

Age Differences in Three Facets of Empathy: Performance-Based Evidence

David Richter and Ute Kunzmann
University of Leipzig

This study investigated age differences in cognitive and affective facets of empathy: the ability to perceive another's emotions accurately, the capacity to share another's emotions, and the ability to behaviorally express sympathy in an empathic episode. Participants, 80 younger ($M_{\text{age}} = 32$ years) and 73 older ($M_{\text{age}} = 59$ years) adults, viewed eight film clips, each portraying a younger or an older adult thinking-aloud about an emotionally engaging topic that was relevant to either younger adults or older adults. In comparison to their younger counterparts, older adults generally reported and expressed greater sympathy while observing the target persons; and they were better able to share the emotions of the target persons who talked about a topic that was relevant to older adults. Age-related deficits in the cognitive ability to accurately perceive another's emotions were only evident when the target person talked about a topic of little relevance to older adults. In sum, the present performance-based evidence speaks for multidirectional age differences in empathy.

Keywords: life-span development, empathic accuracy, emotional congruence, empathic listening behavior

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Empathy has been thought to be a fundamental aspect of social interactions and relationships (e.g., Davis, 1994; Ickes, 1993), an integral part of moral development (e.g., Eisenberg, 2000; Hoffman, 2000), and an important source of pro-social and altruistic behavior (e.g., Batson, Ahmad, Lishner, & Tsang, 2002). Although many studies have investigated the development of empathy in childhood (e.g., Eisenberg & Fabes, 1990; Hoffman, 2000; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992), this subject has rarely been addressed from a life-span developmental and aging perspective. This lack of research is surprising, given that empathy arguably serves adaptive functions at any period during the life-span and especially in adulthood as individuals become increasingly responsible not only for themselves, but also for the well-being of others (e.g., own children, aging parents). The purpose of the present study was to contribute to a better understand-

ing of age-related differences in empathy by using a new video-based paradigm that allows the simultaneous assessment of affective and cognitive facets of empathy in the laboratory.

The Definition of Empathy

Although various definitions of empathy have been introduced in different psychological subdisciplines (e.g., Davis, 1994; Decety & Jackson, 2006; Ickes, 1993, 2003; Singer, 2006; Zhou, Valiente, & Eisenberg, 2003), there is broad agreement that it involves both cognitive and affective processes. On the one hand, empathy requires the cognitive understanding of another person's feelings (often labeled empathic accuracy or perspective-taking). On the other hand, it involves the affective response to another person. Some researchers have defined affective empathy as the degree to which one shares the feelings of another person (i.e., emotional congruence or emotion match; e.g., Eisenberg & Fabes, 1990). Other researchers have suggested a broader definition of empathy that includes sympathy or emotional concern, a feeling state in the observer that is distinct from the feeling state of the target person (e.g., Davis, 1994). Given that emotional congruence and sympathy often co-occur in an empathic episode, we decided to adopt a broad definition of empathy and investigated two affective facets—emotional congruence and sympathy—in addition to the cognitive facet: empathic accuracy.

Age Differences in Empathy: Past Empirical Evidence

What is known about age differences in these different facets of empathy? Like so much about emotional aging, there is a lot of speculation and not enough data. The few relevant empirical studies have been based either on self-report measures or on performance-based tasks. To begin, many self-report measures studies do not allow the separate analysis of specific empathy

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David Richter and Ute Kunzmann, Department of Psychology, University of Leipzig.

David Richter is now with the Department of Psychology at the University of Bamberg.

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Correspondence concerning this article should be addressed to David Richter, BiKS Research Group, University of Bamberg, Jäckstrasse 3, 96052 Bamberg, Germany. E-mail: david.richter@uni-bamberg.de; or Ute Kunzmann, Department of Psychology, Life-Span Development Lab, University of Leipzig, Seeburgstrasse 14-20, 04103 Leipzig, Germany. E-mail: kunzmann@uni-leipzig.de

facets. Many performance-based tasks lack ecological validity and focus on only one facet of empathy, that is, the ability to accurately perceive another's emotions.

Evidence from self-report studies. Two cross-sectional self-report studies have suggested age-related stability in empathy (Diehl, Coyle, & Labouvie-Vief, 1996; Eysenck, Pearson, Easting, & Allsopp, 1985), whereas four studies point to a pattern of negative age differences in empathy (Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008; Helson, Jones, & Kwan, 2002; Phillips, MacLean, & Allen, 2002; Schieman & van Gundy, 2000). All studies were based on large samples covering the teens or early 20s through later adulthood (i.e., the 70s or 80s).

Helson et al. (2002) examined the developmental trajectory of empathy in three longitudinal studies. Analyses of the three samples showed a significant average decrease in empathy over a period of approximately 40 years. Closer inspection of this finding, however, revealed that the overall long-term decline in empathy was mainly due to the participants of one of the three studies. In a second four-wave longitudinal study based on one large and heterogeneous sample of 400 participants between 10 and 87 years at the first wave, Grühn et al. (2008) found that empathy remained stable over a 12-year interval.

In sum, past self-report evidence is mixed. More cross-sectional studies speak for age-related decline rather than for stability. The longitudinal evidence favors the idea that empathy remains stable into old age. This contrast in findings may suggest that the cross-sectional age differences in empathy are the result of cohort rather than age effects, with older cohorts reporting lower levels of empathy than younger cohorts. As Grühn et al. (2008) speculated, individuals who grew up more recently may have greater experience and expertise in thinking and speaking about their own and others' feelings than individuals who grew up during earlier times in which the societal climate left little room for the expression and reflection upon individual feelings and desires.

Before accepting the conclusion that empathy may best be characterized by continuity during adulthood, however, it is important to keep in mind that the typical self-report measure of empathy is likely to reveal the degree of desire to see oneself and to be seen by others as empathetic rather than to provide a valid measure of one's actual ability and proclivity to be empathetic in concrete situations. Past work with young adults has suggested that the correlation between self-reported and performance-based empathy measures is small and often nonsignificant (Ickes, Buysse et al., 2000; Ickes, Stinson, Bissonnette, & Garcia, 1990; Levenson & Ruef, 1992; Marangoni, Garcia, Ickes, & Teng, 1995; but see Zaki, Bolger, & Ochsner, 2008).

Evidence from performance-based tasks. Past performance-based evidence for age differences in empathy exclusively relies on emotion recognition tasks. In these tasks, young and old adults are typically asked to recognize emotions from facial expressions (e.g., Isaacowitz et al., 2007). In a meta-analysis of 28 data sets, Ruffman, Henry, Livingstone, and Phillips (2008) reported that the predominant pattern across all emotions was of age-related decline with the exception of age-related stability in recognizing disgusted facial expressions. There also is a growing body of evidence that the age-related decline in emotion recognition cuts across different modalities and can also be found when recognizing emotions from voices (Ruffman et al., 2008). Thus, on the basis of this evidence one might conclude that empathy—at

least the ability to recognize emotions—generally declines during adulthood.

This conclusion may, however, be premature for at least two reasons. First, the evidence relies on cross-sectional data; longitudinal qualifications are yet to be obtained. Second, and more important to the present study, a person's emotion recognition performance in laboratory tasks most likely is only a rough proxy of this person's empathic accuracy in more natural settings. A serious limitation of the typical emotion recognition tasks is the lack of external validity. Still photographs of faces or isolated voices provide no information about the contexts which typically surround feelings such as anger, sadness, or fear. Further, the to-be-recognized emotions are typically posed rather than truly experienced. As we will argue below, studying empathic accuracy via tasks that are less stripped down in terms of meaningfulness might yield a different picture about age differences in this ability.

Age Differences in Empathy: Theoretical Ideas

Two prominent life-span theories of social and emotional aging have focused on phenomena that arguably are closely related to empathy and, thus, help formulate predictions about age-related change in empathy during adulthood and old age. In her Dynamic Integration Theory (DIT), Labouvie-Vief has investigated the development of cognitive-affective complexity, defined as the complexity of an individual's cognitive representation of the self, other people's personality and emotions (e.g., Labouvie-Vief, 2003; Labouvie-Vief & Medler, 2002). The evidence generally suggests that from adolescence to middle adulthood, such cognitive representations become increasingly complex and well-balanced. In late middle adulthood, however, this growth abates and decline in cognitive-affective complexity occurs thereafter. Thus, age-related change in cognitive-affective complexity appears to follow a curve-linear trajectory suggesting later life declines. These findings would be consistent with age-related deficits in empathy, particularly in empathic accuracy.

A second relevant theory is the Socioemotional Selectivity Theory developed by Carstensen and colleagues (SST; e.g., Carstensen, Isaacowitz, & Charles, 1999). SST posits shifts in the priorities of different goals with age because time horizons become increasingly constrained. More specifically, as endings approach and concerns about the future decrease, present-oriented goals related to affective well-being gain importance causing the older individual to invest time and energy into emotion regulation. Consistent with this idea, older adults reported that they regulate their emotions more frequently and more effectively than middle-aged and young adults (Gross et al., 1997). SST also states that the optimization of close social relationships, as one source of emotionally gratifying experiences, gains importance as people age and as their future life-time becomes increasingly limited. Taken together, on the basis of SST and the empirical evidence supporting it, one would expect age-related stability or even growth in empathy, particularly in its emotional facets.

The two life-span theories discussed above provide a reasonable theoretical background for predictions about age differences in cognitive and emotional facets of empathy, however, neither one has focused on contextual factors that may moderate age-related change in cognitive and emotional functioning. For example, there is now substantial evidence that age deficits in cognitive function-

ing are reduced if the tasks and instructions are designed to be age-appropriate and meaningful. These contextual variations have been shown for age differences in source memory (Rahhal, May, & Hasher, 2002), semantic memory (Fung & Carstensen, 2003), and impression formation (Hess, Rosenberg, & Waters, 2001). There also is evidence that older adults' emotional reactions depend on contextual factors, such as the age-relevance of the emotion-elicitor (e.g., Charles & Piazza, 2007; Kunzmann & Grühn, 2005). Thus, even if the cognitive understanding of others' emotions may be vulnerable to age-related decline, as suggested by DIT and work on emotion recognition, it is still possible that this decline will only be evident under conditions that lack external validity and, thus, meaningfulness and personal relevance. A similar argument can be made for vicarious affective responses; age-related growth, as predicted by SST, may be particularly evident in situations that are meaningful and relevant to older adults.

The Present Study

The present study investigated age differences in three facets of empathy, one cognitive facet: empathic accuracy (defined as the capacity to accurately perceive another's feelings), and two emotional facets: emotional congruence (defined as the capacity to share another's feelings) and sympathy (on the levels of self-report and expressive behavior).

As discussed above, the measures of empathy employed in past work have several limitations. For example, self-report measures may assess an individuals' desire to be empathic (which may decline with age or be lower in older cohorts) rather than this individuals' actual empathy; context-free emotion recognition tasks do not allow the assessment of affective responses and may result in an underestimation of older adults' empathic responses under more natural conditions. In order to address these limitations and extend past work, we assessed the three facets of empathy in vivo and performance-based in the laboratory on the basis of newly developed empathy tasks characterized by high external validity. More specifically, we designed eight short film clips, each portraying one person as he or she was talking about an emotionally engaging issue. To test the role of contextual factors in age differences in empathic responding, we manipulated the age relevance of the topic a target person was talking about. One topic was of particular relevance to older people and dealt with social loss, a second topic was of particular relevance to young people and dealt with an adventurous and risky life transition.

We formulated two sets of predictions referring to the cognitive and affective facets of empathy respectively. First, given the past evidence for the idea that age-related decline in cognitive functioning can be reduced if the task is meaningful and significant to older adults, we predicted that young adults should outperform older adults, when asked to correctly recognize the emotions of protagonists who talk about a topic that is not particularly engaging for older adults. There should be no age difference in empathic accuracy, however, if the task is highly relevant in old age (i.e., if the protagonists talk about a topic of high relevance in old age). Second, given past evidence for improved emotion regulatory skills and enhanced social motivation in old age, we predicted that in comparison to their younger counterparts, older adults should be better able to share the protagonists' feelings and report as well as

express greater sympathy, particularly if the target persons talk about an age-relevant topic.

In addition to testing the main predictions, we analyzed whether our stimulus material successfully elicited emotional reactions in our sample of young and old participants. Therefore, we compared participants' self-reported emotions in reaction to the stimulus material with their self-reported emotions in reaction to a neutral baseline film. In doing so, we tested whether the two topics (social loss and life transition) exhibited the intended age-relevance. Assuming that people react with stronger emotions if an event is personally relevant to them (e.g., Leventhal & Scherer, 1987; Scherer, 1984), we predicted that the social loss theme would elicit greater emotional reactions in older adults than in younger adults. In contrast, the life transition theme should provoke greater emotional reactions in younger than in older adults. We decided not to have our participants complete items that directly ask for the age relevance of the topics, given that past work suggests that even subtle cues can influence empathic behavior (e.g., Ickes, Gesn, & Graham, 2000).

Method

Participants

The sample comprised 153 adults ($M = 44.8$, $SD = 15.1$, age range = 21–71) who were recruited through a survey company via phone, internet, and face-to-face recruiting. On the basis of the median of the continuous age variable, the total sample was split into two age groups representing young adults ($N = 80$; $M = 32.1$ years, $SD = 7.2$ years, age range = 21–44 years, 50% female) and older adults ($M = 58.6$ years, $SD = 7.1$ years, 46–71 years, 52.1% female). Differences between the two age groups were found in marital status (older participants were less likely to be single; $\chi^2_{(1)} = 26.74$, $p < .01$; and more likely to be divorced than younger participants; $\chi^2_{(1)} = 12.74$, $p < .01$) and employment status (all students belonged to the young age group whereas all retired persons belonged to the older age group). There were no significant age differences in education. As to psychological variables, there was a significant negative age group difference in logical reasoning as assessed via the first 18 items of the Advanced Progressive Matrices (Raven, Raven, & Court, 1998; $F_{(1,127)} = 31.40$, $p < .01$, $\eta^2 = .20$). However, no age difference in verbal knowledge occurred (verbal knowledge was assessed via 16 words selected from the Vocabulary subtest of the German version of the Wechsler Adult Intelligence Scale; Wechsler, 1982; $F_{(1,127)} = .48$, $p = .491$, $\eta^2 = .00$). In addition, older adults scored higher on a single item assessing life satisfaction ("how satisfied are you with your present life?"; $F_{(1,126)} = 6.02$, $p < .05$, $\eta^2 = .05$). Taken together, the present sample appears to be largely comparable to the typical sample studied in research on emotional aging. All sample characteristics are depicted in Table 1.

Development of Film Stimuli

Eight film clips were presented. Each was 75-s long and depicted a target person as he or she was talking about an emotionally engaging topic. These clips were recorded during an earlier study in which young and old participants talked about their thoughts and feelings in response to an emotional film clip that

Table 1
Sample Characteristics

Characteristic	Younger adults 21–29 years (<i>n</i> = 80)	Older adults 46–71 years (<i>n</i> = 73)
Age in years		
<i>M</i>	32.10	58.64
<i>SD</i>	7.15	7.11
Marital status ^a		
In relationship	32.5 (26)	46.6 (34)
Single	57.5 (46)	11.0 (8)
Divorced	10.0 (8)	41.1 (30)
Widowed	—	1.4 (1)
Employment status ^a		
Working ^b	40.1 (32)	30.2 (22)
Unemployed	15.0 (12)	12.3 (9)
Retired	—	35.6 (26)
Student	15.0 (12)	—
Other/Not specified	30.0 (24)	22.0 (16)
Intelligence ^{c,d}		
Logical reasoning	76.56 (22.45)	53.68 (23.90)
Verbal knowledge	65.82 (14.57)	63.85 (17.70)
Life satisfaction ^{c,e}	3.48 (1.00)	3.83 (.72)

^a In percent, frequencies in brackets. ^b Full-time or part-time. ^c Mean, standard deviation in brackets. ^d Scores for items were summed up and divided by the possible maximum score. By multiplying this score with 100, we calculated the proportion of correct responses. ^e The response scale ranged from 1 (*very unsatisfied*) to 5 (*very satisfied*).

they previously watched in the laboratory in an individual session. Four target persons (one younger man, one younger woman, one older man, and one older woman) talked about their thoughts and feelings in response to a clip of a woman who mourned for her husband and daughter who were killed in a car accident (social loss theme). We have considered the social loss theme as more relevant to older as compared to younger adults, given that the involvement with death, dying, and social losses becomes increasingly prevalent with age (e.g., Baltes & Mayer, 1999). Four target persons (one younger man, one younger woman, one older man, and one older woman) talked about their thoughts and feelings in response to a clip of a woman who broke off her confining marriage. She left everything behind and moved to another city to start a new life (life transition theme). We have considered the life transition theme as more relevant to younger than to older adults, given that radical changes in how people live become less likely with age (see also Baltes & Mayer, 1999). Directly after the target persons thought-aloud about a film clip, they reported how they had felt while thinking-aloud using a list of 20 emotional adjectives (see description below). The target persons who thought-aloud about the social loss theme were intended to experience and evoke mainly sadness, whereas the target persons who thought-aloud about the life transition theme were intended to experience and evoke mainly amusement. Although dealing with a radical life transition, this stimulus film clip primarily pointed out the unexpected and turbulent aspects of such a transition in an amusing way.

The present eight empathy films were chosen out of a larger pool of film clips in accordance with the following three criteria. First, the target person's self-reported emotion profile was in accordance with the respective film topic. That is, the target

persons who thought-aloud about the social loss theme primarily reported sadness, whereas the target persons who thought-aloud about the life transition theme primarily reported amusement. Second, the target person's facial expressivity was in accordance with the respective film topic. That is, the target persons who thought-aloud about the social loss theme primarily expressed sadness, whereas the target persons who thought-aloud about the life transition theme primarily expressed amusement. Third, the target person's verbal reports were in accordance with the respective film topic. That is, the transcribed verbal reports of the target persons, who thought-aloud about the social loss theme, were rated as negative in tone, whereas the transcribed verbal reports of the target persons, who thought-aloud about the life transition theme, were rated as positive in tone.¹

Procedures and Design

Participants were greeted and told that they would be watching several short film clips.² The films and all subsequent instructions were shown on a 21-inch color television monitor placed at a distance of two meters from the participants. Head and shoulders of the participants were recorded on video. Throughout the experiment, the participant was in the room alone. The experimenter was in an adjacent room that housed the video equipment. An intercom system was used for communication between participant and experimenter who was blind to the hypotheses.

The experimental session comprised nine trials (one film per trial). After each trial participants rated their own emotions during the film as well as the emotions of the film protagonist (see below). The experimenter put the tape on hold while the participant filled out the post-trial inventory. In the first trial, participants watched a neutral baseline film to adapt to the laboratory procedures. This film depicted a young woman talking about her daily way to work; it was designed to elicit as little self-reported emotion as possible. Subsequently, participants viewed the eight empathy films described above. Each clip was preceded by a short instruction: "We will now be showing you a short film clip. It is important to us that you watch the film clip carefully, but if you find the film too stressful, just say 'stop'." At the end of the experimental session, the experimenter debriefed the participants. The empathy films were presented in eight different sequences. A modified Latin square design ensured that every empathy film was shown on each position of the tape and that at most two protagonists of the same age, gender, or topic were shown in succession.

¹ Criteria 2 and 3 were based on the ratings of trained coders. Facial expressivity was rated on the basis of the Emotional Expressive Behavior Coding System (EEB; Gross & Levenson, 1993). The verbal statements were rated on the basis of a coding system developed for present purposes. In addition to applying the three criteria described in the main text, we conducted two pilot studies to determine if our younger and older target persons' personality characteristics and appearance were rated as approximately average (Study 1) and typical for younger and older adults respectively (Study 2). More information about the coding and pilot studies can be obtained from the authors.

² The present study was the third session within a larger research framework on age differences in emotional and social competences. Emotional reactivity, emotional well being, and wisdom-related knowledge were measured in the two previous sessions, which are irrelevant to the present study and, thus, not described further.

Dependent Variables

Empathic accuracy. After each film, the participants rated the emotions of the film protagonist using a list of 20 emotional adjectives. This list was specifically developed for the present study and included items assessing the target emotion amusement, five additional amusement-related positive emotions (cheerful, pleased, excited, interested, and slaphappy), the target emotion sadness, seven additional sadness-related negative emotions (burdened, depressed, sorrowful, dejected, worried, touched, and gloomy), one empathy-related emotion (sympathetic), and five additional negative emotions unrelated to the present target emotions (fearful, dull, angry, hostile, contemptuous). The response scale of this adjective list ranged from 0 (not at all) to 6 (extremely).

Empathic accuracy was computed as “consistency” Intraclass-Correlation between the participants’ other-ratings of target persons’ emotions and the target persons’ self-ratings of their own emotions for a subset of seven emotions, i.e. the two target emotions (sadness and amusement) as well as five additional emotions that are unrelated to the two target emotions (i.e., anger, contempt, dullness, fear, and hostility).^{3,4} All Intraclass-Correlation coefficients were r to Z transformed to be normally distributed for subsequent analyses (Fisher, 1956).

Emotional congruence. After each film, participants rated how they had felt during the film using the same emotional adjective list. Emotional congruence was computed as “consistency” Intraclass-Correlation between the participants’ self-ratings of their own emotions during the film and the target persons’ self-ratings of their own emotions for the same subset of seven emotions.^{3,4} Again the Intraclass-Correlation coefficients were r to Z transformed (Fisher, 1956).

Sympathy. After each film, participants’ level of self-reported sympathy with the target person was assessed with the item “sympathetic.” Self-reports of highly desirable personality characteristics and states, such as being sympathetic with another person, are particularly vulnerable to distortions due to inaccurate self-evaluations and social desirability (e.g., Eisenberg & Lennon, 1983). Therefore, in this study, we also assessed our participants’ level of sympathy on the basis of an observational method. More specifically, as an indicator of sympathy, compassionate listening behavior was scored by three trained coders using a specifically developed coding system (see below).

Video recordings of the participants were digitalized with a high sampling rate (6000kB/s) and coding was done computer-based. The task of the coders was to initially observe the participants during a 60-s baseline period to become familiarized with any idiosyncratic facial characteristics. After this baseline period, the coders observed the participant during an empathy-film period and subsequently coded the participant’s global compassionate listening behavior during this period on a scale ranging from 0 (no compassionate listening behavior) to 3 (explicit compassionate listening behavior). The coders were blind to the nature of the film stimuli and this study’s predictions. To obtain reliability information on our behavioral category, 12.5% of the film clips were scored by all three coders independently. Inter-rater agreement among the three coders was satisfactory ($r_{ICC} > .80$).

Indicators for compassionate listening behavior were drawn from studies measuring and coding behavioral indices of sympathy

(Eisenberg et al., 1989; Strayer & Roberts, 1997) and from studies investigating the characteristics of active, compassionate listening behavior (e.g., Burgoon, 1991; Coakley, Halone, & Wolvin, 1996; Purvis, Dabbs, & Hopper, 1984; Stange, 2005). Explicit compassionate listening behavior was characterized by keeping eye contact, forward lean body posture, sideward head leaning, concerned facial expression, eyes narrowed or squinted, and verbal and/or nonverbal comments (sighs, head nods, mumbling).

Self-reported and behavioral indicators of sympathy showed small but significant correlations ($r = .16, p < .05$).

Results

Our primary analyses involved four univariate repeated measures analyses of variance (ANOVAs) for the four dependent variables (empathic accuracy, emotional congruence, and the two measures of sympathy). F values were computed on the basis of Wilks’s lambda. The partial eta squares representing the portion of explained variance in the dependent variable is reported for each significant effect. The following eta squares correspond with small (.10), medium (.25), and large (.40) effect sizes (f) respectively: $\eta^2 = .01, \eta^2 = .06, \eta^2 = .14$ (Cohen, 1988).

Manipulation Check

Success of the present films in eliciting target emotions. To test if the social loss clips and the life transition clips elicited the predicted target emotions, sadness and amusement respectively, participants’ self-reported emotions were first aggregated across the four social loss and the four life transition films respectively. Cronbach’s alphas for both topics were satisfactory (social loss, Cronbach’s $\alpha = .65-.88$; life transition, Cronbach’s $\alpha = .62-.73$).

³ A “consistency” Intraclass-Correlations works mainly like a Pearson’s correlation and will not take into account mean-level differences between the ratings of the target persons and the ratings of the participants, whereas “absolute” Intraclass-Correlations reflect mean-level differences. “Consistency” Intraclass-Correlations were chosen for the emotional congruence measure because we assumed the emotions of our participants to generally be lower than the emotions of our target persons and did not want this discrepancy to influence our measure. In addition, mean level differences are usually influenced by the response behavior of a specific person (e.g., central tendency bias; Bernieri, Zuckerman, Koestner, & Rosenthal, 1994). Therefore, “consistency” Intraclass-Correlations were chosen for our measure of empathic accuracy as well. However, as to age differences in empathic accuracy and emotional congruence, the analyses of “absolute” and “consistency” Intraclass-Correlations yielded the same pattern of findings.

⁴ Following a discrete emotions approach, we only used the target emotions (sadness and amusement) and the five additional emotions (i.e., anger, contempt, dullness, fear, and hostility) for our analyses. However, the results of our analyses remained largely unchanged if happiness- (Cronbach’s $\alpha = .88$) and sadness-scales (Cronbach’s $\alpha = .94$) were computed for the emotional reactivity measure, or if the Intraclass-Correlations for the empathic accuracy and the emotional congruence measures were calculated with the entire set of 20 emotion items. Means, standard deviations, as well as effect sizes for all 20 emotion adjectives are available from the online supplementary materials for the two topics and for the neutral baseline film (in general and separately for young and older adults).

Multivariate repeated measures analyses of variance (MANOVAs) with the within-subject factors Film (baseline vs. empathy film) and Emotion (amusement vs. sadness vs. anger vs. contempt vs. dullness vs. fear vs. hostility) were computed for both topics. The analyses revealed significant effects of Film [social loss, $F_{(1,149)} = 11.42, p < .01, \eta^2 = .07$; life transition, $F_{(1,149)} = 3.89, p < .05, \eta^2 = .03$] and significant interaction effects of Film and Emotion [social loss, $F_{(6,894)} = 93.78, p < .01, \eta^2 = .39$; life transition, $F_{(6,894)} = 67.75, p < .01, \eta^2 = .31$].

As seen in Table 2, follow-up ANOVAs indicated that the film clips successfully elicited the target emotions. Compared to the neutral baseline film, participants reported significantly greater sadness in reaction to the target persons talking about the social loss theme [$F_{(1,151)} = 195.99, p < .01, \eta^2 = .56$], and significantly greater amusement in reaction to the target persons talking about the life transition theme [$F_{(1,150)} = 147.43, p < .01, \eta^2 = .50$].

In addition, participants reported less sadness [$F_{(1,151)} = 10.64, p < .01, \eta^2 = .07$] as well as greater contempt [$F_{(1,151)} = 7.77, p < .01, \eta^2 = .05$] in reaction to the target persons talking about the life transition theme, and less amusement [$F_{(1,150)} = 47.53, p < .01, \eta^2 = .24$] as well as greater anger [$F_{(1,152)} = 6.57, p < .05, \eta^2 = .04$] in reaction to the target persons talking about the social loss theme. Furthermore, in reaction to both topics participants reported less dullness [social loss, $F_{(1,152)} = 47.13, p < .01, \eta^2 = .24$; life transition, $F_{(1,152)} = 47.91, p < .01, \eta^2 = .24$], greater fear [social loss, $F_{(1,152)} = 20.79, p < .01, \eta^2 = .12$; life transition, $F_{(1,152)} = 11.10, p < .01, \eta^2 = .07$], and greater hostility [social loss, $F_{(1,152)} = 6.27, p < .05, \eta^2 = .04$; life transition, $F_{(1,152)} = 11.10, p < .01, \eta^2 = .07$]. Contrasts with sadness as the reference variable for the social loss theme and amusement as the reference variable for the life transition theme revealed that the mean ratings for the target emotions were significantly higher than the mean ratings for all other emotions (all contrasts were significant at $p < .001$). This finding was independent of whether absolute levels in self-reported emotions or difference scores representing the amount of change from baseline to empathy film were considered.

Interaction effects between age and topic. To explore the interaction effects of the between-subject factor Age Group (young vs. old) and the within-subject factor Age-Relevance of the Film-Topic (young vs. old) on emotional reactivity, a 2×2 repeated measures ANOVA was computed. Dependent variables were self-reported sadness in response to the four persons talking about the social loss theme and amusement in response to the four persons talking about the life transition theme. The overall ANOVA for participants' emotional reactivity revealed a significant interaction effect between Age Group and Age-Relevance of the Film-Topic [$F_{(1,151)} = 18.51, p < .01, \eta^2 = .11$].^{4,5,6,7} To explore this interaction effect we conducted separate follow-up ANOVAs for both themes. The follow-up ANOVA for the social loss theme revealed significant age differences [$F_{(1,151)} = 4.24, p < .05, \eta^2 = .03$]. Older adults reported greater sadness than younger adults when the target persons were talking about the social loss theme (younger adults, $M = 2.21, SD = 1.15$; older adults, $M = 2.67, SD = 1.56$; see also Table 3). The follow-up ANOVA for the life transition theme revealed significant age differences as well [$F_{(1,151)} = 10.61, p < .01, \eta^2 = .07$]. Younger adults reported greater amusement than older ones when the target persons were talking about the life transition theme (younger adults, $M = 2.75,$

$SD = 1.34$; older adults, $M = 2.04, SD = 1.33$; see also Table 3). For the five additional emotions (i.e., anger, contempt, dullness, fear, and hostility) no age differences were obtained.

Taken together, the present clips were successful in eliciting the target emotions. In addition, and as expected, older adults reacted with greater emotions to the films relevant to older adults, whereas younger adults reacted with greater emotions to the films relevant to their young age group. This cross-over interaction can be considered as an indirect indication that the manipulation of age-relevance was successful.

Prediction-Relevant Findings

Empathic accuracy: Interaction effects between age group and age-relevance of the film-topic. Interaction effects of the between-subject factor Age Group (young vs. old) and the within-subject factor Age-Relevance of the Film-Topic (young vs. old) on empathic accuracy were tested via a 2×2 ANOVA. Dependent variables were the measures of empathic accuracy (i.e., intraclass correlations between the self-reported emotions of the target persons and the ratings of the participants) for the four persons talking about the social loss theme and for the four persons talking about the life transition theme. To reduce the number of dependent variables, we aggregated the measures of empathic accuracy for the four target persons across both topics. Considering that only four targets were aggregated, Cronbach's alphas were acceptable and comparable to other studies in the context of which behavioral reactions to film clips were aggregated (Kunzmann & Richter, 2009; Tsai, Levenson, & Carstensen, 2000; social loss, Cronbach's $\alpha = .37$; life transition, Cronbach's $\alpha = .56$).

The overall ANOVA for the measures of empathic accuracy revealed a main effect for Age-Relevance of the Film-Topic [$F_{(1,151)} = 4.60, p < .05, \eta^2 = .03$], and a significant interaction effect between Age Group and Age-Relevance of the Film-Topic [$F_{(1,151)} = 5.35, p < .05, \eta^2 = .03$].^{6,7} Participants were more accurate in rating the emotions of target persons who talked about the social loss theme compared to target persons who talked about the life transition theme (social loss, $M = .80, SD = .32$; life transition, $M = .76, SD = .52$).

To explore the interaction effect between Age Group and Age-Relevance of the Film-Topic we conducted separate follow-up ANOVAs for both themes. As predicted, and consistent with past work on emotion recognition, the follow-up ANOVA for the life transition theme revealed significant age differences [$F_{(1,151)} = 5.53, p < .05, \eta^2 = .04$]. Younger adults were more accurate in perceiving the emotions of the target persons than older adults (younger adults, $M = .80, SD = .49$; older adults, $M = .71, SD = .53$; see also Table 3). The follow-up ANOVA for the social loss theme revealed, however, that there were no age differences in the ability to accurately perceive the emotions of the target persons

⁵ The results of the analyses remained basically unchanged if the neutral baseline film (a young woman talking about her daily way to work) was included as a covariate.

⁶ Film order had neither main effects nor interaction effects on emotional reactivity or the three facets of empathy. In addition, we did not find systematic main or interaction effects of targets' age or gender.

⁷ After statistical control of marital status, employment status, logical reasoning, and life satisfaction the findings remained basically unchanged.

Table 2
Effectiveness of Film Clips

Emotion	Mean			Standard deviation			Film effect ^a	
	B	S	L	B	S	L	S	L
Sadness	0.67	2.43	0.40	1.13	1.38	0.65	.56**	.07**
Amusement	0.91	0.20	2.41	1.32	0.45	1.38	.24**	.50**
Anger	0.31	0.50	0.39	0.86	0.86	0.64	.04*	.01
Contempt	0.11	0.18	0.23	0.53	0.45	0.54	.02	.05**
Dullness	1.99	1.13	1.13	1.54	1.05	1.00	.24**	.24**
Fear	0.46	0.84	0.19	1.00	1.15	0.47	.12**	.08**
Hostility	0.18	0.29	0.35	0.62	0.67	0.66	.04*	.07**

Note. B = neutral baseline film; S = social loss theme; L = life transition theme.

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

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

($F_{(1,151)} = .02, p = .887, \eta^2 = .00$; younger adults, $M = .80, SD = .31$; older adults, $M = .80, SD = .34$; see also Table 3).

Emotional congruence: Interaction effects between age group and age-relevance of the film-topic. Interaction effects of the between-subject factor Age Group (young vs. old) and the within-subject factor Age-Relevance of the Film-Topic (young vs.

Table 3
Age Differences in Emotional Reactivity and the Three Facets of Empathy

	Young adults ^a	Old adults ^a	Age effect ^b
Emotional reactivity			
<i>Social loss theme</i>			
Sadness	2.21 (1.15)	2.67 (1.56)	.03*
Amusement	0.29 (0.53)	0.10 (0.30)	.05*
Anger	0.55 (0.73)	0.46 (0.99)	.00
Contempt	0.19 (0.37)	0.16 (0.53)	.00
Dullness	1.24 (1.06)	1.00 (1.04)	.01
Fear	0.69 (0.93)	1.01 (1.34)	.02
Hostility	0.26 (0.47)	0.32 (0.84)	.00
<i>Life transition theme</i>			
Sadness	0.35 (0.62)	0.46 (0.67)	.01
Amusement	2.75 (1.34)	2.04 (1.33)	.07**
Anger	0.46 (0.67)	0.30 (0.59)	.02
Contempt	0.29 (0.56)	0.17 (0.51)	.01
Dullness	1.21 (1.04)	1.03 (0.92)	.02
Fear	0.17 (0.45)	0.21 (0.48)	.00
Hostility	0.42 (0.72)	0.28 (0.59)	.01
<i>Empathic accuracy</i>			
<i>Social loss theme</i>	.80 (.31)	.80 (.34)	.00
<i>Life transition theme</i>	.80 (.49)	.71 (.53)	.04*
<i>Emotional congruence</i>			
<i>Social loss theme</i>	.47 (.32)	.59 (.41)	.04*
<i>Life transition theme</i>	.75 (.56)	.71 (.57)	.01
Sympathy			
<i>Social loss theme</i>			
Self-report measure	3.38 (1.08)	3.70 (1.26)	.03*
Behavioral measure	0.51 (0.47)	0.71 (0.48)	.05**
<i>Life transition theme</i>			
Self-report measure	2.26 (1.25)	2.81 (1.28)	.05**
Behavioral measure	0.63 (0.53)	0.89 (0.57)	.06**

^a Mean (standard deviation). ^b Effect sizes are partial eta squares (η^2).

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

old) on emotional congruence were tested via a 2×2 ANOVA. Dependent variables were the measures of emotional congruence (i.e., intra-class correlations between the self-reported emotions of the target persons and the self-reported emotions of the participants) for the four persons talking about the social loss theme and for the four persons talking about the life transition theme. The measures for the four target persons were aggregated across both topics to reduce the number of dependent variables. Considering that only four targets were aggregated, Cronbach's alphas were acceptable (social loss, Cronbach's $\alpha = .62$; life transition, Cronbach's $\alpha = .46$).

The overall ANOVA for the measures of emotional congruence revealed a main effect for Age-Relevance of the Film-Topic [$F_{(1,149)} = 35.31, p < .01, \eta^2 = .19$], and a significant interaction effect between Age Group and Age-Relevance of the Film-Topic [$F_{(1,149)} = 4.99, p < .05, \eta^2 = .03$].^{6,7} Participants experienced greater emotional congruence with target persons who talked about the life transition theme than with target persons who talked about the social loss theme (social loss, $M = .53, SD = .37$; life transition, $M = .73, SD = .57$).

To explore the interaction effect between Age Group and Age-Relevance of the Film-Topic we conducted separate follow-up ANOVAs for both themes. The follow-up ANOVA for the social loss theme revealed significant age differences [$F_{(1,150)} = 6.32, p < .05, \eta^2 = .04$]. As predicted, older adults experienced greater emotional congruence than younger adults (younger adults, $M = .47, SD = .32$; older adults, $M = .59, SD = .41$; see also Table 3). The follow-up ANOVA for the life transition theme, however, did not show significant differences between the two age groups [$F_{(1,149)} = .77, p = .381, \eta^2 = .01$]. Younger adults were as congruent as older ones with the emotions of the target persons (younger adults, $M = .75, SD = .56$; older adults, $M = .71, SD = .57$; see also Table 3).

Age Differences in Sympathy

Interaction effects of the between-subject factor Age Group (young vs. old) and the within-subject factor Age-Relevance of the Film-Topic (young vs. old) on self-reported and behavioral sympathy (i.e., participants' compassionate listening behavior) were tested via two separate 2×2 ANOVAs. Dependent variables were the degree of self-reported sympathy and the ratings of behavioral

sympathy for the four persons talking about the social loss theme and for the four persons talking about the life transition theme. Again, we aggregated the four target persons across both topics to reduce the number of dependent variables. Cronbach's alphas were satisfactory (self-report measure: social loss, Cronbach's $\alpha = .78$, life transition, Cronbach's $\alpha = .81$; behavioral measure: social loss, Cronbach's $\alpha = .72$, life transition, Cronbach's $\alpha = .79$).

The two overall ANOVAs for sympathy revealed for both measures main effects for Age-Relevance of the Film-Topic [self-report measure: $F_{(1,151)} = 156.25, p < .01, \eta^2 = .51$; behavioral measure: $F_{(1,148)} = 22.82, p < .01, \eta^2 = .13$] and a for Age Group [self-report measure: $F_{(1,151)} = 5.95, p < .05, \eta^2 = .04$; behavioral measure: $F_{(1,148)} = 8.53, p < .01, \eta^2 = .06$].^{5,6,7} The interactions between Age Group and Age-Relevance of the Film-Topic were non-significant [self-report measure: $F_{(1,151)} = 1.92, p = .168, \eta^2 = .01$; behavioral measure: $F_{(1,148)} = .76, p = .384, \eta^2 = .01$]. Participants reported greater sympathy in reaction to the target persons who talked about the social loss theme than to the persons who talked about the life transition theme (social loss, $M = 3.53, SD = 1.17$; life transition, $M = 2.52, SD = 1.29$). However, participants expressed greater sympathy in reaction to the target persons who talked about the life transition theme than to the persons who talked about the social loss theme (social loss, $M = .60, SD = .49$; life transition, $M = .75, SD = .56$). More relevant to our predictions regarding age differences, older adults generally reported and expressed greater sympathy in reaction to the target persons than younger adults (self-report measure: younger adults, $M = 2.82, SD = 1.05$, older adults, $M = 3.26, SD = 1.18$; behavioral measure: younger adults, $M = .57, SD = .46$, older adults, $M = .80, SD = .49$; see also Table 3).

Discussion

The present study investigated age differences in cognitive and affective facets of empathy: the ability to perceive another's emotions accurately, the capacity to share another's emotions, and the capacity to experience and behaviorally express sympathy in an empathic episode. Results showed that the separation of these three facets of empathy was useful—differential age effects for the different components of empathy were observed. Moreover, and as predicted, contextual factors moderated age differences in empathic accuracy and emotional congruence.

Age Differences in Empathic Accuracy

As predicted, and in contrast to past research on age differences in emotion recognition, the present study suggests a complex pattern of age differences in the ability to accurately perceive another's emotions rather than a pattern of uniform age-related deficits. Whereas past work on emotion recognition has been based on context-free tasks of little motivational relevance to the test taker (e.g., Isaacowitz et al., 2007; Ruffman et al., 2008), in the present study, we developed context-rich tasks that varied in the age-relevance of the topic a target person was talking about. Our findings strongly suggest that negative age differences in empathic accuracy are only evident if the empathy episode is of little relevance to older people. If a target person talks about a topic of high relevance to older adults, however, there were no age-related deficits in empathic accuracy observable.

Moreover, our results suggest that the age-relevance of the task has greater influence on older adults' empathic accuracy than on younger adults' performance. That is, older adults' empathic accuracy showed greater variations across the different types of tasks (i.e., tasks differing in age-relevance) than younger adults' empathic accuracy. Together the present findings are consistent with the idea that adults become increasingly selective in investing their cognitive resources as they grow older (Hess, 2006). Obviously, this higher selectivity in old age is not a random process. Rather, older people appear to focus their time and energy on those tasks that are of high motivational relevance. To the best of our knowledge, this is the first study providing evidence for this idea in the realm of empathic accuracy. In this vein, it extends past empirical work on age differences in impression formation (Hess et al., 2001) and more basic cognitive functions (e.g., Fung & Carstensen, 2003; Rahhal et al., 2002).

Although the present data are consistent with the conclusion that a motivational process (i.e., enhanced selectivity in old age) can explain older adults' variability in empathic accuracy, it deserves note that this motivational process was not directly assessed in the present study. Future work is needed that will address the mechanisms that could explain the effects of contextual variations such as the age-relevance of the task more explicitly. In this work, it will be important to disentangle the effects of enhanced motivational involvement in vs. enhanced familiarity with a certain task. Of course, these two mechanisms are not mutually exclusive—when seen over a longer time window, enhanced motivation to engage in a task should lead to greater familiarity with this task. However, it is important to clarify if it is purely for motivational reasons that older adults can raise their performance or if accumulated experience and expertise are also necessary to facilitate performance.

Age Differences in Emotional Congruence

Consistent with SST (e.g., Carstensen et al., 1999), the present evidence suggests that older adults' emotional competencies remain stable or even show growth throughout the adult years. Older adults were at least as capable of sharing the emotions of the present target persons as younger adults. If the task was of high relevance to old age, older people even outperformed younger adults in that they experienced more congruent emotions with the target persons. This context effect is consistent with past work on age differences in emotional reactivity (Kunzmann & Grünh, 2005; Kunzmann & Richter, 2009) and suggests an important qualification to past theoretical work on emotional aging. Even if older people generally have more emotional resources than cognitive resources available, the age-relevance of the task still plays a significant role. Age-related gains in emotional functioning are most likely detectable if the task is of high relevance to older people.

Age Differences in Sympathy

In this study, we assessed self-reported and behavioral indicators of sympathy (i.e., younger and older people's compassionate listening behavior). Sympathy was the only facet of empathy for which we did not find that age differences were modulated by the age-relevance of the task. More specifically, older adults reported

and expressed greater sympathy with any of the target persons than young adults did. At this point, it is difficult to explain this unexpected finding. Sympathy, as assessed in the present study, might be based on experience-based automatized behavior, whereas the other components of empathy, especially empathic accuracy, might be based on more effortful deliberate processes. As a consequence, sympathy-relevant behaviour might be less resource-intensive and, thus, less sensitive to contextual influences than the other two facets of empathy.

Remarkably, participants' self-reported sympathy was higher for the social loss theme, while their behavioral sympathy was higher for the life transition theme. Reasons for this discrepancy could be manifold. Possibly, participants were either more willing to get involved in, or better able to understand the positively valenced situation. Moreover, self-reported and behavioral measures may be regulated and reported differently, given that different standards apply to them, for instance with regard to social desirability (see research on gender differences in self-reported vs. behavioral empathy, e.g., Eisenberg & Lennon, 1983). The discrepancy between self-reported and behavioral sympathy underlines the necessity to use multiple measures to assess sympathy, as in this study. Much more important for our research questions is the stability of the positive relationship between sympathy and age for both measures, regardless of mean level differences.

Taken together, the present evidence speaks clearly against uniform age-related change in empathy. Extending past laboratory research on emotion recognition (e.g., Isaacowitz et al., 2007) as well as past field studies using self-report measures (e.g., Grühn et al., 2008), the present study simultaneously assessed three distinct facets of empathy. Similar to other complex skills that have been investigated in research on aging (e.g., emotion regulation; e.g., Kunzmann, Kupperbusch, & Levenson, 2005), the fate of empathy in adulthood and old age appears to be best characterized by multidirectional age-related changes. More specifically, cognitive facets of empathy may be more vulnerable to age-related decline than emotional facets. At the same time, there is clear evidence supporting the idea that the age-relevance of the situation modulates age differences in at least empathic accuracy and emotional congruence. Therefore, if these two empathy facets evince negative, positive, or no age differences may be co-determined by the motivational significance of the empathic episode that is being considered.

Limitations and Avenues for Future Research

In the present study, different facets of empathy were assessed simultaneously and *in vivo* under controlled laboratory conditions. In contrast to past experimental work on emotion recognition, our goal was to develop empathy tasks of high ecological relevance. In contrast to past work via self-reports, empathy was assessed in situation-specific ways and performance-based. Despite these strengths, the present study has several limitations that we shall discuss subsequently.

First, to manipulate the age-relevance of our empathy tasks, we instructed our target persons to talk about two different types of themes, social loss and life transition. Given that past work has documented clear age differences in the prevalence of events related to social loss (i.e., age-related increase in relevant events) as well as in the prevalence of events related to major life transi-

tions (i.e., age-related decrease in relevant events), we have considered it appropriate to classify the social loss theme as primarily relevant to older people and the life transition theme as primarily relevant to young adults. The findings of our manipulation check were consistent with this classification, that is, older people reacted with greater emotions to films of social loss, whereas younger people reacted with greater emotions to films of the life transition theme. One limitation of this type of manipulation check clearly is its indirect nature. Future studies should test the age-relevance of the present films more directly by asking participants about the film topics' personal and or perceived age-relevance. It will be important to consider, however, that empathic behavior can be quite easily influenced by subtle cues triggering motivational effects (e.g., activation of gender role stereotypes via questionnaire items; Ickes, Gesn et al., 2000). Therefore, it is likely that direct questions about the age-relevance of the task will enhance or decrease performance.

Second, in this study, the film clips' age-relevance (young vs. old) and their emotional quality (sadness vs. amusement) were not systematically varied. The film clips dealing with social loss primarily elicited sadness, whereas the film clips dealing with an adventurous and risky life transition primarily elicited amusement. Therefore, we cannot exclude the possibility that the present age differences in the different empathy facets are emotion-specific, at least partly. Speaking against this possibility is work conducted in the context of SST (e.g., Carstensen et al., 1999). According to SST one would expect that older adults are particularly motivated to experience and up-regulate their emotions in response to positive emotion-elicitors, but to down-regulate reactions to negative emotion-eliciting events. In the present study, an opposite pattern of results emerged: Older participants reacted with greater sadness than younger adults to the social loss theme, and they experienced less positive affect than younger participants in response to the life transition theme. Seen in this light, the present results speak for strong influences of contextual factors, such as the age-relevance of the task, on empathic behavior.

An important, related issue refers to the restricted number of different types of empathic episodes (i.e., empathy tasks) that one can realize in a laboratory study and when studying empathy *in vivo* rather than by questionnaire. Given that we realized only two types of situations differing in the age-relevance of the task (empathy in situations characterized by social loss vs. radical life transitions), it remains open whether the present findings will generalize to empathic episodes with different issues at stake. Also, a more traditional approach to developmental and aging processes—an approach that emphasizes general rather than differential or contextually-bound age differences—would certainly prefer a more representative sampling of empathic episodes in order to determine the effects of age and/or cohort on empathy in general (i.e., aggregated across multiple situations and over longer periods of time).

Third, the present paradigm arguably exhibits greater external validity than the typical emotion recognition task employed in aging research, given that the present target persons were real people who experienced authentic emotions while they were videotaped. Although the present film clips were designed to be close to real-life, one limitation of our paradigm certainly is that it did not require participants to actually interact with a target person. One interesting avenue for future research is to study age differ-

ences in empathy under more natural conditions by having participants interact with strangers and/or persons they know well. Past age comparative work on emotional reactivity and regulation using the marital interaction paradigm (e.g., Levenson, Carstensen, & Gottman, 1994) or past work in the field of social and personality research using the dyadic interaction paradigm (e.g., Ickes, Bissonnette, Garcia, & Stinson, 1990) could certainly be useful in this endeavor.

Finally, our design was cross-sectional, not longitudinal within individuals. Thus, we studied age differences and inferred age-related changes from these differences. It remains unclear whether differences between young and old participants in the present study were truly age-related or due to cohort differences (Baltes, Reese, & Lipsitt, 1980). For example, greater sympathy in response to the present target persons could result from age-related factors, cohort-related factors, or both. In order to disentangle such effects and begin to study intraindividual changes in empathy rather than individual differences in empathy, future work will need to turn to a creative combination of experimental and longitudinal designs.

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