberg, N., & Fabes, R. A. (1998). Prosocial development. *Handbook of Child Psychology, 3,* 701–778.

Eisenberg, N., Fabes, R. A., Miller, P. A., Fultz, J., Shell, R., Mathy, R. M., & Reno, R. R. (1989). Relation of sympathy and personal distress to prosocial behavior: A multimethod study. *Journal of Personality and Social Psychology, 57,* 55–66. doi:10.1037/0022-3514.57.1.55

Eisenberg, N., Fabes, R. A., Nyman, M., Bernzweig, J., & Pinuelas, A. (1994). The relations of emotionality and regulation to children's anger-related reactions. *Child Development, 65, 109–128*. doi:10.2307/1131369

Eisenberg, N., & Lennon, R. (1983). Sex differences in empathy and related capacities. *Psychological Bulletin, 94,* 100–131. doi:10.1037/0033-2909.94.1.100

Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin, 101,* 91–119. doi:10.1037/0033-2909.101.1.91

Eisenberg, N., Schaller, M., Fabes, R. A., Bustamante, D., Mathy, R., Shell, R., & Rhodes, K. (1988). Differentiation of personal distress and sympathy in children and adults. *Developmental Psychology, 24,* 766–775. doi:10.1037/0012-1649.24.6.766

Erikson, E. H. (1982). *The life cycle completed: A review.* New York, NY: Norton.

Fisher, B. J. (1995). Successful aging, life satisfaction, and generativity in later life. *International Journal of Aging & Human Development, 41,* 239–250. doi:10.2190/HA9X-H48D–9GYB-85XW

Francoeur, R. B. (2002). Use of an income-equivalence scale to understand age-related changes in financial strain. *Research on Aging, 24,* 445–472. doi:10.1177/01627502024004003

Gross, J. J., & Levenson, R. W. (1997). Hiding feelings: The acute effects of inhibiting negative and positive emotion. *Journal of Abnormal Psychology, 106,* 95–103.

Grühn, D., Rebucal, K., Diehl, M., Lumley, M. A., & Labouvie-Vief, G. (2008). Empathy across the adult lifespan: Longitudinal and experience-sampling findings. *Emotion, 8,* 753–765. doi:10.1037/a0014123

Gurven, M., & Kaplan, H. S. (2009). Beyond the grandmother hypothesis: Evolutionary models of human longevity. In J. Sokolovsky (Ed.), *The cultural context of aging: Worldwide perspectives* (3rd ed., pp. 53–66). Santa Barbara, CA: Greenwood Press.

Hastings, P. D., Zahn-Waxler, C., Robinson, J., Usher, B., & Bridges, D. (2000). The development of concern for others in children with behavior problems. *Developmental Psychology, 36,* 531–546. doi:10.1037/0012-1649.36.5.531

Hoffman, M. L. (1975). Developmental synthesis of affect and cognition and its implications for altruistic motivation. *Developmental Psychology, 11,* 607–622. doi:10.1037/0012-1649.11.5.607

Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice.* Cambridge, UK: Cambridge University Press.

Hoppmann, C. A., Coats, A. H., & Blanchard-Fields, F. (2007). Goals and everyday problem solving: Examining the link between age-related goals and problem-solving strategy use. *Aging, Neuropsychology, and Cognition, 15,* 401–423. doi:10.1080/13825580701533777

Izard, C. E. (1977). *Human emotions.* New York, NY: Springer.

Kahneman, D., & Knetsch, J. L. (1992). Valuing public goods: The purchase of moral satisfaction. *Journal of Environmental Economics and Management, 22,* 57–70. doi:10.1016/0095-0696(92)90019-S

Kliegel, M., Jäger, T., & Phillips, L. H. (2007). Emotional development across adulthood: Differential age-related emotional reactivity and emotion regulation in a negative mood induction procedure. *The International Journal of Aging and Human Development, 64,* 217–244. doi:10.2190/U48Q-0063-3318-1175

Krebs, D. (1975). Empathy and altruism. *Journal of Personality and Social Psychology, 32,* 1134–1146. doi:10.1037/0022-3514.32.6.1134

Kunzmann, U., & Gruhn, D. (2005). Age differences in emotional reactivity: The sample case of sadness. *Psychology and Aging, 20,* 47–59. doi:10.1037/0882-7974.20.1.47

Lamm, C., Batson, C. D., & Decety, J. (2007). The neural substrate of human empathy: Effects of perspective-taking and cognitive appraisal. *Journal of Cognitive Neuroscience, 19,* 42–58.

Lanzetta, J., & Englis, B. (1989). Expectations of cooperation and competition and their effects on observer's vicarious emotional responses. *Journal of Personality and Social Psychology, 56,* 543–554. doi:10.1037/0022-3514.56.4.543

Liu, S. Y., & Lapane, K. L. (2009). Residential modifications and decline in physical function among community-dwelling older adults. *Gerontologist, 49,* 344–354. doi:10.1093/geront/gnp033

Magai, C. (2008). Long-lived emotions. In M. Lewis, J. M. Haviland-Jones, & L. Feldman (Eds.), *Handbook of emotions* (pp. 376–392). New York, NY: Guilford Press.

Mauss, I. B., Levenson, R. W., McCarter, L., Wilhelm, F. H., & Gross, J. J. (2005). The tie that binds? Coherence among emotional experience, behavior, and autonomic physiology. *Emotion, 5,* 175–190.

McAdams, D. P., St. Aubin, E. D., & Logan, R. L. (1993). Generativity among young, midlife, and older adults. *Psychology and Aging, 8,* 221–230. doi:10.1037/0882-7974.8.2.221

Moll, J., Krueger, F., Zahn, R., Pardini, M., de Oliveira-Souza, R., & Grafman, J. (2006). Human fronto-mesolimbic networks guide decisions about charitable donation. *Proceedings of the National Academy of Sciences, 103,* 15623–15628. doi:10.1073/pnas.0604475103

Palmore, E. (1974). *Normal Aging: II.* Durham, NC: Duke University Press.

Phillips, L. H., Henry, J. D., Hosie, J. A., & Milne, A. B. (2008). Effective regulation of the experience and expression of negative affect in old age. *The Journals of Gerontology Series B, Psychological Sciences and Social Sciences, 63,* P138–P145.

Preston, S. D., & de Waal, F. B. M. (2003). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences, 25,* 1–20.

Ruffman, T., Henry, J. D., Livingstone, V., & Phillips, L. H. (2008). A meta-analytic review of emotion recognition and aging: Implications for

neuropsychological models of aging. *Neuroscience and Biobehavioral Reviews, 32,* 863–881. doi:10.1016/j.neubiorev.2008.01.001

Salthouse, T. A. (2004). What and when of cognitive aging. *Current Directions in Psychological Science, 13,* 140–144.

Schaller, M., & Cialdini, R. B. (1988). The economics of empathic helping: Support for a mood management motive. *Journal of Experimental Social Psychology, 24,* 163–181. doi:10.1016/0022-1031(88)90019-4

Schieman, S., & Van Gundy, K. (2000). The personal and social links between age and self-reported empathy. *Social Psychology Quarterly, 63,* 152–174. doi:10.2307/2695889

Schonert-Reichl, K. A. (1993). Empathy and social relationships in adolescents with behavioral disorders. *Behavioral Disorders, 18,* 189–204.

Seider, B. H., Shiota, M. N., Whalen, P., & Levenson, R. W. (2010). Greater sadness reactivity in late life. *Social Cognitive and Affective Neuroscience.*

Singer, T. (2006). The neuronal basis and ontogeny of empathy and mind reading: Review of literature and implications for future research. *Neuroscience & Biobehavioral Reviews, 30,* 855–863. doi:10.1016/j.neubiorev.2006.06.011

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhart (Ed.), *Sociological methodology* (pp. 290–312). San Francisco, CA: Jossey-Bass.

Staub, E. (1979). *Positive social behavior and morality: Social and personal influences.* New York: Academic Press.

Stocks, E. L., Lishner, D. A., & Decker, S. K. (2009). Altruism or psychological escape: Why does empathy promote prosocial behavior? *European Journal of Social Psychology. 39,* 649–665. doi:10.1002/ejsp.561

Sturm, V. E., Rosen, H. J., Allison, S., Miller, B. L., & Levenson, R. W. (2006). Self-conscious emotion deficits in frontotemporal lobar degeneration. *Brain, 129,* 2508.

Toi, M., & Batson, C. D. (1982). More evidence that empathy is a source of altruistic motivation. *Journal of Personality and Social Psychology, 43,* 281–292.

Tueth, M. J. (2000). Exposing financial exploitation of impaired elderly persons. *The American Journal of Geriatric Psychiatry. 8,* 104–111.

Vaillant, G. E. (2003). *Aging well.* New York, NY: Little, Brown and Company.

Weiner, B., & Graham, S. (1989). Understanding the motivational role of affect: Lifespan research from an attributional perspective. *Cognition & Emotion. Special Issue: Development of Emotion-Cognition Relations, 3,* 401–419.

Werner, K. H., Roberts, N. A., Rosen, H. J., Dean, D. L., Kramer, J. H., Weiner, M. W., . . . Levenson R. W. (2007). Emotional reactivity and emotion recognition in frontotemporal lobar degeneration. *Neurology, 69,* 148–155. doi:10.1212/01.wnl.0000265589.32060.d3

Zahn-Waxler, C., Cole, P. M., Welsh, J. D., & Fox, N. A. (1995). Psychophysiological correlates of empathy and prosocial behaviors in preschool children with behavior problems. *Development and Psychopathology, 7,* 27–48. doi:10.1017/S0954579400006325

Zahn-Waxler, C., Friedman, S. L., & Cummings, E. M. (1983). Children's emotions and behaviors in response to infants' cries. *Child Development, 54,* 1522–1528. doi:10.2307/1129815

Received December 11, 2010
Revision received June 13, 2011
Accepted June 27, 2011 ■