

Annual Review of Developmental Psychology

Knowing What Others Think and Feel: Empathic Accuracy Across Adulthood

Michaela Riediger¹ and Elisabeth S. Blanke²

¹Department of Developmental Psychology, Friedrich Schiller University Jena, D-07743 Jena, Germany; email: michaela.riediger@uni-jena.de

²Department of Psychology, Humboldt-Universität zu Berlin, 10099 Berlin, Germany

Annu. Rev. Dev. Psychol. 2020. 2:157–76

First published as a Review in Advance on
September 18, 2020

The *Annual Review of Developmental Psychology* is
online at devpsych.annualreviews.org

<https://doi.org/10.1146/annurev-devpsych-040920-035557>

Copyright © 2020 by Annual Reviews.
All rights reserved

Keywords

empathy, empathic accuracy, life span, age differences, emotional development

Abstract

Empathic accuracy is the ability to infer another person's inner states. While early findings suggested older adults to be less empathically accurate on average than younger individuals, the context dependency of such age differences was emphasized more recently. Comparable empathic accuracy was observed in older and younger empathizers when conversational topics were positive or personally relevant or when empathic judgments were solely based on prior knowledge of the target. Motivational and cognitive mechanisms are assumed to underlie this context-dependent pattern of findings. A refined future understanding of the sources of variation in empathic skills within and across age groups will require unraveling the contributions of the empathizer, the target person, and their relationship. Moreover, improved insights into the implications of empathic skills in various phases of adulthood, including older adults' social functioning and health, will require joint consideration of cognitive and affective components of empathy and their accompanying physiological processes.

ANNUAL
REVIEWS **CONNECT**

www.annualreviews.org

- Download figures
- Navigate cited references
- Keyword search
- Explore related articles
- Share via email or social media

Contents

INTRODUCTION	158
SETTING THE STAGE: ADULT EMOTIONAL DEVELOPMENT	159
THE PHENOMENON OF EMPATHY	160
ADULT AGE DIFFERENCES IN EMPATHIC ACCURACY	161
Theoretical Positions	161
Empirical Evidence on Adult Age Differences in Empathic Accuracy	162
Potential Reasons for Adult Age Differences in Empathic Accuracy	164
Summary	166
OPEN QUESTIONS AND FUTURE DIRECTIONS	166
Employing the Social Relations Model in Developmental Investigations of Empathic Skills	168
Considering the Role of Affective Components and Physiological Processes in Developmental Investigations of Empathic Skills	169
CONCLUSIONS	170

INTRODUCTION

Empathic accuracy, the extent to which an individual understands the thoughts and feelings of another person, is a hallmark of social competencies. Correctly inferring other people's internal states is necessary (though not sufficient) for being responsive to their needs, avoiding social faux pas, and steering an interaction in the direction that is in line with one's goals. Studies indeed demonstrate positive associations between empathic skills and indicators of social adjustment in various age groups, such as prosocial behavior, peer acceptance, and friendship among children (Caputi et al. 2012, Fink et al. 2015, Gleason et al. 2009), or social well-being in various age groups (Blanke et al. 2016, Gleason et al. 2009, Lecce et al. 2017, Sened et al. 2017). Conversely, low empathic accuracy is characteristic of various psychological conditions that are associated with social adjustment difficulties, such as autism (Dziobek et al. 2008), schizophrenia (Lee et al. 2011), and schizotypal disorder (Ripoll et al. 2013).

However, empathic accuracy is not equally beneficial in all situations. In some contexts, understanding others' thoughts and feelings can be a source of stress and can create strain on social relationships, for example, when the inferred mental states of others are threatening to one's self or relationships (e.g., Elfenbein & Ambady 2002, Simpson et al. 1995), particularly when the other person does not want to reveal these thoughts or feelings (e.g., Elfenbein & Ambady 2002; Puccinelli & Tickle-Degnen 2004; see also Ickes & Hodges 2013). In a similar vein, individuals with borderline personality disorder, a psychological condition characterized by instable and conflict-laden relationships, have been found to show increased empathic accuracy to relationship-threatening thoughts and feelings of their partners compared to healthy controls (Miano et al. 2017).

Given the complexity of the relevance of empathic skills for individuals' adjustment, understanding their development and implications for different life domains is important. The present article provides a review of the extant literature on empathic accuracy during adulthood and old age and points out new directions for future studies. We start out by embedding the specific topic of this review within the broader research field of emotional development across adulthood. We then characterize our phenomenon of interest, empathic accuracy, and distinguish it from related

phenomena. Following that, we review current research on adult age differences in empathic accuracy and on potential underlying mechanisms. We also discuss the strengths and pitfalls of the methodological evolution of this research field. We conclude with a discussion of open questions and promising new avenues for future developmental research.

SETTING THE STAGE: ADULT EMOTIONAL DEVELOPMENT

Research on adult age differences in empathic accuracy is a comparatively younger branch within the broader research field on adult emotional development. Among the most prominent and well-documented findings from this broader field is evidence of average age-related stability or increases in well-being from young adulthood into early old age. For example, older adults, on average, report more positive and less negative affective experiences in their daily lives than younger adults (for a review, see Riediger & Rauers 2014). For many aging individuals, a terminal decline of well-being appears to occur only toward the very end of life (Gerstorf et al. 2016, 2018). The positive trajectory of emotional well-being well into old age seems at odds with aging-associated losses in other life domains, such as social partners, cognitive functioning, and physical health. To reconcile this apparent stability-despite-loss paradox of adult well-being (Kunzmann & Wrosch 2015), several researchers theorized that it derives from adult changes in the motivation and competence to regulate personal emotional experiences (Blanchard-Fields et al. 2007, Carstensen 2006, Charles 2010).

Socioemotional selectivity theory (e.g., Carstensen 2006) proposes that with older age, as individuals perceive their time horizons as increasingly limited, they become more motivated to optimize their affective experiences in the here and now. This claim is consistent with findings of an age-related increase from adolescence to old age in self-reported and behavioral indicators of prohedonic motivation (wanting to maintain or enhance positive, or to dampen negative, experiences) (Cohrdes et al. 2017; Riediger et al. 2009, 2014b). It is also in line with evidence of a so-called age-related positivity effect in affective information processing: Older adults, on average, tend to preferentially attend to and remember positive over negative information when it is presented without further instructions (e.g., meta-analysis in Reed et al. 2014), whereas in younger adults, the opposite pattern is often observed. This phenomenon has been interpreted as reflecting older adults' strategic deployment of attention to protect their affective well-being.

The often-made claim that the increase in well-being is due to increased competence in emotion regulation is less well supported. Although older adults tend to describe themselves, on average, as in better control of their feelings than younger adults (Doerwald et al. 2016), experimental studies do not indicate systematic adult age differences in behavioral measures of the ability to regulate emotions across adulthood (e.g., meta-analysis in Brady et al. 2018; systematic review in Doerwald et al. 2016). Available evidence also indicates few systematic adult age differences in the use of emotion-regulation strategies in experimentally controlled settings (e.g., systematic review in Allen & Windsor 2019) or in everyday life contexts (Benson et al. 2019, Eldesouky & English 2018).

The Strength and Vulnerability Integration model (e.g., Charles & Luong 2013) highlights the importance of situational contexts for understanding emotional development in adulthood. The theory proposes that aging-related declines in the flexibility to physiologically recuperate from stress responses should render successful emotion regulation increasingly difficult with age in highly arousing and complex contexts. In less demanding situations, however, older adults' emotion-regulation success should be comparable to (or even better than) that of younger individuals given maintained emotion-regulation effectiveness coupled with an age-related increase in prohedonic affect-regulation motivation. Supporting evidence includes, for example, findings

that stressor complexity moderates adult age differences in affective stress reactivity. In reaction to mild stressors, comparable or lower affective responses are observed among older compared to younger adults, whereas affective reactivity to complex stressors is enhanced among older relative to younger adults (e.g., Birditt 2014, Wrzus et al. 2013). There is also evidence that older adults lead less stressful lives than younger adults, potentially in part by avoiding stressful situations that are foreseeable and can be circumvented (Brose et al. 2013).

Taken together, age differences in emotional experiences and emotion regulation have been prominent topics in research on adult emotional development. Studies have yielded convincing evidence of average positive age trajectories of emotional well-being from young adulthood into early old age. Empirical findings suggest that enhanced hedonic affect-regulation motivation and maintained emotion-regulation capacity contribute to this trajectory. In recent years, interest has been growing in adult development of other emotional competencies in addition to emotion regulation, such as understanding emotions in the self and in others (Doerwald et al. 2016). Among these competencies is empathic accuracy, which we focus on in this review. In the following sections, we give an overview of the current state of knowledge and outline future directions. We begin our discussion by characterizing the phenomenon of empathy and differentiating empathic accuracy from related constructs.

THE PHENOMENON OF EMPATHY

Empathic abilities comprise cognitive and affective components. The cognitive side involves the ability to understand which internal states another person is experiencing and is a focal point in this review. We use the term empathic accuracy, which Ickes (1997) defined as the ability to read other people's thoughts and feelings correctly. It is a complex form of interpersonal inference that requires adequately integrating information from different sources, such as observation, knowledge, experiences, and reasoning. Depending on the specific research tradition, related phenomena have been referred to by various other labels, such as theory of mind, mentalizing, or perspective taking (for an overview, see Blanke & Riediger 2019). Regardless of the label, the focus is on the empathizer's cognitive representations of the other person's mental states. The affective component of empathy, in contrast, refers to emotionally responding to another person's internal state. Narrow definitions restrict it to affect sharing, or emotional congruence, that is, to experiencing an affective state that resembles (but may be less intense than) that of the other person (e.g., Walter 2012). More encompassing conceptualizations also consider responses that differ in quality from the other's affective state, such as compassion (Dziobek et al. 2008). Cognitive and affective empathy are regarded as distinct phenomena, although they may mutually facilitate each other (Zaki & Ochsner 2011). Indeed, measures of cognitive and affective empathy have been found to be not, or only weakly, associated with one another (e.g., Grant et al. 2018). It has also been argued that distinct neural systems subserve cognitive and affective empathy, although both were found to be active when people make accurate empathic judgments (Zaki et al. 2009).

While we stress the importance of an integrated consideration of cognitive and affective components of empathy later in this article, the primary focus of this review is on cognitive empathy, as it is to date the most thoroughly investigated facet of empathy in adult developmental research. More specifically, we review studies that operationalized cognitive empathy as an agreement between the thoughts or feelings an empathizer assumes a given target person to have and the target person's self-reported thoughts or feelings. Investigations that used empathizers' self-reported cognitive empathy only are not considered because (a) self-report measures of empathy are susceptible to socially desirable self-presentations (which may also differ with age), and (b) the extent to which individuals can gain insights into their own empathic skills may be limited as empathizers

lack valid criteria for judging the accuracy of their empathy (because it is typically not possible to verify whether one correctly inferred the other person's thoughts and feelings). Indeed, empirical evidence demonstrates limited overlap between behavioral and self-report measures of empathy (for an overview, see Ickes et al. 2000). Measures of self-reported empathy are valuable when individuals' subjective conceptions are of primary interest rather than their objective accuracy. Our emphasis in the following sections is on interindividual differences in the latter, and we therefore focus on findings from behavioral measures.

ADULT AGE DIFFERENCES IN EMPATHIC ACCURACY

In these sections, we discuss theoretical positions in life span developmental psychology that invite hypotheses regarding possible adult age differences in empathic accuracy. We then highlight findings from various measurement approaches that have been used to empirically investigate possible adult age differences in empathic accuracy and summarize the state of knowledge concerning factors that might contribute to such differences. Following that, we present open questions and propose future directions the field should take to address these open issues.

Theoretical Positions

Several theoretical positions in developmental psychology give rise to competing expectations regarding the development of empathic accuracy during adulthood and into old age (Kunzmann et al. 2018). One position, for example, proposes that generativity (i.e., providing emotional and instrumental support to younger generations) gains in importance beginning in middle adulthood (Erikson 1985). This suggests a growing interest in the welfare of others. One might expect that this, together with accumulating life experience (Hess 2006), might lead to an age-related increase in empathic accuracy.

Socioemotional selectivity theory (e.g., Carstensen 2006) maintains that the increasing salience of one's finite remaining time alive leads to a growing motivation to maximize one's well-being in the present. Consequently, the tendency to preferentially attend to positive, and away from negative, information is assumed to increase with age. The theory also posits that as adults age, emotionally meaningful goals become increasingly more important than goals that involve information seeking. Preferential investment in emotionally close relationships therefore should increase throughout adulthood. Based on this account, one could expect an age-related increase in empathic accuracy for positive, but a decrease in empathic accuracy for negative, thoughts and feelings of target persons that the empathizer does not feel close to and in situations where this negative information is not otherwise instrumental for the empathizer (e.g., English & Carstensen 2015, Reed et al. 2014). One could also expect on the basis of this theory that selective motivation to correctly infer thoughts and feelings of close network partners, rather than of peripheral social partners or strangers, might increase throughout adulthood.

In contrast to the above theories that emphasize the role of motivation, yet another account, Dynamic Integration Theory (Labouvie-Vief 2009), focuses on the role of biologically based cognitive aging processes. According to this position, physiological aging processes yield an adult developmental trajectory of cognitive-affective complexity that is characterized by increases during young adulthood, a peak in middle adulthood, and subsequent declines into old age. Cognitive representations of others' mental states can be considered as one component of cognitive-affective complexity. This theory thus invites the hypothesis that cognitive empathy might follow an inverted u-shaped developmental trajectory during adulthood irrespective of the content of the to-be-inferred information.

Taken together, various life span developmental theories invite alternative hypotheses regarding potential age differences in empathic accuracy across adulthood. In the following sections, we give an overview of the currently available empirical evidence and highlight the methodological evolution of this research field over the past years.

Empirical Evidence on Adult Age Differences in Empathic Accuracy

Interest in the development of cognitive empathy across adulthood sparked after Ruffman et al. (2008) concluded from a meta-analysis that older adults are less adept than younger adults in recognizing nonverbal emotional expressions (which can be viewed as a subcomponent of cognitive empathy). Various authors, however, called into question the suitability of the paradigms employed by most of the studies in this meta-analysis, such as presenting participants with photographs of posed, supposedly prototypic, expressions of highly intense basic emotions. Major points of criticism pertained to the limited age fairness and ecological validity of the employed methods (Isaacowitz & Stanley 2011, Richter & Kunzmann 2011, Richter et al. 2011, Riediger et al. 2011). The first criticism, limited age fairness, referred to the employed stimulus sets. Stimuli were selected based on prototypicality judgments by younger adults and included expressions shown by younger or middle-aged, but not older, posers. It was argued that prototypicality judgments might vary with age and/or that people might be more knowledgeable and/or motivated to interpret expressions shown by individuals of their own, as opposed to other, age groups. If either or all of these possibilities were the case, then the selection of stimuli would have put older participants at a disadvantage in these studies compared to younger participants. The second criticism, limited ecological validity, addressed the fact that the employed stimuli typically showcased purportedly prototypic, static, and intense emotional expressions detached from situational context, whereas emotional expressions in real life are often subtle, dynamic, variable, and situated in a context that provides additional cues for empathic inference. Given that adult age differences in problem-solving performance tend to be amplified for artificial versus everyday problems, the limited ecological validity might have disadvantaged older adults' emotion-recognition performance more than that of younger adults (for a summary of these arguments, see Blanke & Riediger 2019, Riediger et al. 2014a).

These criticisms imply that age differences shown in the meta-analysis may not generalize to cognitive empathy in real life, which gave impetus for the development of alternative paradigms. Some studies focused primarily on the age-fairness concern and used, for example, the FACES database of emotional expressions from young, middle-aged, and older adults (e.g., Ebner & Johnson 2009; Ebner et al. 2010, 2011; Riediger et al. 2011) or videos of expressions that younger and older adults showed in different emotional states (Murphy et al. 2010, Riediger et al. 2014a, Ruffman et al. 2020). Most of these studies replicated findings of lower average emotion-recognition performance among older adults compared to younger individuals. Regarding the hypothesis that older adults might be better at recognizing expressions from older compared to younger targets, these studies yielded mixed results. When such an age-match effect was observed, then it showed a reduced emotion-recognition performance advantage of younger versus older participants for expressions from older versus younger targets (e.g., Riediger et al. 2014a). A reversal of the effect, however, with older adults outperforming younger participants was not observed. Also, in these studies the ecological validity of employed paradigms was restricted as they focused on decontextualized presentations of one isolated expression modality (facial expressions), whereas emotional expressions in real life involve multiple modalities (e.g., utterances, prosody, posture) and are embedded in a context. The suspicion that such a lack of ecological validity might bias results of age-comparative research received support from studies showing that older adults'

emotion-recognition performance profited more than that of younger adults from multimodal compared to unimodal presentations of expression stimuli (Chaby et al. 2015, Hunter et al. 2010, Wieck & Kunzmann 2017).

Consequently, research on adult age differences in cognitive empathy increasingly turned toward the more encompassing and ecologically relevant concept of empathic accuracy (Ickes 1997). Empathic accuracy, the ability to correctly infer other people's thoughts and feelings, has been assessed with various paradigms that accommodate the multimodal nature of emotional expressions. In the available research on adult age differences in empathic accuracy, three paradigms are particularly noteworthy and their respective findings are reviewed below: (a) the standard-stimulus video paradigm, (b) the dyadic experience-sampling paradigm, and (c) the dyadic interaction paradigm.

In the standard-stimulus video paradigm, target persons are filmed in emotionally relevant situations, such as reliving emotions by talking about personal and emotionally relevant topics. Afterward, the targets rate the emotional experiences they had while being videotaped. These videos are later shown to participants (empathizers) who rate the emotional experiences they assume the target had during video recording. Empathic accuracy is operationalized as the agreement between targets' self-reports and the empathizers' ratings. Richter et al. (2011) and Wieck & Kunzmann (2015) used such video material of target persons talking about topics varying in relevance for younger and older adults. They found that younger empathizers evinced higher empathic accuracy than older empathizers only when the target persons talked about topics of presumably little self-relevance to older adults (e.g., starting a new life in another city), whereas no age differences emerged for topics of higher personal relevance for older adults (e.g., loss of a loved one). Two other studies even found greater empathic accuracy of older compared to younger empathizers for romantic partners discussing a marital topic (Sze et al. 2012) and for target persons reflecting about death-related topics (Katzorreck & Kunzmann 2018, study 1). The latter authors surmised that older adults might be more motivated to attend to and process information about topics that are personally relevant to them as opposed to less self-relevant topics (for a related argument, see Hess 2014).

Different from the standard-stimulus video paradigm, where participants empathize with protagonists whom they neither know nor personally interact with, the dyadic experience-sampling paradigm investigates empathic accuracy in real-life relationships (Wilhelm & Perrez 2004). Rauers et al. (2013) used this approach in a sample of younger and older adult romantic couples. Participants received mobile phones that they carried with them while they pursued their normal daily routines. The phones signaled participants at random times, but synchronized for both partners, to characterize their own and their partner's momentary affective state. Each participant thus served both as the empathizer and as the target of empathic accuracy. When the target partner was currently somewhere else, older and younger empathizers did not differ in empathic accuracy, which was above chance on average, despite the absence of the target. When partners were present, however, younger empathizers were more empathically accurate than older empathizers as only younger empathizers' accuracy benefited from their partners' presence. Several processes might have contributed to these findings. For example, physiological and neurostructural aging processes might have yielded less effective information processing of the expressive cues their partners provided about their emotional states in older empathizers. It is also possible that couples from both age groups differed in interest in, or expressiveness of, emotional states. Thus, despite high ecological validity, this study left questions open and provided limited possibilities to disentangle age effects from effects due to different relationship durations (as older couples, on average, had been together for a longer period of time than younger couples).

To naturalistically investigate age differences in empathic accuracy without the possible effects of relationship duration, Blanke et al. (2015, 2016) studied dyads of younger and older adult women

who had not known each other before using the dyadic interaction paradigm. Participants were videotaped during a dyadic exchange about unpleasant and pleasant experiences. Each dyad member disclosed one negative and one positive experience, which were discussed by the dyad members for three minutes each. After the conversation, participants reviewed the videotaped conversation twice. During the first review, participants indicated, at several predetermined time points, how they themselves had felt and what they had thought at that moment during the interaction. During the second review, participants answered the same questions with regard to what they thought their interaction partner had felt and thought at that moment. As with the other paradigms, associations between self- and other-rated emotions served as an indicator of empathic accuracy for feelings. In addition, trained raters coded agreement of self- and other-reported thoughts as an indicator of empathic accuracy for thoughts. Results showed that age differences in empathic accuracy were moderated by the valence of to-be-inferred thoughts and feelings: While younger and older women did not differ in their empathic accuracy for positive thoughts and feelings, younger participants outperformed older participants' accuracy for negative thoughts and feelings. The latter was due to the fact that older participants were less empathically accurate for negative versus positive thoughts and feelings, whereas no such valence difference emerged for younger women's empathic accuracy. This pattern of findings was independent of the age-group composition of the investigated dyads. These findings seem consistent with the theoretical claims of socioemotional selectivity theory (e.g., Carstensen 2006) and with empirical observations that older adults tend to be more motivated to regulate their emotional well-being in a prohedonic manner (e.g., Riediger et al. 2009) and to preferentially attend to positive over negative information (Reed et al. 2014). Although this suggests the possibility that older empathizers might have been less motivated than younger empathizers to empathize with negative information from unknown target persons, direct empirical evidence for this interpretation is still lacking.

Potential Reasons for Adult Age Differences in Empathic Accuracy

Discussions of potential reasons for the observed pattern of age differences in empathic accuracy have so far almost exclusively concentrated on the empathizer, whereas little attention has been paid to the role of the target person or the relationship between empathizer and target. This spotlight of attention mirrors the ongoing search for characteristics of the good empathizer in the social-psychological literature, which so far have been surprisingly difficult to find in college student convenience samples (for a review, see Hodges et al. 2015).

Several studies have shown that patterns of age differences in empathic accuracy are robust to controlling for sensory acuity (for an overview, see Blanke & Riediger 2019). Hence, age-related declines in vision or hearing do not seem to play a major role in accounting for observed age-related differences in empathic accuracy. Instead, and in line with the theoretical positions introduced above, empathizers' cognitive functioning and their motivation to empathize have received the most attention as potential reasons for the observed pattern of age differences in empathic accuracy.

Empathizers' cognitive functioning. Associations of empathic accuracy with both mechanistic and pragmatic cognitive abilities (Baltes 1987) have been investigated. Cognitive-mechanic abilities comprise basic information-processing operations and are strongly intertwined with neurobiological functioning. Such abilities are known to peak in young adulthood and to decline afterward (Baltes et al. 1999). Although it seems plausible that aging-related decline in cognitive-mechanic abilities should be related to differences in empathy accuracy (as the latter requires paying attention to relevant information, processing it, and holding it in memory; e.g., Ickes 1997), evidence

supporting such an association is rare. Kunzmann et al. (2018), for example, found young adult men to outperform both adolescents and middle-aged men in a video-based standard-stimulus empathic accuracy task. These age differences were related to performance differences in a composite measure of cognitive mechanics (derived from tests of cognitive speed and logical reasoning). Similarly, Hülür et al. (2016) found in a dyadic-experience-sampling study of older adult couples that sensorimotor speed performance was associated with empathic accuracy for happiness in older men but not older women.

Why is empirical support for associations between cognitive mechanics and age differences in empathic accuracy scarce? A possible explanation derives from evidence in other domains of cognitive functioning that pragmatic skills can compensate for age-related decline in mechanic abilities so that high levels of cognitive achievement are possible into very old age. Cognitive pragmatics refer to experience-based bodies of knowledge and skills. They show a more favorable adult developmental trajectory, typically improving or remaining stable throughout large proportions of the adult life span (Baltes et al. 1999). Only when cognitive mechanics fall below a critical functional threshold do pragmatic abilities also start to decline (La Fleur et al. 2018). Several studies support the idea that empathizers' verbal abilities, which represent a core element of cognitive-pragmatic functioning, are associated with higher empathic accuracy (Ickes et al. 2000, Kunzmann et al. 2018). There also is evidence that prior knowledge about given target persons and/or their situational contexts contributes to better empathic accuracy in young adults (e.g., Hodges et al. 2010, Lewis et al. 2012). In a related vein, few age-comparative studies suggest that the effects of age-related losses in cognitive mechanics on lower empathic accuracy are buffered when older empathizers can relate to prior knowledge about the target or context. In support of this idea are, for example, the above reported findings by Raters et al. (2013) that younger and older adults evinced comparable and above-chance levels of empathic accuracy for their romantic partners when the partner was currently somewhere else and empathizers could base their empathic judgments solely on their knowledge about their partners. Another study by Stanley & Isaacowitz (2015) led to a similar conclusion. Here, younger and older targets were filmed while watching emotion-eliciting stimuli and were instructed to behave in such a way that someone watching could infer their feelings. Targets also rated their emotional experiences. These videos were then watched by the targets' romantic partners as well as by individuals who had not known the targets before. Their task was to infer the emotion that was exhibited most intensely. Younger adults outperformed older adults in this task, but this age difference was reduced for familiar compared to unfamiliar target persons. These findings demonstrate the role of prior target knowledge for empathic inference, but it remains unclear to what extent motivational processes (e.g., older adults finding the task with the familiar target more relevant) might have been involved.

Empathizers' motivation. In the social psychology literature, the best documented factor associated with higher empathic accuracy in college student samples is motivation. Various studies found higher empathic accuracy in college students when empathizers' motivation to be accurate was either manipulated or indirectly inferred to be higher (e.g., when empathizers expected rewards or judged targets they found attractive; for reviews, see Flury & Ickes 2006, Hodges et al. 2015). A motivational account has also been proposed for the above-described findings of differential age effects on empathic accuracy depending on the nature of the to-be-inferred information. Older adults were assumed to be less motivated to empathize, and hence less empathically accurate than younger adults, when unfamiliar targets experienced negative thoughts and feelings (Blanke et al. 2015) and reflected about topics of little relevance to older adults (e.g., Richter et al. 2011, Wiek & Kunzmann 2015). Conversely, the absence of age differences for empathic accuracy for positive

mental states and for narrations of age-relevant topics was interpreted as an indicator of older adults' high motivation to empathize.

Summary

Taken together, various recent studies improved the ecological validity of assessing cognitive empathy and thus yielded a refined understanding of adult age differences in empathic accuracy. Findings of higher empathic accuracy among younger versus older adults (as regularly observed with emotion-recognition paradigms of low ecological relevance) were replicated in some, but not all, study contexts. No age differences or even higher average empathic accuracy among older adults emerged when topics of high self-relevance for older adults were discussed, when romantic partners as target persons were currently not present, or when to-be-inferred states of unfamiliar targets were of positive valence. In line with theoretical positions introduced above, both motivational and cognitive processes were proposed as potential explanations of these patterns of findings, but direct evidence of the underlying mechanisms is still missing. Results from several studies are in line with motivational accounts deriving from socioemotional selectivity theory (e.g., Carstensen 2006). In particular, studies showing that age effects in empathic accuracy varied depending on the valence of to-be-inferred states or the personal relevance of the topic were interpreted as reflecting older adults' varying motivation to empathize with different types of contents or in different types of situations. Less evidence is available with regard to the role of cognitive aging processes. Although it is plausible that biologically based cognitive aging renders empathic accuracy more difficult for older than for younger adults (e.g., Dynamic Integration Theory; Labouvie-Vief 2009), direct empirical support for this claim is still scarce. Some of the available evidence, however, is in line with the idea that older adults may be able to compensate for the potential effects of declining fluid-cognitive abilities on empathic accuracy through cognitive-pragmatic resources (such as knowledge about the target person) and increased motivation (and, hence, effort).

OPEN QUESTIONS AND FUTURE DIRECTIONS

Despite recent advances in the field, many questions still remain open. First, the reasons for the observed pattern of average age differences in empathic skills are not well understood. Though previous studies pointed to the relevance of motivational and cognitive processes, the majority of these studies used indicators of motivation and cognition that were either unrelated to the empathic interaction, indirect, or inferred. The specific mechanisms through which motivational and cognitive processes shape average age differences in empathic accuracy are still unknown. To unravel these underlying mechanisms, future studies need to go beyond the current focus on empathizers. Empathy as an inherently interpersonal phenomenon is influenced not only by the empathizer but also by the target person and the relationship between empathizer and target (Kenny et al. 2006). Regarding relevant mechanisms on the part of empathizers, research with young adult samples has shown that their attentiveness (Flury & Ickes 2006), responsiveness (Reis & Gable 2015), and communicatory behaviors directed at eliciting and comprehending information about the targets' mental states (i.e., perspective seeking; Eyal et al. 2018) contribute to enhanced interpersonal understanding. In terms of targets, findings with young adults demonstrated that their expressive behaviors and how readable, based on these expressions, their thoughts and feelings are for others are predictive of empathic accuracy (for a review, see Hodges et al. 2015). Adding a developmental perspective, questions arise as to if, or under which circumstances, empathizers and targets from various adult age groups differ in their attentiveness, responsiveness, perspective seeking, or expressive transparency and whether these characteristics are predictive of higher

empathic accuracy across all phases of adulthood. In terms of the relationship between empathizer and target, an interesting open question for future studies pertains, for example, to the role of rapport, that is, interactants' mutual experience of getting along with one another (Vicaria et al. 2015). Rapport is characterized by reciprocated interest, mutual liking, and coordination (Tickle-Degnen & Rosenthal 1990) and might be related to higher empathic accuracy through facilitating motivational processes both on the side of the perceiver (motivation to empathize) and on the side of the target (motivation to disclose).

A related direction for future studies concerns interindividual variation in empathic accuracy within age groups. As Kunzmann et al. (2018) pointed out, differences within age groups in empathic accuracy are larger than differences between age groups. Even more important than characterizing average differences between adults from various age groups is therefore understanding which factors contribute to the maintenance of high levels of empathic accuracy well into old age. With regard to the emotion-communicatory behaviors mentioned above, for example, an intriguing question is whether age group differences in empathic accuracy are attenuated when older empathizers are attentive, responsive, and actively seek information about the interaction partners' mental states.

Furthermore, the evidence available thus far derives exclusively from cross-sectional comparisons between age groups and does not allow conclusions regarding developmental changes as people grow older. Longitudinal investigations are indispensable to adequately understand adult developmental trajectories of empathic skills and their correlates. However, as a prerequisite, researchers need to demonstrate that indicators of empathic accuracy are sufficiently reliable as measures of interindividual differences and intraindividual change. Only if an empathic accuracy score is a valid and reliable indicator of an empathizer's skill can within-person variation of repeated measures be interpreted as change in empathic accuracy over time. In this context, it is essential to understand the roles that the targets and the relationship between empathizer and targets play as sources of variance in empathic accuracy measures. For example, if substantial proportions of the variance in an empathic accuracy score are due not to the empathizer's skill but to the target's expressivity and/or the empathizer-target relationship, then that needs to be considered in the setup of the study (e.g., have empathizers interact with multiple targets) and interpretation of results.

Finally, more insights are necessary regarding the implications of empathic skills for developmental adaptation in old age and regarding potential age-related changes of such implications of empathic skills throughout the adult life span. Empirical findings demonstrate better average social adjustment among more empathically accurate individuals, but older adults rarely participated in these studies. At present, little evidence is available that relates lower average empathic accuracy in older adults to disadvantages in their social lives, and this evidence is not consistent across studies (e.g., in associations with lower social satisfaction; Bailey et al. 2008, Khanjani et al. 2015; but see Blanke et al. 2016). More thorough investigations are necessary, as what can be considered adaptive at younger ages may not necessarily be equally adaptive in older adulthood. To better understand this, it will be helpful to take into consideration implications of empathic accuracy for life domains other than social functioning. For example, age-comparative research should pay more attention to empathic skills as a potential source of stress and physiological strain (e.g., Elfenbein & Ambady 2002, Simpson et al. 1995).

To address these open questions, it will be necessary to incorporate methodological approaches that have not yet been used in developmental investigations of empathic skills. Connecting with existing work in other research fields and adding a developmental perspective will be helpful. In the following sections, we elaborate on two directions that we consider particularly promising for advancing insight into antecedents and consequences of adult development of empathic skills.

First, we discuss how employing the social relations model (SRM) may help unravel cognitive and motivational reasons for cross-sectional age differential patterns in empathic skills while considering the empathizer, the target, and their relationship as sources of variance in empathy measures. As the model implies the repeated measure of empathic skills in different settings, it will also help determine the reliability of intra- and interindividual differences in empathic skills, which is a prerequisite for longitudinal research. Second, we propose that to understand implications of empathic exchanges for developmental adaptation in other life domains, future life span developmental research should go beyond the currently prevailing narrow focus on cognitive facets of empathy and also consider its affective components and accompanying physiological processes. This will help unravel potential health implications of empathy, which may be especially relevant for older adults, as physiological vulnerabilities in the face of stress increase with age.

Employing the Social Relations Model in Developmental Investigations of Empathic Skills

The SRM (e.g., Kenny et al. 2006) is a conceptual framework that distinguishes three substantively meaningful sources of variance for interpersonal phenomena. Applied to empathic accuracy, these include the empathizer (i.e., the extent to which this person is typically empathically accurate toward other people), the target (i.e., the extent to which other people are typically empathically accurate toward this person), and the relationship between the two (i.e., the relational dynamic between empathizer and target that shapes momentary empathic accuracy above and beyond the empathizer's typical empathic understanding and the target's typical empathic readability). The model also allows the investigation of associations of each of these components with other characteristics of the interactants, the dyad, or the interaction (e.g., age, composition of the dyad, or the content of exchanged information). Several approaches and software packages are available for the statistical computation of SRM analyses. Recent advances include the development of restricted maximum likelihood (Nestler 2016) and Bayesian estimation approaches (e.g., Lüdtke et al. 2013).

Statistically disentangling the three SRM components requires a study design in which each empathizer and each target provide multiple data points deriving from each empathizer interacting with multiple targets and each target interacting with multiple empathizers. Round-robin designs are one option and achieve the highest power for a given sample size (Lashley & Kenny 1998). They consist of one or more groups of four or more participants, with all participants completing the paradigm to assess empathic skills with each of the other participants of their group.

Importantly, the SRM also provides the basis for unambiguous interpretations of longitudinal assessments of empathic accuracy. Without the decomposition of empathizer, target, and relationship effects, longitudinal assessments of empathic accuracy, particularly those assessed with the dyadic interaction paradigm, could not be unequivocally interpreted. It would remain unclear if, and to what extent, longitudinal trajectories are due to longitudinal stability versus change over time in empathizers' empathic accuracy, in targets' readability, or in the relationship effect between the two interactants. Applying the SRM longitudinally allows modeling within-person and within-dyad developmental trajectories over time and studying between-person and between-dyad differences in these trajectories (Nestler et al. 2017).

Despite its compelling conceptual and methodological strengths, the SRM has not yet been applied in adult developmental research on empathic skills. In fact, we are aware of only one nondevelopmental study (Buysse & Ickes 1999) that assessed empathic accuracy with the dyadic interaction paradigm in a round-robin design, using a complex, and underpowered (Lashley & Kenny 1998), multifactorial design. Consequently, there is a void in the current understanding of the various components (empathizer, target, relationship effects) of empathic accuracy throughout

adulthood, of interpersonal and interdyad differences therein, and of respective antecedents and consequences that future research should aim to fill.

Considering the Role of Affective Components and Physiological Processes in Developmental Investigations of Empathic Skills

To arrive at a better understanding of the relevance of empathic abilities for adult development inside and outside of social functioning, it is necessary to forgo the currently prevailing emphasis on cognitive empathy and to pay more attention also to affective facets of empathy and its accompanying physiological processes. While physiological implications of empathic exchanges have rarely been investigated in life span developmental research, available evidence on affective empathy yielded different patterns of results depending on whether narrow or broad conceptualizations were employed. Narrow conceptualizations define affective empathy as emotional congruence, typically operationalized as covariation between an empathizer's and a target's self-reported emotional experiences, which several studies found to be comparable for younger and older empathizers (Blanke et al. 2016, Wieck & Kunzmann 2015). Only when target persons reflected on a topic of presumably high relevance for older adults (but not when that was not the case) did Richter et al. (2011) observe more emotional congruence with target persons in older compared to younger empathizers. Broader approaches define affective empathy as any response to another person, irrespective of whether that response mirrors the target person's affective state. Few studies suggest that such broadly defined emotional empathy might be more pronounced on average among older compared to younger adults, which is in line with theoretical claims of age-related increases across adulthood in generativity and concern for other people (Erikson 1985). When watching video clips of other persons in emotionally relevant situations, older compared to younger adults reported more empathic concern for protagonists, showed more pronounced emotional and physiological reactions, and exhibited more compassionate listening behavior (e.g., Katzorreck & Kunzmann 2018, Kunzmann & Richter 2009, Richter et al. 2011, Sze et al. 2012, Wieck & Kunzmann 2015). The age-related stability or increase in affective empathy has been interpreted mostly as reflecting a favorable adult trajectory (e.g., Richter & Kunzmann 2011), although empirical evidence linking emotional empathy to adaptive outcomes in older age is still scarce. Affective empathy in younger adults, in contrast, has been discussed more broadly as potentially contributing to either compassion or empathic distress (see Singer & Klimecki 2014). Life span developmental research should take a similarly broad perspective in the future and pay more attention to potential associations of empathic skills with stress- and health-related outcomes in adults of various age groups.

Promising in this regard is consideration of currently accumulating evidence of alignment between interactants at a physiological level, that is, covariation of interaction partners' physiological states over time. First observed in the 1950s (Di Mascio et al. 1955), interest in physiological linkage has increased in recent years, triggered by technological and statistical advances that have provided refined means to capture and analyze complex interpersonal dynamics of physiological processes (e.g., Helm et al. 2018, McAssey et al. 2013, Thorson et al. 2018). Physiological linkage has been demonstrated in various contexts and for different physiological measures (for a review, see Timmons et al. 2015) and was found to vary and amplify with higher physical or emotional connectedness between interactants (e.g., Chatel-Goldman et al. 2014, Konvalinka et al. 2011, Marci & Orr 2006), which points toward potential motivational underpinnings.

Few prior findings are available that demonstrate associations of empathic accuracy and physiological linkage between targets and empathizers (Levenson & Ruef 1992, Ruef 2001). The causal direction of the observed associations is still unknown, but the authors speculated

that physiological synchrony arises when empathizers share targets' emotional experiences and that this, in turn, represents a valid cue for accurately inferring the targets' internal states. It is unknown, however, to what extent this holds true for adults of different age groups. On the one hand, biological aging may affect the physiological experience of emotional states that, in turn, may affect interpersonal physiological linkage. Mendes (2016), for example, argued that the mind-body connection weakens with age. If that is indeed the case, empathizers' physiological resonance with targets and the usefulness of internal states as guides for empathic inference through experience sharing might decline in older age. On the other hand, the above-mentioned findings of age-related stability or increases in empathizers' sharing of targets' emotional experiences and in physiological responsivity to videos depicting other persons in need suggest that processes of physiological linkage might be relevant in empathic exchanges well into old age. More evidence is needed to reconcile these alternative hypotheses empirically.

Whereas physiological resonance with a target person may facilitate accuracy of momentary empathic inference and compassion as adaptive responses, it may also trigger empathic distress and longer-term health risks, particularly for vulnerable empathizers and when occurring frequently or being sustained over extended periods of time. In an extreme case, this is illustrated by findings of healthcare providers' excessive empathy with patients being related to an increased risk of developing clinically relevant burnout and compassion fatigue syndromes (Abendroth & Flannery 2006, O'Brien & Haaga 2015). In mundane empathic exchanges as well, frequent and sustained physiological resonance with other persons' negative experiences (such as stress, fear, or anger) might be related to enhanced physiological morbidity risk in vulnerable empathizers. In target persons, stress responses are adaptive in the short term by supporting the organism in counter-acting acute stressors, but they take a physiological toll when sustained over extended periods of time (e.g., McEwen 2000). Frequent and sustained vicarious stress responses in empathizers might also contribute to physiological wear and tear over and above the influences from the empathizer's own accumulated stress experiences.

Potential costs of physiologically resonating with negative states in others should be particularly relevant in physiologically vulnerable individuals, such as older adults (e.g., Charles & Luong 2013, Piazza et al. 2012). In the presence of such physiological vulnerability, motivated selective attention to (and, hence, selective physiological resonance with) unfamiliar interaction partners' positive (as opposed to negative) affective states, as previously observed in older adults (Blanke et al. 2015), could serve self-protective purposes. Thus, this valence-specific pattern of age differences in empathic accuracy might not necessarily reflect a declining competence in older individuals but instead represent a motivational strategy of selective investment of empathic resources that is adaptive as long as the long-term benefits of resource conservation outweigh the immediate costs of reduced empathic accuracy (e.g., Hess 2014). Again, in our view, empirically investigating this idea is a promising new direction for future investigations.

CONCLUSIONS

Adult emotional development is multidirectional. On the one hand, age-related increases in the motivation to optimize emotional experiences in the here and now have been linked to positive age trajectories of everyday emotional well-being from young adulthood into early old age. On the other hand, older adults' empathic accuracy, that is, their ability to infer other persons' inner states, is occasionally lower than that of younger age groups. In some situations, however, such as when the conversational topic is of high relevance to older adults or the to-be-inferred mental states are of positive valence, no such adult age differences in cognitive empathy have been observed. Both theoretical accounts and empirical findings point toward motivational and

cognitive processes as possible reasons for this context-dependent pattern of adult age differences in empathic accuracy. The specific mechanisms that underlie these age effects, however, as well as the factors that contribute to variance in empathic accuracy within age groups, are not yet well understood. Moving forward, we make a case for employing the SRM to unravel the roles of the empathizer, the target, and their relationship in empathic interactions across adulthood as well as respective associations with other characteristics of the interactants, the dyad, or the situation. Disentangling these sources of variance is also a necessary prerequisite for adequately interpreting much needed assessments of longitudinal change in empathic accuracy over time. We also propose that going beyond the current primary focus on cognitive empathy in life span developmental research will foster our understanding of how empathic skills not only shape social adjustment across adulthood but also relate to interindividual differences in other life domains. Implications for health-related outcomes, which may be particularly pronounced in older adulthood, are especially important to understand. To achieve this, the respective roles of the affective facets of empathy and the accompanying physiological processes, such as physiological alignment between empathizers and targets, need to be taken into consideration.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

LITERATURE CITED

- Abendroth M, Flannery J. 2006. Predicting the risk of compassion fatigue: a study of hospice nurses. *J. Hosp. Palliat. Nurs.* 8(6):346–56. <https://doi.org/10.1097/00129191-200611000-00007>
- Allen V, Windsor T. 2019. Age differences in the use of emotion regulation strategies derived from the process model of emotion regulation: a systematic review. *Aging Ment. Health* 23(1):1–14. <https://doi.org/10.1080/13607863.2017.1396575>
- Bailey PE, Henry JD, Von Hippel W. 2008. Empathy and social functioning in late adulthood. *Aging Ment. Health* 12(4):499–503. <https://doi.org/10.1080/13607860802224243>
- Baltes PB. 1987. Theoretical propositions of life-span developmental psychology: on the dynamics between growth and decline. *Dev. Psychol.* 23:611–26. <https://doi.org/10.1037/0012-1649.23.5.611>
- Baltes PB, Staudinger UM, Lindenberger U. 1999. Lifespan psychology: theory and application to intellectual functioning. *Annu. Rev. Psychol.* 50:471–507. <https://doi.org/10.1146/annurev.psych.50.1.471>
- Benson L, English T, Conroy DE, Pincus AL, Gerstorf D, Ram N. 2019. Age differences in emotion regulation strategy use, variability, and flexibility: an experience sampling approach. *Dev. Psychol.* 55(9):1951–64. <https://doi.org/10.1037/dev0000727>
- Birditt KS. 2014. Age differences in emotional reactions to daily negative social encounters. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 69(4):557–66. <https://doi.org/10.1093/geronb/gbt045>
- Blanchard-Fields F, Mienaltowski A, Seay RB. 2007. Age differences in everyday problem-solving effectiveness: Older adults select more effective strategies for interpersonal problems. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 62(1):P61–64. <https://doi.org/10.1093/geronb/62.1.P61>
- Blanke ES, Raters A, Riediger M. 2015. Nice to meet you—adult age differences in empathic accuracy for strangers. *Psychol. Aging* 30(1):149–59. <https://doi.org/10.1037/a0038459>
- Blanke ES, Raters A, Riediger M. 2016. Does being empathic pay off? Associations between performance-based measures of empathy and social adjustment in younger and older women. *Emotion* 16(5):671–83. <https://doi.org/10.1037/emo0000166>
- Blanke ES, Riediger M. 2019. Reading thoughts and feelings of other people: empathic accuracy across the lifespan. In *Progress in Brain Research*, Vol. 247: *Emotion and Cognition*, ed. N Srinivasan, pp. 305–27. Amsterdam: Elsevier. <https://doi.org/10.1016/bs.pbr.2019.02.002>

- Brady B, Kneebone II, Denson N, Bailey PE. 2018. Systematic review and meta-analysis of age-related differences in instructed emotion regulation success. *PeerJ* 6:e6051. <https://doi.org/10.7717/peerj.6051>
- Brose A, Scheibe S, Schmiedek F. 2013. Life contexts make a difference: emotional stability in younger and older adults. *Psychol. Aging* 28(1):148–59. <https://doi.org/10.1037/a0030047>
- Buyse A, Ickes W. 1999. Topic-relevant cognition and empathic accuracy in laboratory discussions of safer sex. *Psychol. Health* 14(2):351–66. <https://doi.org/10.1080/08870449908407333>
- Caputi M, Lecce S, Pagnin A, Banerjee R. 2012. Longitudinal effects of theory of mind on later peer relations: the role of prosocial behavior. *Dev. Psychol.* 48(1):257–70. <https://doi.org/10.1037/a0025402>
- Carstensen LL. 2006. The influence of a sense of time on human development. *Science* 312(5782):1913–15. <https://doi.org/10.1126/science.1127488>
- Chaby L, Luherne-du Boullay V, Chetouani M, Plaza M. 2015. Compensating for age limits through emotional crossmodal integration. *Front. Psychol.* 6:691. <https://doi.org/10.3389/fpsyg>
- Charles ST. 2010. Strength and vulnerability integration: a model of emotional well-being across adulthood. *Psychol. Bull.* 136(6):1068–91. <https://doi.org/10.1037/a0021232>
- Charles ST, Luong G. 2013. Emotional experience across adulthood: the theoretical model of strength and vulnerability integration. *Curr. Dir. Psychol. Sci.* 22(6):443–48. <https://doi.org/10.1177/0963721413497013>
- Chatel-Goldman J, Congedo M, Jutten C, Schwartz J-L. 2014. Touch increases autonomic coupling between romantic partners. *Front. Behav. Neurosci.* 8:95. <https://doi.org/10.3389/fnbeh.2014.00095>
- Cohrdes C, Wrzus C, Frisch S, Riediger M. 2017. Tune yourself in: valence and arousal preferences in music-listening choices from adolescence to old age. *Dev. Psychol.* 53(9):1777–94. <https://doi.org/10.1037/dev0000362>
- Di Mascio A, Boyd RW, Greenblatt M, Solomon HC. 1955. The psychiatric interview: a sociophysiological study. *Dis. Nerv. Syst.* 16(1):4–9
- Doerwald F, Scheibe S, Zacher H, Van Yperen NW. 2016. Emotional competencies across adulthood: state of knowledge and implications for the work context. *Work Aging Retire.* 2(2):159–216. <https://doi.org/10.1093/workar/waw013>
- Dziobek I, Rogers K, Fleck S, Bahnemann M, Heekeren HR, et al. 2008. Dissociation of cognitive and emotional empathy in adults with Asperger syndrome using the Multifaceted Empathy Test (MET). *J. Autism Dev. Disord.* 38(3):464–73. <https://doi.org/10.1007/s10803-007-0486-x>
- Ebner NC, He Y, Johnson MK. 2011. Age and emotion affect how we look at a face: Visual scan patterns differ for own-age versus other-age emotional faces. *Cogn. Emot.* 25(6):983–97. <https://doi.org/10.1080/02699931.2010.540817>
- Ebner NC, Johnson MK. 2009. Young and older emotional faces: Are there age group differences in expression identification and memory? *Psychol. Aging* 9(3):329–39. <https://doi.org/10.1037/a0015179>
- Ebner NC, Riediger M, Lindenberger U. 2010. FACES—a database of facial expressions in young, middle-aged, and older women and men: development and validation. *Behav. Res. Methods* 42(1):351–62. <https://doi.org/10.3758/BRM.42.1.351>
- Eldesouky L, English T. 2018. Another year older, another year wiser? Emotion regulation strategy selection and flexibility across adulthood. *Psychol. Aging* 33(4):572–85. <https://doi.org/10.1037/pag0000251>
- Elfenbein HA, Ambady N. 2002. Predicting workplace outcomes from the ability to eavesdrop on feelings. *J. Appl. Psychol.* 87(5):963–71. <https://doi.org/10.1037/0021-9010.87.5.963>
- English T, Carstensen LL. 2015. Does positivity operate when the stakes are high? Health status and decision making among older adults. *Psychol. Aging* 30(2):348–55. <https://doi.org/10.1037/a0039121>
- Erikson EH. 1985. *The Life Cycle Completed: A Review*. Scranton, PA: W. W. Norton
- Eyal T, Steffel M, Epley N. 2018. Perspective mistaking: Accurately understanding the mind of another requires getting perspective, not taking perspective. *J. Personal. Soc. Psychol.* 114(4):547–71. <https://doi.org/10.1037/pspa0000115>
- Fink E, Begeer S, Peterson CC, Slaughter V, de Rosnay M. 2015. Friendlessness and theory of mind: a prospective longitudinal study. *Br. J. Dev. Psychol.* 33(1):1–17. <https://doi.org/10.1111/bjdp.12060>
- Flury J, Ickes W. 2006. Emotional intelligence and empathic accuracy in friendships and dating relationships. In *Emotional Intelligence in Everyday Life*, ed. J Ciarrochi, JP Forgas, JD Mayer, pp. 140–65. New York: Psychol. Press. 2nd ed.

- Gerstorf D, Hoppmann CA, Löckenhoff CE, Infurna FJ, Schupp J, et al. 2016. Terminal decline in well-being: the role of social orientation. *Psychol. Aging* 31(2):149–65. <https://doi.org/10.1037/pag0000072>
- Gerstorf D, Hülür G, Wagner GG, Kunzmann U, Ram N. 2018. Terminal change across facets of affective experience and domain satisfaction: commonalities, differences, and bittersweet emotions at the end of life. *Dev. Psychol.* 54(12):2382–402. <https://doi.org/10.1037/dev0000599>
- Gleason KA, Jensen-Campbell LA, Ickes W. 2009. The role of empathic accuracy in adolescents' peer relations and adjustment. *Personal. Soc. Psychol. Bull.* 35(8):997–1011. <https://doi.org/10.1177/0146167209336605>
- Grant BJ, Fetterman Z, Weyhaupt MB, Kim M, Tullett AM. 2018. It takes two: a replication. *J. Res. Personal.* 72:58–63. <https://doi.org/10.1016/j.jrp.2016.06.023>
- Helm JL, Miller JG, Kahle S, Troxel NR, Hastings PD. 2018. On measuring and modeling physiological synchrony in dyads. *Multivar. Behav. Res.* 53(4):521–43. <https://doi.org/10.1080/00273171.2018.1459292>
- Hess TM. 2006. Adaptive aspects of social cognitive functioning in adulthood: age-related goal and knowledge influences. *Soc. Cogn.* 24(3):279–309. <https://doi.org/10.1521/soco.2006.24.3.279>
- Hess TM. 2014. Selective engagement of cognitive resources: motivational influences on older adults' cognitive functioning. *Perspect. Psychol. Sci.* 9(4):388–407. <https://doi.org/10.1177/1745691614527465>
- Hodges SD, Kiel KJ, Kramer AD, Veach D, Villanueva BR. 2010. Giving birth to empathy: The effects of similar experience on empathic accuracy, empathic concern, and perceived empathy. *Personal. Soc. Psychol. Bull.* 36(3):398–409. <https://doi.org/10.1177/0146167209350326>
- Hodges SD, Lewis KL, Ickes W. 2015. The matter of other minds: empathic accuracy and the factors that influence it. In *APA Handbook of Personality and Social Psychology*, Vol. 3: *Interpersonal Relations*, ed. P Shaver, M Mikulincer, pp. 319–48. Washington, DC: Am. Psychol. Assoc.
- Hülür G, Hoppmann CA, Rauters A, Schade H, Ram N, Gerstorf D. 2016. Empathic accuracy for happiness in the daily lives of older couples: Fluid cognitive performance predicts pattern accuracy among men. *Psychol. Aging* 31(5):545–52. <https://doi.org/10.1037/pag0000109>
- Hunter EM, Phillips LH, MacPherson SE. 2010. Effects of age on cross-modal emotion perception. *Psychol. Aging* 25(4):779–87. <https://doi.org/10.1037/a0020528>
- Ickes W, ed. 1997. *Empathic Accuracy*. New York: Guilford Press
- Ickes W, Buysse A, Pham H, Rivers K, Erickson JR, et al. 2000. On the difficulty of distinguishing “good” and “poor” perceivers: a social relations analysis of empathic accuracy data. *Pers. Relatsh.* 7(2):219–34. <https://doi.org/10.1111/j.1475-6811.2000.tb00013.x>
- Ickes W, Hodges SD. 2013. Empathic accuracy in close relationships. In *The Oxford Handbook of Close Relationships*, ed. A Simpson, L Campbell, pp. 348–73. London: Oxford Univ. Press
- Isaacowitz DM, Stanley JT. 2011. Bringing an ecological perspective to the study of aging and recognition of emotional facial expressions: past, current, and future methods. *J. Nonverbal Behav.* 35(4):261–78. <https://doi.org/10.1007/s10919-011-0113-6>
- Katzorreck M, Kunzmann U. 2018. Greater empathic accuracy and emotional reactivity in old age: the sample case of death and dying. *Psychol. Aging* 33(8):1202–14. <https://doi.org/10.1037/pag0000313>
- Kenny DA, Kashy DA, Cook WL. 2006. *Dyadic Data Analysis*. New York: Guilford Press
- Khanjani Z, Mosanezhad Jeddi E, Hekmati I, Khalilzade S, Etemadi Nia M, et al. 2015. Comparison of cognitive empathy, emotional empathy, and social functioning in different age groups. *Aust. Psychol.* 50(1):80–85. <https://doi.org/10.1111/ap.12099>
- Konvalinka I, Xygalatas D, Bulbulia J, Schjødt U, Jegindø E-M, et al. 2011. Synchronized arousal between performers and related spectators in a fire-walking ritual. *PNAS* 108(20):8514–19. <https://doi.org/10.1073/pnas.1016955108>
- Kunzmann U, Richter D. 2009. Emotional reactivity across the adult life span: The cognitive pragmatics make a difference. *Psychol. Aging* 24(4):879–89. <https://doi.org/10.1037/a0017347>
- Kunzmann U, Wieck C, Dietzel C. 2018. Empathic accuracy: age differences from adolescence into middle adulthood. *Cogn. Emot.* 32(8):1611–24. <https://doi.org/10.1080/02699931.2018.1433128>
- Kunzmann U, Wrosch C. 2015. Emotional development in old age. In *Encyclopedia of Geropsychology*, ed. NA Pachana, pp. 752–62. Singapore: Springer. https://doi.org/10.1007/978-981-287-082-7_112
- La Fleur C-G, Meyer MJ, Dodson C. 2018. Exploring dedifferentiation across the adult lifespan. *Psychol. Aging* 33(5):855–70. <https://doi.org/10.1037/pag0000274>

- Labouvie-Vief G. 2009. Dynamic integration theory: emotion, cognition, and equilibrium in later life. In *Handbook of Theories of Aging*, ed. VL Bengtson, M Silverstein, NM Putney, D Gans, pp. 277–93. New York: Springer. 2nd ed.
- Lashley BR, Kenny DA. 1998. Power estimation in social relations analyses. *Psychol. Methods* 3(3):328–38. <https://doi.org/10.1037/1082-989X.3.3.328>
- Lecce S, Ceccato I, Bianco F, Rosi A, Bottioli S, Cavallini E. 2017. Theory of Mind and social relationships in older adults: the role of social motivation. *Aging Ment. Health* 21(3):253–58. <https://doi.org/10.1080/13607863.2015.1114586>
- Lee J, Zaki J, Harvey P-O, Ochsner K, Green MF. 2011. Schizophrenia patients are impaired in empathic accuracy. *Psychol. Med.* 41(11):2297–304. <https://doi.org/10.1017/S0033291711000614>
- Levenson RW, Ruef AM. 1992. Empathy: a physiological substrate. *J. Personal. Soc. Psychol.* 63(2):234–46. <https://doi.org/10.1037/0022-3514.63.2.234>
- Lewis KL, Hodges SD, Laurent SM, Srivastava S, Biancarosa G. 2012. Reading between the minds: the use of stereotypes in empathic accuracy. *Psychol. Sci.* 23(9):1040–46. <https://doi.org/10.1177/0956797612439719>
- Lüdtke O, Robitzsch A, Kenny DA, Trautwein U. 2013. A general and flexible approach to estimating the social relations model using Bayesian methods. *Psychol. Methods* 18(1):101–19. <https://doi.org/10.1037/a0029252>
- Marci CD, Orr SP. 2006. The effect of emotional distance on psychophysiological concordance and perceived empathy between patient and interviewer. *Appl. Psychophysiol. Biofeedback* 31(2):115–28. <https://doi.org/10.1007/s10484-006-9008-4>
- McAssey MP, Helm J, Hsieh F, Sbarra DA, Ferrer E. 2013. Methodological advances for detecting physiological synchrony during dyadic interactions. *Methodology* 9(2):41–53. <https://doi.org/10.1027/1614-2241/a000053>
- McEwen BS. 2000. Allostasis and allostatic load: implications for neuropsychopharmacology. *Neuropsychopharmacology* 22(2):108–24. [https://doi.org/10.1016/S0893-133X\(99\)00129-3](https://doi.org/10.1016/S0893-133X(99)00129-3)
- Mendes WB. 2016. Emotion and the autonomic nervous system. In *Handbook of Emotions*, ed. L Feldman Barrett, M Lewis, JM Haviland-Jones, pp. 166–81. New York: Guilford Press. 4th ed.
- Miano A, Dziobek I, Roepke S. 2017. Understanding interpersonal dysfunction in borderline personality disorder: A naturalistic dyadic study reveals absence of relationship-protective empathic inaccuracy. *Clin. Psychol. Sci.* 5(2):355–66. <https://doi.org/10.1177/2167702616683505>
- Murphy NA, Lehrfeld JM, Isaacowitz DM. 2010. Recognition of posed and spontaneous dynamic smiles in young and older adults. *Psychol. Aging* 25(4):811–21. <https://doi.org/10.1037/a0019888>
- Nestler S. 2016. Restricted maximum likelihood estimation for parameters of the social relations model. *Psychometrika* 81(4):1098–117. <https://doi.org/10.1007/s11336-015-9474-9>
- Nestler S, Geukes K, Hutteman R, Back MD. 2017. Tackling longitudinal round-robin data: a social relations growth model. *Psychometrika* 82(4):1162–81. <https://doi.org/10.1007/s11336-016-9546-5>
- O'Brien JL, Haaga DA. 2015. Empathic accuracy and compassion fatigue among therapist trainees. *Prof. Psychol. Res. Pract.* 46(6):414–20. <https://doi.org/10.1037/pro0000037>
- Piazza JR, Charles ST, Sliwinski MJ, Mogle J, Almeida DM. 2012. Affective reactivity to daily stressors and long-term risk of reporting a chronic physical health condition. *Ann. Behav. Med.* 45(1):110–20. <https://doi.org/10.1007/s12160-012-9423-0>
- Puccinelli NM, Tickle-Degnen L. 2004. Knowing too much about others: moderators of the relationship between eavesdropping and rapport in social interaction. *J. Nonverbal Behav.* 28(4):223–43. <https://doi.org/10.1007/s10919-004-4157-8>
- Rauers A, Blanke ES, Riediger M. 2013. Everyday empathic accuracy in younger and older couples: Do you need to see your partner to know his or her feelings? *Psychol. Sci.* 24(11):2210–17. <https://doi.org/10.1177/0956797613490747>
- Reed AE, Chan L, Mikels JA. 2014. Meta-analysis of the age-related positivity effect: age differences in preferences for positive over negative information. *Psychol. Aging* 29(1):1–15. <https://doi.org/10.1037/a0035194>
- Reis HT, Gable SL. 2015. Responsiveness. *Curr. Opin. Psychol.* 1:67–71. <https://doi.org/10.1016/j.copsyc.2015.01.001>

- Richter D, Dietzel C, Kunzmann U. 2011. Age differences in emotion recognition: the task matters. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 66B(1):48–55. <https://doi.org/10.1093/geronb/gbq068>
- Richter D, Kunzmann U. 2011. Age differences in three facets of empathy: performance-based evidence. *Psychol. Aging* 26(1):60–70. <https://doi.org/10.1037/a0021138>
- Riediger M, Rauers A. 2014. Do everyday affective experiences differ throughout adulthood? A review of ambulatory-assessment evidence. In *The Oxford Handbook of Emotion, Social Cognition, and Everyday Problem Solving During Adulthood*, ed. P Verhaeghen, C Hertzog, pp. 61–82. London: Oxford Univ. Press
- Riediger M, Schmiedek F, Wagner G, Lindenberger U. 2009. Seeking pleasure and seeking pain: differences in pro- and contra-hedonic motivation from adolescence to old age. *Psychol. Sci.* 20(12):1529–35. <https://doi.org/10.1111/j.1467-9280.2009.02473.x>
- Riediger M, Studtmann M, Westphal A, Rauers A, Weber H. 2014a. No smile like another: adult age differences in identifying emotions that accompany smiles. *Front. Psychol.* 5:480. <https://doi.org/10.3389/fpsyg.2014.00480>
- Riediger M, Voelkle MC, Ebner NC, Lindenberger U. 2011. Beyond “happy, angry, or sad?”: age-of-presenter and age-of-rater effects on multi-dimensional emotion perception. *Cogn. Emot.* 25(6):968–82. <https://doi.org/10.1080/02699931.2010.540812>
- Riediger M, Wrzus C, Wagner GG. 2014b. Happiness is pleasant, or is it? Implicit representations of affect valence are associated with contra-hedonic motivation and mixed affect in daily life. *Emotion* 14(5):950–61. <https://doi.org/10.1037/a0037711>
- Ripoll LH, Zaki J, Perez-Rodriguez MM, Snyder R, Strike KS, et al. 2013. Empathic accuracy and cognition in schizotypal personality disorder. *Psychiatry Res.* 210(1):232–41. <https://doi.org/10.1016/j.psychres.2013.05.025>
- Ruef AM. 2001. *Empathy in long-term marriage: behavioral and physiological correlates*. PhD Diss., Univ. Calif., Berkeley
- Ruffman T, Halberstadt J, Murray J, Jack F, Vater T. 2020. Empathic accuracy: worse recognition by older adults and less transparency in older adult expressions compared with young adults. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 8:1658–67. <https://doi.org/10.1093/geronb/gbz008>
- Ruffman T, Henry JD, Livingstone V, Phillips LH. 2008. A meta-analytic review of emotion recognition and aging: implications for neuropsychological models of aging. *Neurosci. Biobehav. Rev.* 32(4):863–81. <https://doi.org/10.1016/j.neubiorev.2008.01.001>
- Sened H, Lavidor M, Lazarus G, Bar-Kalifa E, Rafaeli E, Ickes W. 2017. Empathic accuracy and relationship satisfaction: a meta-analytic review. *J. Fam. Psychol.* 31(6):742–52. <https://doi.org/10.1037/fam0000320>
- Simpson JA, Ickes W, Blackstone T. 1995. When the head protects the heart: empathic accuracy in dating relationships. *J. Personal. Soc. Psychol.* 69(4):629–41. <https://doi.org/10.1037/0022-3514.69.4.629>
- Singer T, Klimecki OM. 2014. Empathy and compassion. *Curr. Biol.* 24(18):R875–78. <https://doi.org/10.1016/j.cub.2014.06.054>
- Stanley JT, Isaacowitz DM. 2015. Caring more and knowing more reduces age-related differences in emotion perception. *Psychol. Aging* 30(2):383–95. <https://doi.org/10.1037/pag0000028>
- Sze JA, Goodkind MS, Gyurak A, Levenson RW. 2012. Aging and emotion recognition: not just a losing matter. *Psychol. Aging* 27(4):940–50. <https://doi.org/10.1037/a0029367>
- Thorson KR, West TV, Mendes WB. 2018. Measuring physiological influence in dyads: a guide to designing, implementing, and analyzing dyadic physiological studies. *Psychol. Methods* 23(4):595–616. <https://doi.org/10.1037/met0000166>
- Tickle-Degnen L, Rosenthal R. 1990. The nature of rapport and its nonverbal correlates. *Psychol. Inq.* 1(4):285–93. https://doi.org/10.1207/s15327965pli0104_1
- Timmons AC, Margolin G, Saxbe DE. 2015. Physiological linkage in couples and its implications for individual and interpersonal functioning: a literature review. *J. Fam. Psychol.* 29(5):720–31. <https://doi.org/10.1037/fam0000115>
- Vicaria IM, Bernieri FJ, Isaacowitz DM. 2015. Perceptions of rapport across the life span: gaze patterns and judgment accuracy. *Psychol. Aging* 30(2):396–406. <https://doi.org/10.1037/pag0000019>
- Walter H. 2012. Social cognitive neuroscience of empathy: concepts, circuits, and genes. *Emot. Rev.* 4(1):9–17. <https://doi.org/10.1177/1754073911421379>

- Wieck C, Kunzmann U. 2015. Age differences in empathy: multidirectional and context-dependent. *Psychol. Aging* 30(2):407–19. <https://doi.org/10.1037/a0039001>
- Wieck C, Kunzmann U. 2017. Age differences in emotion recognition: a question of modality? *Psychol. Aging* 32(5):401–11. <https://doi.org/10.1037/pag0000178>
- Wilhelm P, Perrez M. 2004. How is my partner feeling in different daily-life settings? Accuracy of spouses' judgements about their partner's feelings at work and at home. *Soc. Indic. Res.* 67(1–2):183–246. <https://doi.org/10.1023/B:SOCI.0000007339.48649.20>
- Wrzus C, Müller V, Wagner GG, Lindenberger U, Riediger M. 2013. Affective and cardiovascular responding to unpleasant events from adolescence to old age: complexity of events matters. *Dev. Psychol.* 49(2):384–97. <https://doi.org/10.1037/a0028325>
- Zaki J, Ochsner K. 2011. Reintegrating the study of accuracy into social cognition research. *Psychol. Inq.* 22(3):159–82. <https://doi.org/10.1080/1047840X.2011.551743>
- Zaki J, Weber J, Bolger N, Ochsner K. 2009. The neural bases of empathic accuracy. *PNAS* 106(27):11382–87. <https://doi.org/10.1073/pnas.0902666106>