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Recognizing Others' Thoughts and Feelings: Empathic Skills

and Their Social Implications in Younger and Older Adults

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Acknowledgments

Abstract

Empathic skills include the ability to recognize other people's mental and affective states (cognitive facet) and the ability to respond emotionally (emotional facet). Such empathic skills are associated with various positive social outcomes (e.g., relationship well-being). Hence, previous research findings that indicate an age-related decline in cognitive empathic skills are unsettling. These findings, however, have been challenged for several reasons; one of them being that the assessment of these skills usually has lacked ecological validity (i.e., the employed measurement paradigms have been rather artificial). Furthermore, little is known about the potential impact of declining cognitive empathic skills on older adults' social lives.

This thesis addresses three main research questions: (1) Are there age differences in cognitive empathic skills in the case of a more realistic paradigm? (2) Are there social implications of such age differences? (3) Does the subjective interpretation of artificial stimuli promote age differences in a conventional emotion-recognition paradigm? These questions are addressed in three empirical manuscripts. The thesis also includes a short review that I wrote together with my coauthors for a German online magazine to raise awareness on the topic of age differences in empathic skills. The empirical manuscripts are based on two data sets, in which cognitive empathic skills were assessed in two different ways. In the first data collection, my coauthors and I developed a novel dyadic interaction task to measure cognitive empathic skills. In this task, 102 younger (20−31 years) and 106 older women (69−80 years) had dyadic conversations and were asked to infer their interaction partner's thoughts and feelings. Subsequently, the participants reported on their communication satisfaction in this interaction, and on their social satisfaction with social relationships in everyday life. In a second data collection, 48 younger (20−30 years) and 48 older adults' (70−78 years)

subjective interpretations of posed emotional facial expressions and their performance in an emotion-recognition task utilizing such stimuli were assessed.

The findings indicate age differences in cognitive empathic skills to depend on the measurement paradigm used. In the more realistic dyadic interaction task, younger women only outperformed older women in the inference of negative but not positive affective content. Only accuracy for positive content, however, was associated with younger and older women's social adjustment. As to be expected, younger adults outperformed older adults in the artificial emotion-recognition task. Only for older adults, the subjective interpretation of the stimuli as conveying emotional experiences predicted the emotion-recognition performance.

Taken together, the findings suggest that even though older adults might often score lower than younger adults in cognitive empathic tasks, it likely has little impact on their social lives. This thesis therefore advances the knowledge about age differences in cognitive empathic skills and about their social implications. It also serves to emphasize the importance of ecological validity in the assessment of empathic skills in future research streams.

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Zusammenfassung

Die Gedanken und Gefühle anderer erkennen: Empathische Fähigkeiten und ihre

sozialen Implikationen bei jüngeren und älteren Erwachsenen

Empathie ist ein populärer und vielfältig interpretierbarer Begriff. In der psychologischen Literatur werden in der Regel zwei Komponenten von Empathie unterschieden: Einerseits die Fähigkeit mentale und affektive Zustände anderer Menschen zu erschließen (kognitive Komponente), und andererseits eine emotionale Reaktion auf diese Zustände (affektive oder emotionale Komponente). Eine Vielzahl von psychologischen Konstrukten ist darüber hinaus entweder kognitiver oder emotionaler Empathie konzeptuell sehr ähnlich. Empathie sowie eng verwandte Konzepte werden in der vorliegenden Dissertation unter dem Begriff *empathische Fähigkeiten* zusammengefasst. Empathische Fähigkeiten sind mit verschiedenen positiven sozialen Anpassungsmaßen assoziiert (z. B. Beziehungszufriedenheit). Man könnte annehmen, dass sich empathische Fähigkeiten mit zunehmender Übung und damit auch mit zu-nehmendem Alter verbessern sollten. Hinsichtlich kognitiver empathischer Fähigkeiten scheint jedoch das Gegenteil zuzutreffen: Ältere Menschen schneiden − im Vergleich zu jüngeren Menschen − in den meisten Testverfahren schlechter ab, die diese Fähigkeiten messen sollen. Diese empirischen Ergebnisse werden jedoch angezweifelt, unter anderem, weil die eingesetzten Testverfahren nicht ökologisch valide sind (d. h. realitätsfern). Zudem ist wenig darüber bekannt, inwiefern sich solche Altersunterschiede in empathischen Fähigkeiten auf das Sozialleben von älteren Menschen auswirken könnten.

Kapitel 1 dieser Dissertation gibt eine Einführung in die konzeptuellen Unterschiede zwischen verschiedenen empathischen Fähigkeiten und erklärt, inwiefern Altersunterschiede in diesen Fähigkeiten empirisch nachgewiesen sind, welche möglichen Gründe es für diese

Unterschiede geben könnte und welche sozialen Implikationen diese Fähigkeiten haben können. Da Altersunterschiede in der Regel nicht im Bereich der emotionalen empathischen Fähigkeiten auftreten, konzentriert sich die Darstellung verstärkt auf die kognitive Komponente, insbesondere auf die Konzepte *empathische Akkuratheit* und *Emotionserkennung*. Empathische Akkuratheit beschreibt die Fähigkeit, die Gedanken und Gefühle anderer Menschen korrekt einschätzen zu können. Empathische Akkuratheit basiert dabei in der Regel auf der Integration verschiedener Informationskanäle, wie beispielsweise der Mimik und Gestik und auch gesprochener Inhalte. Emotionserkennung hingegen bezeichnet ausschließlich die Fähigkeit, die Emotionen anderer erschließen zu können, üblicherweise basierend auf isolierten nonverbalen Informationskanälen, beispielsweise dem Gesicht, der Stimme oder der Körperhaltung. Die eingesetzten Stimuli sind oft statisch (z. B. Fotographien) und enthalten häufig posierte Emotionsausdrücke. Emotionserkennungsparadigmen werden daher besonders stark für ihre mangelnde ökologische Validität kritisiert.

Im empirischen Teil dieser Dissertation werden folgende Fragestellungen in drei Manuskripten untersucht: (1) Existieren Altersunterschiede in empathischer Akkuratheit, wenn diese mit einem realitätsnahen Paradigma untersucht werden (Kapitel 2)? (2) Welche sozialen Implikationen haben derartige Altersunterschiede (Kapitel 3)? (3) Haben subjektive Einschätzungen von artifiziellen Emotionserkennungsstimuli Auswirkungen auf die Leistungen in üblicherweise verwendeten Emotionserkennungstests (Kapitel 4)? Diese Fragen werden auf der Basis von zwei umfassenden Datensätzen verfolgt. In der ersten Datenerhebung wurde die empathische Akkuratheit von 102 jüngeren (20−31 Jahre) und 106 älteren Frauen (69−80 Jahre) in einem neuartigen dyadischen Interaktionsparadigma erfasst, welches meine Koautorinnen und ich entwickelt haben. In diesem Interaktionsparadigma führten die Frauen ein videoaufgezeichnetes Gespräch. Anschließend berichteten sie ihre eigenen Gedanken und

Gefühle während dieses Gesprächs und erschlossen die Gedanken und Gefühle der Gesprächspartnerin mit Hilfe der Videoaufnahme. Darüber hinaus wurden verschiedene Fragen vorgelegt, die sich unter anderem auf die soziale Anpassung der Studienteilnehmerinnen bezogen. In der zweiten Datenerhebung wurde die Emotionserkennungsfähigkeit von 48 jüngeren (20−30 Jahre) und 48 älteren Erwachsenen (70−78 Jahre) mit Hilfe von Bildern emotionaler Gesichtsausdrücke erfasst. Die Studienteilnehmenden gaben außerdem an, wie sie selbst diese Stimuli subjektiv interpretierten. Kapitel 2 und 3 basieren auf der ersten Datenerhebung, Kapitel 4 auf der zweiten.

Kapitel 2 widmet sich empirisch der Frage nach Altersunterschieden in empathischer Akkuratheit. Hier zeigte sich, dass jüngere Frauen die negativen Gefühle ihrer Gesprächspartnerin und deren Gedanken, die mit negativen Gefühlen einhergingen („negative Gedanken"), besser erkennen konnten als ältere Frauen. Dies war jedoch nicht der Fall für positive Gefühle und Gedanken, die mit positiven Gefühlen einhergingen („positive Gedanken") – hier unterschieden sich jüngere und ältere Frauen nicht. Diese Ergebnisse werden in Kapitel 2 in Hinblick auf motivationale Erklärungen von Altersunterschieden diskutiert.

Die Studie in Kapitel 3 ergab, dass empathische Akkuratheit für positive Gedanken und Gefühle einer Gesprächspartnerin bei jüngeren und älteren Frauen mit positiven sozialen Maßen zusammenhingen, nämlich Kommunikationszufriedenheit nach dem Interaktionsparadigma sowie Zufriedenheit mit sozialen Kontakten im Allgemeinen. Dies war nicht der Fall hinsichtlich empathischer Akkuratheit für negative Gedanken und Gefühle. Meine Koautorinnen und ich interpretieren dies als Hinweis für die Wichtigkeit von positiven sozialen Interaktionen für die soziale Zufriedenheit. Die Ergebnisse legen nahe, dass ältere Menschen auch bei einer Abnahme empathischer Fähigkeiten (insbesondere im negativen

Affekt) eher wenig unter sozialen Problemen zu leiden haben. Kapitel 2 und 3 verdeutlichen, dass eine realistische Erfassung von empathischen Fähigkeiten andere Schlüsse über Altersunterschiede und mögliche soziale Implikationen zulässt als artifiziellere Paradigmen.

Kapitel 4 geht dieser Idee weiter nach. Es wird untersucht, ob die verwendeten Stimuli in Emotionserkennungsaufgaben Altersunterschiede in der Leistung begünstigen. Wie zu erwarten, zeigten sich in der hier berichteten Studie die bekannten Altersunterschiede in der Emotionserkennungsleistung. Nur bei älteren Menschen beeinflussten jedoch ihre eigenen subjektiven Interpretationen der Stimuli die Emotionserkennungsleistung: Je mehr ältere Menschen in den emotionalen Gesichtsausdrücken ein Gefühl der Person zum Ausdruck gebracht sahen, desto eher konnten sie die gezeigte Emotion auch erkennen. Dies war nicht der Fall für jüngere Menschen. Dieses Ergebnis wird in Einklang mit der Annahme interpretiert, dass ältere Menschen stärker als jüngere motiviert sind, Aufgaben zu bearbeiten, die ihnen sinnvoll erscheinen.

Kapitel 5 enthält einen deutschsprachigen Kurzüberblick über empathische Fähigkeiten im Lebensverlauf. Dieser Kurzüberblick wurde für ein deutsches Onlinemagazin geschrieben und soll Leser mit einem allgemeinen Interesse an der Psychologie über das Thema informieren und begeistern, und möglicherweise weitere Forschungsideen anstoßen.

In Kapitel 6 werden die empirischen Erkenntnisse zusammengefasst und miteinander in Bezug gestellt. Es werden gemeinsame Stärken und Schwächen der Manuskripte herausgearbeitet sowie Anregungen für zukünftige Forschung gegeben, zudem wird ein Praxisbezug hergestellt.

Die vorliegende Dissertation liefert einen Beitrag zum Verständnis dafür, ob und wann Altersunterschiede in kognitiven empathischen Fähigkeiten auftreten und welche sozialen Implikationen solche Altersunterschiede haben können. Sie ist zudem ein weiterer Schritt auf

dem Weg zur Entwicklung realistischer Paradigmen zur Erfassung empathischer Fähigkeiten, welche, wie die vorliegende Arbeit ebenfalls unterstreicht, nötig sind um die praktische Alltagsrelevanz von psychologischen Laborstudien besser abschätzen zu können.

Chapter 1: Introduction

"There is a lot of talk in this country about the federal deficit, but if we hope to meet the moral test of our times […] then I think we're going to have to talk more about the empathy deficit—the ability to put ourselves into somebody else's shoes."

Barack Obama, 2006

Empathy is a very popular concept. This exemplary quote taken from a speech by Barack Obama reflects appreciation of empathy—presumably because it is a key to morality or social harmony. In the quote, Obama defines empathy as "the ability to put ourselves in somebody else's shoes." Most scientific definitions of empathy indeed include such an ability to take somebody else's perspective as well as an affective response to the other person (e.g., Decety & Jackson, 2004). There is, however, no consensus among psychological scientists on what *empathy* exactly means and how it should be measured. In this thesis, concepts referred to as empathy in the literature as well as conceptually similar psychological constructs are therefore subsumed under the umbrella term *empathic skills.*

In line with Obama's reflection, empathic skills have been shown to be associated with a variety of positive social outcomes, such as prosocial behavior in children (e.g., Caputi, Lecce, Pagnin, & Banerjee, 2012), relationship well-being in adolescents, students, and middle-aged adults (e.g., Carton, Kessler, & Pape, 1999; Cohen, Schulz, Weiss, & Waldinger, 2012; Haugen, Welsh, & McNulty, 2008), or positive traits, such as affiliation (Hall, Andrzejewski, & Yopchick, 2009). Deficits in empathic skills have been observed in people

with adjustment problems, for example, abusive men (Schweinle, Ickes, & Bernstein, 2002) or persons with schizotypal personality disorder (Ripoll et al., 2013). Interindividual differences in empathic skills have also been documented across the adult lifespan, with older adults reliably scoring lower than younger adults in some of the tests that measure empathic skills (for meta-analyses see Henry, Phillips, Ruffman, & Bailey, 2013; Ruffman, Henry, Livingstone, & Phillips, 2008).[1] These findings may be surprising, given that adults seem to accumulate social expertise as they get older (e.g., Hess, 2006) and are usually very satisfied with their social relationships (Luong, Charles, & Fingerman, 2011).

Why some empathic skills may decline with older age, is not yet understood. Among other explanations, it has been assumed that the research paradigms utilized to measure empathic skills may have disadvantaged older adults, and therefore possibly inflated differences between younger and older adults (e.g., Isaacowitz & Stanley, 2011; Rauers, Blanke, & Riediger, 2013; Richter & Kunzmann, 2011; Riediger, Studtmann, Westphal, Rauers, & Weber, 2014). Especially the measurement of emotion recognition—the ability to infer emotions from facial, vocal, or bodily expressions (e.g., Ruffman et al., 2008)—has been criticized. First and foremost, it has been suggested that emotion-recognition tasks lack ecological validity (i.e., are artificial or unrealistic). This may have demotivated older adults, who have been shown to perform better in more realistic tasks, at least in other domains (e.g., cognitive tasks; Kliegel, Martin, McDaniel, & Phillips, 2007).

In this dissertation, my coauthors and I follow up on this criticism. To measure empathic skills, Chapter 2 introduces a novel dyadic interaction paradigm, which addresses

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[1] The age group assignment in such age-comparative studies is not always the same. In the meta-analysis by Bailey et al. (2012), only studies were included in which older adults were, on average, 65 years old or older, whereas younger adults' mean age was allowed to vary between 19 and 56. In the meta-analysis by Ruffman et al. (2008) older adults' mean age ranged from 65.1 years to 76.9 years and younger adults' mean age ranged from 19.2 years to 29.9 years.

shortcomings of previous research. The focus lies on the examination of adult age differences in *empathic accuracy,* the ability to read other people's thoughts and feelings correctly (e.g., Ickes, 1997). Whereas an age-related decline in emotion-recognition is well documented (see meta-analysis by Ruffman et al., 2008), only few studies investigated age differences in empathic accuracy, and the results are less clear.

Furthermore, little is known about to what extent age differences in empathic skills may affect older adults' lives. In Chapter 3, my coauthors and I therefore investigate associations of empathic accuracy with two social adjustment outcomes, communication satisfaction and satisfaction with social relationships, in younger and older adults. Understanding the social consequences of age-related losses in empathic skills is important, for example, to predict whether older adults might profit from interventions to enhance their abilities.

Chapter 4 revisits a central theme touched on in Chapters 2 and 3. Here, the question is addressed whether the performance in prototypical emotion-recognition tasks may be affected by the artificial nature of emotion-recognition stimuli. My coauthors and I investigate how participants perceive emotion-recognition stimuli and how subjective interpretations of such stimuli may influence the emotion-recognition performance in younger and older adults.

Chapter 5 consists of a review of the currently available research on age differences in empathic skills for a general audience with an interest in emotion psychology. This review was written for a German online magazine to raise awareness on the topic and to potentially motivate further research interest.

In the final Chapter 6, the findings reported in the empirical Chapters 2, 3, and 4 are discussed, strengths and the limitations of the studies are pointed out, and suggestions for further research and practice are made.

In the following, different empathic skills are defined, and examples for their measurement are provided. This taxonomy highlights similarities and differences between various concepts of empathic skills to then focus on empathic accuracy, thereby integrating the current thesis into the broad literature on empathic skills. It is then reviewed how younger and older adults perform in tasks that measure empathic skills, and how these performances may be linked to social outcomes. To further support the claim of the importance of ecological validity in the assessment of empathic skills, it is examined how the interpretation of facial emotion-recognition stimuli may shape the emotion-recognition performance in younger and older adults. I then give a summary of the aims of this dissertation and shortly describe the empirical studies that my coauthors and I conducted to answer our research questions.

1.1 Empathic Skills: An Introduction into Concepts and Measurement

Many psychologists agree that empathy entails a cognitive and an emotional (or affective) facet (e.g., Decety & Jackson, 2004).[2] *Cognitive empathy* is described as the ability to infer other people's thoughts and/or feelings (e.g., Dziobek et al., 2008; Walter, 2012). *Emotional empathy* is as an affective response towards another person; this response can either pertain to the sharing of the other person's affective state (e.g., Singer & Klimecki, 2014) or to an affective response that *differs* from the other persons' state, such as concern for the person (e.g., Dziobek et al., 2008). To classify these responses as empathic, the empathizer needs to be able to differentiate between the self and the other person (otherwise the reaction may, for

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[2] I endorse the point of view that emotions are multi-componential affective phenomena, which can include, for example, cognitive evaluations, bodily expressions (e.g., facial expressions), and the subjective emotional experience or *feeling* (e.g., Scherer, 2005). In this framework, *affect* is a superordinate concept that encompasses shorter, more distinct and intense emotions (such as anger or fear), but also longer, less intensive mood states. There are, however, also other conceptualizations. Concerning empathic skills, there is no consistent usage of the terms affect, emotions, or feelings. The terms are therefore used as the cited authors used them.

example, be referred to as "emotion contagion"; e.g., Decety & Jackson, 2004). There are various concepts which are very similar to either cognitive or emotional empathy (e.g., Walter, 2012), and sometimes different concepts are used rather interchangeably in the literature. In a definition comprising both emotional and cognitive facets of empathy, Davis (1983, p. 113) refers to empathy in its broadest sense as "the reactions of one individual to the observed experiences of another." His Interpersonal Reactivity Inventory (IRI; e.g., Davis, 1983) is an example for a frequently used self-report measure of empathy. It includes subscales for the abilities to take other people's perspectives (*perspective taking*) and to identify with fictional characters (*fantasy*), the tendencies to be emotionally concerned about others (*empathic concern*), or to feel distressed in the face of other people's suffering (*personal distress*). Such reactions as *emotional concern* or *compassion* (i.e., positive, other-directed feelings of love) and *personal* or *empathic distress* (i.e., negative, self-related feelings) are not always counted towards empathy: In social neuroscience, empathy is oftentimes reduced to the own emotional reaction, namely the (neuronal) sharing of another person's emotional experiences (Singer & Klimecki, 2014). The sharing of other people's emotions is sometimes also measured with psycho-physiological measures, such as cardiovascular activity (Levenson & Ruef, 1992) or facial mimicry (Hühnel, Fölster, Werheid, & Hess, 2014).

An example for a performance measure of empathy is the Multifaceted Empathy Test (MET; e.g., Dziobek et al., 2008). In this test, photographs depicting persons in emotionally charged situations are presented to the participants. To assess *emotional empathy*, participants rate their emotional reactions when looking at the picture (their own calmness/arousal and their empathic concern). To assess *cognitive empathy*, participants choose a mental state that best describes the person's state out of four answering options. As mentioned, the term cognitive empathy can, however, also pertain to the ability to infer affective states (e.g.,

Walter, 2012). The measurement of cognitive empathy in the MET resembles the measurement of two other related concepts that include the inference of other people's thoughts and/or feelings, (a) Theory of Mind and (b) emotion recognition. Traditionally, *Theory of Mind (ToM)* denotes the inference of mental states (Premack & Woodruff, 1978) and can be measured in various ways, but usually performance tests are used instead of self-reports. In such tests, participants have to identify mental states of protagonists in comic strips, vignettes, pictures, or sometimes also videos (e.g., Dziobek, 2012). In more current research, ToM is sometimes also further subdivided into *cognitive ToM* and *affective ToM*: Cognitive ToM refers to the inference of mental states (and is also sometimes called *mentalizing*), affective ToM pertains to the ability to infer affective states (Walter, 2012). Affective ToM is therefore also very similar to the construct *emotion recognition*, the capacity to infer emotions from facial, vocal, or bodily expressions (e.g., Ruffman et al., 2008). In emotion-recognition tasks, participants are usually asked to judge other people's emotional expressions from pictures or sometimes videos or audio tapes. Another term that is sometimes used to name the ability to infer nonverbal affective content is *nonverbal sensitivity* (e.g., Hall, Roter, Blanch, & Frankel, 2009).

Whereas most of these concepts (that are related to cognitive empathy) focus on the ability to infer thoughts or emotions from isolated modalities (e.g., the face or the voice), *empathic accuracy* is a more integrative concept. Empathic accuracy describes the ability to read other people's thoughts and feelings correctly; it can be achieved by utilizing observation, memory, knowledge, and reasoning (e.g., Ickes, 1997). Empathic accuracy may draw on other empathic abilities (such as emotion recognition) and it differs from other concepts in its assessment. There are two major paradigms to measure empathic accuracy, (a) the unstructured dyadic interaction paradigm, and (b) the standard stimulus paradigm (e.g., Rollings,

Cuperman, & Ickes, 2011). In the dyadic interaction paradigm, participants are being filmed while they interact with each other (originally without knowing that they are being filmed). Afterwards, they individually watch the video of their interaction and pause it when they remember having had an important thought or feeling during the interaction, which they then report in an open-answer format. Thereafter, participants watch the video again and it is stopped at the time points at which their interaction partner reported an important thought or feeling; the other partner is then asked to infer this thought or feeling. In the standard stimulus paradigm, participants watch already recorded videos and rate the protagonists' thoughts and feelings. The protagonists beforehand reported their own thoughts and feelings in these situations. In both paradigms, empathic accuracy is defined as the agreement between the self-report of one person (in the standard stimulus paradigm: the protagonist in the video) and the judgment of the other person.

Ickes and colleagues did not differentiate between empathic accuracy for thoughts and for feelings (Ickes, Stinson, Bissonnette, & Garcia, 1990),[3] whereas more recent work mainly concentrated on empathic accuracy for feelings (e.g., Rauers et al., 2013; Richter & Kunzmann, 2011; Ripoll et al., 2013; Zaki, Bolger, & Ochsner, 2008; Zaki & Ochsner, 2011). In these studies, the intensity of the self-reported and judged feelings is rated at pre-defined time points using Likert scales with discrete emotion items or rated continuously with valence rating dials (instead of an open-answer format).

Empathic accuracy and other empathic skills are sometimes subsumed under the term *interpersonal sensitivity*, which can be very broadly defined as "the ability to sense, perceive accurately, and respond appropriately to one's personal, interpersonal, and social environ-

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[3] Initially, Ickes and colleagues assessed a measure for valence accuracy in addition to their measure of empathic accuracy. This measure, however, was not reliable and was therefore dropped from further investigations.

ment" (Bernieri, 2001, p. 3). Unlike the term empathic skills, which is used in this dissertation, this terminology also includes prosocial behavior (i.e., behavior intended to benefit another person; Eisenberg & Miller, 1987). Another broad concept is *emotional intelligence*, which does not only include the ability to perceive others' emotions, but also other abilities, such as the management of emotions (e.g., Mayer, Salovey, Caruso, & Sitarenios, 2003). In contrast to interpersonal sensitivity or emotional intelligence, empathic skills (as discussed in this dissertation) include less heterogeneous concepts. Although emotional and cognitive facets of empathy can be separated and may be differentially impaired (e.g., Dziobek et al., 2008), there seems to be a conceptual overlap between different empathic skills, which can also be empirically observed: For example, tasks measuring empathic accuracy for feelings activate both neural networks that are usually associated with cognitive empathy as well as networks associated with emotion sharing or emotional empathy (Zaki, Weber, Bolger, & Ochsner, 2009). This finding is also in line with the notion that affective empathy includes "some cognitive appreciation of the other's affective state comprising perspective taking" (Walter, 2012, p. 19).[4]

Despite conceptual similarities of the reviewed empathic skills and neuronal overlap between cognitive and emotional facets, there are usually only weak associations (or no associations at all) between test scores of different empathic skills. Measures of empathic accuracy, for example, repeatedly did not correlate systematically with self-report measures of empathy—although both measures aim to assess the ability to understand somebody else's point of view. This finding was interpreted as reflecting participants' lack of insight into their

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[4] The term *perspective taking*—just like the term empathy—is used in various different ways (sometimes interchangeably with empathy); it can also be subdivided into several components (visual-spatial, cognitive, and affective; Steins & Wicklund, 1993). To avoid misunderstandings, I will refer to this term only as the subscale of the IRI.

own empathic skills (Ickes et al., 2000). It has, however, also been shown that, under certain circumstances, self-reported affective empathy can be predictive of empathic accuracy for feelings, for example, when the person who communicates these feelings (the target) expresses them clearly (Zaki et al., 2008).

The limited correspondence between different measures of empathic skills may also have other reasons than inexpressive behavior in the target. One limitation of many tests that measure empathic skills is their lack of ecological validity (i.e., the tasks are not very realistic; e.g., Dziobek, 2012; Isaacowitz & Stanley, 2011), which may potentially be a source of error variance. Moreover, in many situations in everyday life, people have to integrate emotional expressions from various channels, whereas in most tests that measure empathic skills, emotional or mental states have to be inferred from isolated channels (such as the face *or* the voice). Such abilities can be very useful: It can, for example, be very important to understand the emotional tone of a voice when having a conversation with a stranger on the telephone. In many social situations, however, it is important to integrate cues from different sources, nonverbal (facial, vocal, and bodily expressions) and verbal (conversation content) cues, but also contextual and knowledge-based cues. Therefore, different empathic skills may fulfill different purposes. My coauthors and I argue that the assessment of empathic skills, regardless of the skill that is being measured, should be as ecologically valid as possible. In the next section, it is pointed out why ecologically valid assessment may be especially important when considering empathic skills across the adult lifespan.

1.2 Age Differences in Empathic Skills

In recent years, empirical evidence accumulated that older adults (as compared to younger adults) have problems inferring other people's mental and emotional states. This has

been shown in two meta-analyses, one covering ToM tasks (Henry et al., 2013) and the other covering emotion-recognition tasks (Ruffman et al., 2008). An age-related decline has also been documented for self-reported empathy (e.g., Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008). Concerning empathic accuracy, the results are less clear: An age-related decline was only observed under certain conditions (which will be discussed later in this section and in Chapter 2). Most studies, however, also point to some difficulties in older as compared to younger adults concerning empathic accuracy (Rauers et al., 2013; Richter, Dietzel, & Kunzmann, 2011; Richter & Kunzmann, 2011).

An age-related decline in empathic skills only seems to pertain to the cognitive inference of mental and emotional states, but usually not the emotional reaction (Hühnel et al., 2014; Richter & Kunzmann, 2011; Sze, Gyurak, Goodkind, & Levenson, 2012; but see Chen, Chen, Decety & Cheng, 2014, for an exception). The reasons for an age-related decline in cognitive empathic abilities have not yet been understood. Concerning the age-related decline observed in emotion recognition, several explanations have been discussed:

(1) General age-related decline in cognitive abilities (i.e., fluid abilities/cognitive mechanics) and sensory functioning (i.e., declining vision and hearing loss)

(2) Neuropsychological changes (gray matter and neurotransmitters)

(3) Age-differential attention to, and usage of, cues to accuracy (i.e., face regions)

(4) Cohort differences

(5) Stimulus material

In the following, the different arguments are described, which, so far, cannot fully explain the age-related differences in cognitive empathic skills.

(1) General age-related decline: Ruffman et al. (2008) concluded that cognitive decline can play a role in emotion-recognition tasks, but does not fully account for the age-related differences (for empirical studies, see, e.g., Orbelo, Grim, Talbott, & Ross, 2005; Sullivan & Ruffman, 2004). On a related note, age differences in emotion recognition also occurred in studies that only included participants whose vision was in the normal range (e.g., Sullivan, Ruffman, & Hutton, 2007). Moreover, variability in older adults' emotion-recognition performance on the basis of auditory stimuli was not predicted by hearing difficulties (Orbelo et al., 2005).

(2) Neuropsychological changes: Structural and functional neuropsychological changes with age concerning gray matter and/or neurotransmitters are another possible explanation for age differences in emotion recognition (Ruffman et al., 2008). Although there is evidence for age-related changes in brain regions that have been associated with emotion recognition (e.g., the amygdala or the orbitofrontal cortex), only few studies linked these neuropsychological changes to emotion-recognition performance in older adults so far (see Williams et al., 2006, for an exception). More empirical evidence is therefore needed to consider this explanation.

(3) Age-differential attention and usage of cues to accuracy: It has been speculated that older adults (as compared to younger) pay more attention to the less informative mouth region than to the more informative eye region when trying to recognize emotions in facial expressions, which could lead to lower performance scores in emotion-recognition tasks (e.g., Isaacowitz & Stanley, 2011; Ruffman, 2011; Ruffman et al., 2008). Evidence for this hypothesis is, however, not yet conclusive (Sullivan et al., 2007; Wong, Cronin-Golomb, & Neargarder, 2005). Furthermore, this approach is limited to facial emotion recognition, but does not explain age-related declines in the abilities to infer emotions from voices or bodily expressions.

(4) Cohort differences: Cross-sectional differences between younger and older adults may evince due to the environment that different birth cohorts grew up in rather than due to the aging process. A study by Grühn et al. (2008) supported this hypothesis for self-reported empathy: Whereas cross-sectionally, older adults described themselves as less empathic, self-reported empathy in older adults did not decline during the twelve years that the study longitudinally spanned. The authors speculated that for individuals of younger cohorts "it may be more acceptable to talk and think about their own and others' feelings than for individuals who grew up during an earlier era" (Grühn et al., 2008, p. 762). Such cohort differences could potentially also explain age differences in empathic skills other than self-reported empathy, but, to our knowledge, such longitudinal findings on other empathic skills do not yet exist.

(5) *Stimulus material:* Another line of explanation is built on the assumption that age differences in emotion-recognition performance are inflated (or even produced) by the stimulus material that is being used. A limitation of many emotion-recognition stimulus sets is the use of mainly negative emotional expressions in contrast to only a few positive emotions (usually only "happiness"). In line with the positivity effect, this may have demotivated older adults to perform well: The positivity effect (also described as the "reduced negativity effect") denotes a motivational shift with increasing adult age from a relative preference of negative stimulus material in younger ages to a relative preference of positive material in older ages (e.g., Carstensen & Mikels, 2005; Grühn, Scheibe, & Baltes, 2007). This preference has been shown to exist in attention, memory, and decision making, and is thought to be a strategy of older adults to maintain or enhance their emotional well-being (Scheibe & Carstensen, 2010). In emotion-recognition tasks, this effect was also assumed to be present, but does not seem to explain the pattern of results: Whereas older adults usually display no problems in identifying disgust (a negative emotion), they seem to show at least some problems with the identification

of positive emotions (e.g., Ruffman et al., 2008). These problems may be small, at least concerning facial affect. The fact that age differences are usually less pronounced in positive affect could, however, be due to ceiling effects in the recognition of a single positive emotion out of a number of negative emotions (e.g., Ruffman et al., 2008). Since an influence of the positivity effect on emotion-recognition ability has never been tested, it seems possible that the positivity effect at least reduces older adults' problems in the recognition of positive affect.

The stimulus material has also been criticized for at least two other reasons, (a) the lack of age-fairness and (b) the lack of ecological validity. Age-fairness alludes to the fact that most stimuli only depict emotional expressions posed by younger, but not by older people. It has been hypothesized that there may be an own-age advantage when it comes to the recognition of emotions in facial expressions, but empirical evidence is still inconclusive (e.g., Ebner, He, & Johnson (2011); Riediger, Voelkle, Ebner, & Lindenberger, 2011). Ecological validity is lacking in emotion-recognition stimuli because they usually consist of still pictures that display posed emotional facial expressions without any context.

These characteristics of the stimuli may have especially disadvantaged older adults, as older adults have been shown to profit more from additional context information in emotion-recognition tasks (Noh & Isaacowitz, 2013), and, at least in other domains, to perform better in tasks that are more familiar and less artificial (e.g., cognitive tasks; Kliegel et al., 2007). Older adults have a lifetime of experience in decoding social stimuli and the artificial emotion-recognition stimuli might not motivate them sufficiently to perform well in these tasks (Isaacowitz & Stanley, 2011). This explanation could also pertain to ToM tasks, which have been criticized for their artificiality as well (Dziobek, 2012). However, the empirical evidence suggests that older adults usually also perform worse in more realistic emotion-recognition and ToM tasks, which, for example, feature video sequences (Henry et al., 2013; Ruffman et

al., 2008). Only occasionally, older adults have been shown to outperform younger adults in such tasks (Sze, Goodkind, Gyurak, & Levenson, 2012).

Very few studies investigated age differences in empathic accuracy. Empathic-accuracy tasks are well suited to assess empathic inferences that resemble everyday life because they pertain to the inference of actual emotional experiences (as opposed to posed expressions) which are presented through multiple information channels (such as the face, the voice, etc.); age-fairness can be achieved by varying the target's age. The existing studies on age differences in empathic accuracy were restricted to empathic accuracy for feelings; they either used the standard stimulus paradigm (Richter et al., 2011; Richter & Kunzmann, 2011) or a newly developed experience-sampling paradigm (Rauers et al., 2013). In one of the studies employing a standard stimulus paradigm, age differences occurred when (a) the videos were presented without sound (context-poor), or when (b) the videos contained negative information (with or without sound; Richter et al., 2011). In a similar study, age differences were only apparent when the videos contained a topic that was presumably less relevant to older adults (e.g., a person talking about life transitions; Richter & Kunzmann, 2011). These results point to motivational changes in the inference of others' feelings with adult age.

Although the usage of videos may, for example, capture the dynamics of emotional expressions, videos still do not do justice to the inherently interactive nature of emotion expression and communication. This aspect was considered in the experience-sampling study by Rauers et al. (2013), in which empathic accuracy for feelings was assessed in couples in daily life. In this study, older adults' accuracy for their partners' affect was comparable to younger adults' accuracy when the partner was absent, presumably because knowledge about the partner is well preserved in older age (e.g., John knows that Sarah does not like shopping). When the partners were together, however, younger adults outperformed older adults in

inferring their partners' affect. A limitation of the study was the restricted age range of the partner's age (partners in each couple were of similar ages). None of the studies investigated age differences in empathic accuracy for thoughts, an important part of the empathic accuracy construct (Ickes, 2011). In Chapter 2, my coauthors and I describe a novel dyadic interaction approach to measure age differences in empathic accuracy for thoughts and feelings, and we test empirically whether age differences do exist in such an interactive setting.

Research on empathic skills is often motivated by the notion that these skills are related to positive social outcomes. In the next section, such associations between empathic skills and various social outcomes are reviewed, and it is discussed how age differences in empathic skill may impact older adults' social lives.

1.3 The Bigger Picture: Empathic Skills and Social Adjustment

Many empirical studies documented an association between empathic skills and a wide range of positive outcomes across various age groups. Such positive outcomes can be categorized into three facets of adjustment that are oftentimes mentioned in the literature (Kwan, John, Kenny, Bond, & Robins, 2004): intrapsychic aspects (e.g., having a good mood), interpersonal aspects (e.g., forming and maintaining loving relationships), and achievement aspects (e.g., working productively). Concerning intrapsychic adjustment, interpersonal sensitivity, for example, has been related to various psychosocial characteristics of the empathizer, such as positive personality traits (e.g., openness, and tolerance; see meta-analysis by Hall et al., 2009) or self-esteem (Davis & Kraus, 1997). In line with these findings, higher self-reported empathy has also been related to lower aggression scores (Richardson, Hammock, Smith, Gardner, & Signo, 1994). There is also empirical evidence for associations between empathic skills and achievement aspects, for example in therapists whose empathic accuracy was

associated with their clients' satisfaction with the therapy (Kwon & Jo, 2012). Most studies, however, focused on associations between empathic skills and interpersonal or *social* adjustment. Higher Theory of Mind (ToM) scores in preschoolers, for example, longitudinally predicted their acceptance by peers (Caputi et al., 2012). Similarly, higher empathic accuracy scores in children were also associated with better peer relationships (Gleason, Jensen-Campbell, & Ickes, 2009). For students, higher emotion-recognition scores have been associated with higher relationship well-being in romantic relationships (Carton et al., 1999). Similar associations have emerged for higher empathic accuracy in adolescents (Haugen et al., 2008), and in younger and middle-aged adults (Cohen et al., 2012).

In some occasions, however, high levels of empathic accuracy can have negative social consequences: In dating partners, empathic accuracy for each other's potentially hurtful or "relationship-threatening" thoughts lower relationship stability (Simpson, Ickes, & Blackstone, 1995). Similarly, in the work place, the ability to recognize negative nonverbal cues from less controllable channels (such as the body or the voice) was associated with less positive evaluations by co-workers; in contrast, the ability to pick up on positive feelings was associated with more positive evaluations (Elfenbein & Ambady, 2002). In most situations, however, empathic accuracy seems to be beneficial for social relationships (Ickes & Simpson, 2007).

These associations are correlational and do not necessarily imply causality. Furthermore, the positive social outcomes that have been associated with empathic skills are quite divers and it is oftentimes not specified how or why empathic skills should be associated with the outcome measures. Even if underlying mechanisms are assumed, these mechanisms are usually not tested (e.g., as pointed out by Elfenbein, Foo, White, Tan, & Aik, 2007). In a longitudinal study with children, Caputi et al. (2012) hypothesized that prosocial behavior mediates the association between ToM and social adjustment (peer-relationship quality). In

line with this hypothesis, ToM at age 5 predicted prosocial behavior at age 6, which in turn predicted peer-relationship quality at age 7 (above and beyond ToM at age 6). This study supports the view that being able to adopt others' perspective facilitates prosocial behavior, which in turn leads to peer-acceptance. Following this logic, both partners in a social relationship may profit from one empathizer's accurate judgment: High levels of empathic skill may enable the empathizer to display interpersonal behavior (e.g., social support; Verhofstadt, Buysse, Ickes, Davis, & Devoldre, 2008) that is appreciated by the respective partner, leading to increased satisfaction in both partners (e.g., relationship satisfaction, Cohen et al., 2012). Carton et al. (1999) also suggested a bidirectional relationship between decoding skills and the quality of romantic relationships.

There is little empirical evidence for such positive associations between empathic skills and social outcomes in older adults. For self-reported empathy, there are a few studies showing associations with adjustment outcomes, such as higher well-being in individuals with higher empathy (Grühn et al., 2008), or reduced social activity in individuals with lower empathy (Bailey, Henry, & Von Hippel, 2008). For performance measures of empathic skills, there is even less empirical evidence. Bailey et al. (2008) did not find a significant association between a ToM measure and social activity. Another study found that for older men (but not women) poorer emotion-recognition ability was correlated with more verbosity (extended speech that is lacking in focus or coherence; Ruffman, Murray, Halberstadt, & Taumoepeau, 2010). As verbose individuals tend to have less satisfied interaction partners (Pushkar et al., 2000), this study indirectly supported the assumption that declining emotion-recognition skills negatively affect communication satisfaction in older adults' social partners.

Although empirical evidence is still rare, the reviewed studies seem to point to a relationship between empathic skills and social outcomes in younger as well as in older adults.

If this is the case, then older adults' declining empathic skills should lead to adjustment impairments (as compared to younger adults). To investigate whether this is the case, my coauthors and I focus on associations between empathic accuracy and social adjustment in Chapter 3.

Older adults are usually very satisfied with their social relationships (e.g., Luong et al., 2011). Although older adults' social networks are smaller than younger adults', the networks usually only comprise smaller numbers of less close friends and acquaintances (Wrzus, Hänel, Wagner, & Neyer, 2013). This is in line with the socio-emotional selectivity theory (SST): SST posits that, as the future time perspective becomes limited, emotional well-being emerges as a major goal in old age (e.g., Carstensen, Isaacowitz, & Charles, 1999). Older adults may therefore prioritize emotionally meaningful ties and discard less close social partners. Assuming that empathic skills and social adjustment are associated in older adults like they typically are in younger adults, older adults' lower levels of empathic skills should lead to lower levels of social adjustment. In Chapter 3, this apparent paradox is addressed: My coauthors and I derive and test the hypothesis that empathic accuracy may be less relevant for older adults' social adjustment than it is in younger adults'.

In the empirical Chapters 2 and 3, empathic accuracy is assessed in a dyadic interaction paradigm. The findings of these studies point to the importance of a realistic assessment of empathic skills. In Chapter 4, my coauthors and I follow up on this idea by focusing on the question whether a lack of validity in emotion-recognition tasks may help to explain age-related differences in emotion-recognition performance. In the next section, it is described how participants interpret prototypical facial emotion-recognition stimuli and how these interpretations might be associated with the emotion-recognition performance in younger and older adults.

1.4 Following up on Validity: The Example of Facial Emotion Recognition

Facial emotion-recognition stimuli typically differ from facial emotional expressions in everyday life in many important ways (e.g., Isaacowitz & Stanley, 2011): They are usually (a) static (vs. dynamic), (b) prototypical and very high in intensity (vs. ambiguous and subtle), (c) isolated (vs. within a context), and (d) posed (vs. authentic). These observations may have two consequences, (1) it could be particularly relevant for participants' task motivation that they perceive this relatively artificial task as reasonable, and (2) the performance in emotion-recognition tasks might not reflect the ability to recognize emotions in daily life very well. These caveats may be especially disadvantageous when investigating age differences in emotion-recognition ability, since older adults seem to have expertise with realistic stimuli and perform better when confronted with such (as elaborated in 1.2).

In Chapter 4, my coauthors and I approach this problem from an emotion theory perspective. Many emotion researchers assume that emotional facial expressions are multifunctional and convey different kinds of information at the same time (Scherer & Grandjean, 2008): a subjective feeling (e.g., feeling happy; Ekman, Friesen, & Ancoli, 1980), a cognitive appraisal of the situation (e.g., "I just received a gift"; Scherer & Ellgring, 2007; Scherer & Grandjean, 2008), a behavioral tendency (e.g., "I want to jump up and down"; Frijda, Kuipers, & ter Schure, 1989), or a social message (implying an action tendency or an request, e.g., "Let's play!"; Fridlund, 1994). These different components can be considered part of emotion (Scherer, 2005) and can also be inferred from facial expressions: Whereas emotion-recognition tasks typically feature emotion words as response options (e.g., happiness, anger, and fear), people are also able to recognize emotional facial expressions better than chance based on appraisals, social messages, and action tendencies (Scherer & Grandjean, 2008; Yik & Russell, 1999). People are, however, usually more accurate when

emotion labels are presented than when other labels are used. Horstmann (2003) asked over 2,000 participants to indicate what the presented facial expressions conveyed: an emotional experience, an action tendency, or an action request. The majority of participants interpreted most facial expressions as conveying an emotional experience rather than an action tendency or request. In line with this observation, Scherer (2004) assumed that the emotional experience (e.g., feeling happy) is a conglomerate of the different components. Furthermore, the emotional experience is strongly coupled with the verbal emotion label (e.g., happiness). Emotional experiences are therefore inherently emotional, which does not have to be the case for social messages, appraisals, action tendencies or requests.

My coauthors and I assume that the stronger participants perceive facial emotional stimuli as conveying an underlying emotional experience, the more reasonable they will find the task of labeling the stimuli with emotion labels. An interpretation of the stimuli as conveying an emotional experience may be a proxy for (1) face validity (the participants agree that the task measures emotion recognition) and (2) ecological validity within the limitations of the task (e.g., even without any situational context, the participants agree that the stimuli resemble emotional facial expressions). In Chapter 4, my coauthors and I test whether such subjective interpretations of the facial stimuli as conveying emotional experiences (or other components such as action tendencies) can predict the emotion-recognition performance in younger and older adults. Furthermore, we explore how older adults interpret facial emotional stimuli in terms of their components, which has not been investigated before. We derive and test the hypothesis that subjective interpretations of the stimuli as conveying emotional experiences are more important for older adults' emotion-recognition performance than for younger adults'. In the following, the aims and research questions of this dissertation as elaborated in the previous sections are summarized.

1.5 Summary of the Aims and Research Questions of this Dissertation

In this thesis, four objectives are pursued. For the objectives that require empirical investigation, I briefly address the research questions and hypotheses, which are explained in detail in the corresponding chapters. This dissertation has the following aims:

(1) Strengthening empirical evidence on age differences in empathic accuracy as measured in a more realistic dyadic interaction setting.

There is compelling evidence for an age-related decline in cognitive empathic skills, especially in tasks that measure the abilities to infer thoughts or feelings from isolated sensory channels (e.g., the face or the voice), as it is often the case in emotion-recognition or ToM tasks. Less, however, is known about the integrative concept of empathic accuracy, which is the ability to infer others' thoughts and feelings from multichannel stimuli that resemble real life situations. It has therefore been speculated whether age differences in empathic skills translate into everyday life. In Chapter 2, my coauthors and I introduce a novel dyadic interaction paradigm to pursue this research question in realistic interactions between unfamiliar women. Based on the currently available empirical evidence, we derive and test the hypothesis that older women are less empathically accurate than younger women.

(2) Investigating associations between empathic accuracy and social adjustment in younger and older adults.

Findings on older adults' positive social adjustment in daily life cast doubt on an age-related decline in empathic skills, as declining skills should worsen social adjustment. In Chapter 3, my coauthors and I predict social adjustment in younger and older women with their empathic accuracy, and elaborate why older adults may retain their social adjustment despite declining cognitive empathic skills. Specifically, we hypothesize that empathic

accuracy may be less strongly associated with social adjustment in older than in younger women.

(3) Exploring subjective interpretations of facial emotion-recognition stimuli in younger and older adults, and examining associations between such interpretations and emotion-recognition performance.

Facial emotion-recognition stimuli are frequently used to assess emotion-recognition accuracy, with accumulating evidence that younger adults usually are more accurate than older adults. Adults seem to strongly interpret these stimuli as conveying emotional experiences, which may be considered as a proxy for face validity and ecological validity. It is, however, not clear whether there are age differences in such interpretations. In Chapter 4, my coauthors and I explore adult age differences in subjective interpretations of facial emotion-recognition stimuli, and test associations between these interpretations of facial emotion-recognition stimuli and emotion-recognition performance in younger and older adults. As we elaborate, there is reason to assume that older adults' perceptions of the task as realistic or reasonable may especially promote their performance in emotion-recognition. We therefore hypothesize that interpreting the stimuli as conveying emotional experiences is more predictive of older adults' emotion-recognition performance than of younger adults'.

(4) Informing about age differences in empathic skills.

Chapter 5 was written for a German online magazine that presents psychological findings for laypersons. Whereas age-related differences in cognitive skills (e.g., memory loss in older age) receive a lot of public interest (e.g., by discussing how to preserve these skills), age differences in emotional competencies are less often in the spotlight. We therefore want to raise awareness on the topic of age-related differences in empathic skills. Although previous research suggests that there are age-related losses in cognitive empathy, my coauthors and I

point out in Chapter 5 that age differences may be qualified, for example, by characteristics of the situation. I also explain that the social consequences of a potential decline in cognitive empathy are not yet well understood, which may motivate further research interest in the topic. Next, I briefly describe the data sets that form the empirical basis for Chapters 2−4.

1.6 Empirical Data Sets

To answer the research questions, my coauthors and I used two data sets that were collected within the Max Planck Research Group "Affect Across the Lifespan" (headed by PD Dr. Michaela Riediger) at the Max Planck Institute for Human Development. Data collection I was conducted in 2013 (principal investigators: Dipl.-Psych. Elisabeth S. Blanke, Dr. Antje Rauers, and PD Dr. Michaela Riediger). The sample comprised 208 women from two age groups: $n = 102$ younger women (age range = 20–31 years, $M = 25.95$, $SD = 3.06$) and $n = 106$ older women (age range = 69–80 years, $M = 72.94$, $SD = 2.52$). The assessment consisted of two sessions, in which the participants engaged in a dyadic interaction (in the first session) and worked on several other tasks. Results from this data set are reported in the Chapters 2 and 3. Data collection II was conducted in 2010 (principal investigators: Dr. Markus Studtmann and PD Dr. Michaela Riediger) as part of a bigger project that aimed at investigating age differences in different emotion-recognition paradigms. The sample comprised 96 participants from two age groups: $n = 48$ younger adults (age range = 20–30 years, $M = 25.67$, $SD = 2.72$; 50% female), and $n = 48$ older adults (age range = 70–78 years, $M = 73.47$, $SD = 2.50$; 50% female). Participants were scheduled for two sessions of which only the second one is relevant for the current research question. Chapter 4 reports results from this data set. The now following Chapters 2−4 consist of empirical manuscripts; Chapter 5 contains a short review article. Chapter 6 integrates the findings reported in the empirical chapters.

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Chapter 2: Nice to Meet You—Adult Age Differences in Empathic Accuracy for Strangers

This chapter is based on the following original article:

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Abstract

Empathic accuracy is the ability to correctly identify others' thoughts and feelings. Based on evidence from past laboratory experiments, researchers concluded that this ability decreases throughout adulthood. This conclusion, however, was mostly based on evidence regarding isolated components of the ability to read others' thoughts and feelings (e.g., inferring thoughts or feelings from facial expressions presented without context). In contrast, empathic accuracy involves the integration of a multitude of such inferences from diverse sources of information that are available in everyday interactions (e.g., facial and bodily expressions, prosody, communication content, situational context, etc.). To strengthen empirical evidence on age differences in this integrative ability, we assessed empathic accuracy in dyadic interactions between 102 younger (20−31 years) and 106 older (69−80 years) women, paired in same-age or mixed-age dyads. In these interactions, older women were only less empathically accurate than younger women when judging their interaction partner's negative feelings and when judging thoughts that accompanied experiences of negative affect. In contrast, there were no age differences in empathic accuracy for positive feelings and for thoughts accompanying experiences of positive affect. These results were independent of the age of the interaction partner. The current study thus provides further evidence that age differences in empathic accuracy (a) may be qualified by situational properties, such as valence of inferred content, and (b) can be less pronounced when integration of multiple sources of information is possible than research investigating isolated information channels has thus far suggested.

Keywords: age differences, dyadic interaction, empathic accuracy

Nice to Meet You—Adult Age Differences in Empathic Accuracy for Strangers

Imagine that someone you do not recognize is looking at you in the subway. You may wonder, "Is there something on my face?", "Does this person know me?", or simply, "What is this person thinking?" Your answers to these questions likely guide your reaction (e.g., examining your reflection in the window, looking away, or smiling). People frequently encounter such situations in which they try to infer what other people, familiar or unfamiliar, think and feel. The degree to which these inferences are correct has been referred to as empathic accuracy (Ickes, Stinson, Bissonnette, & Garcia., 1990). Previous research suggested that such empathic accuracy is beneficial for social adjustment, for example, as reflected in higher marital satisfaction or a better ability to provide social support (e.g., Cohen, Schulz, Weiss, & Waldinger, 2012; Verhofstadt, Buysse, Ickes, Davis, & Devoldre, 2008).

Given the importance that abilities involved in making inferences about others' thoughts and feelings have for social interactions, prior empirical evidence that they might decline with age is unsettling (for meta-analyses, see Henry, Phillips, Ruffman, & Bailey, 2013; Ruffman, Henry, Livingstone, & Phillips, 2008). Most of this evidence stems from age-comparative research on specific components of the ability to correctly identify others' thoughts and feelings studied in isolation from each other, such as the ability to read emotional facial expressions when presented without context. Empathic accuracy, however, is more than just the combination of such isolated skills. As Ickes (1997, p. 2) put it, empathic accuracy is achieved by "complex psychological inference in which observation, memory, knowledge, and reasoning are combined to yield insight into the thoughts and feelings of others." It thus reflects the empathizer's ability to integrate the manifold and complex pieces of information that usually are available in natural interactions and that stem from different sources (e.g.,

facial and bodily expressions, prosody, communication content, situational context, etc.). To date, little is known about older adults' empathic accuracy as it derives from such complex integration of information. In the following, we first review evidence from age-comparative research on isolated skills that are conceptually related to empathic accuracy, and then turn to the relatively scarce findings on adult age differences in empathic accuracy, as both strands of research informed our hypotheses.

Age differences in isolated skills that are related to empathic accuracy

Empirical research on adult age differences in skills that are related to empathic accuracy points to a decrease in the abilities to read emotional expressions and to understand mental states. Results from a meta-analysis (Ruffman et al., 2008) showed that older adults perform worse than younger adults in reading the majority of emotional expressions displayed in faces, voices, and bodily postures—an ability that is referred to as emotion recognition (see also Mill, Allik, Realo, & Valk, 2009; Ruffman, Murray, Halberstadt, & Taumoepeau, 2010). In emotion-recognition tasks, participants are usually presented with posed emotional expressions from one isolated information channel (e.g., facial expressions). The participant's task typically is to select the expression intended by the poser (the target) from a number of response options. Another recent meta-analysis by Henry et al. (2013) showed an age-related decrease in the ability to infer mental states, referred to as Theory of Mind (ToM). Like emotion-recognition tasks, ToM tasks often consist of multiple-choice questions, asking participants to choose a mental state that best describes a (usually posed) expression in a picture or video or a mindset of a fictional character in a story. The causes for age-related decreases in emotion recognition and ToM are not yet understood. Age-related structural (e.g., cognitive and neurophysiological) and motivational changes as well as differences in the facial cues (e.g., from the mouth versus eye region) used to judge emotional expressions have been

discussed as potential candidates (Charles & Campos, 2011; Isaacowitz & Stanley, 2011; Ruffman, 2011; Ruffman et al., 2008). Empirical support for these lines of reasoning is, however, still rare (Ruffman, 2011).

Moreover, the ways of measuring these skills, especially emotion recognition, have been criticized as being potentially disadvantageous for older adults. The two most prominent criticisms have been the lack of age-fairness and the lack of ecological validity (e.g., Isaacowitz & Stanley, 2011; Rauers, Blanke, & Riediger, 2013; Richter, Dietzel, & Kunzmann, 2011; Richter & Kunzmann, 2011; Riediger, Studtmann, Westphal, Rauers, & Weber, 2014). Age-fairness is lacking because stimuli usually included younger and middle-aged adults' emotional expressions as targets, but not older adults' (but see, e.g., Riediger, Voelkle, Ebner, & Lindenberger, 2011 for an exception). This may have disadvantaged older perceivers in that it has been hypothesized that older adults might perform better at recognizing emotional expressions of their own age group, typically referred to as own-age advantage, although empirical evidence is not yet conclusive (e.g., Ebner, He, & Johnson, 2011; Riediger et al., 2011). The ecological validity in most previous emotion-recognition tasks has been limited for several reasons: The stimulus material often consisted of still pictures displaying posed emotional expressions without any contextual information. Spontaneous emotional expressions, in contrast, are dynamic and rapidly changing; and they are more subtle than posed expressions (Reisenzein, Studtmann, & Horstmann, 2013). Artificiality of the task might especially hinder older adults' performance, as older adults seem to profit in other domains from familiar and less artificial tasks (e.g., cognitive tasks; Kliegel, Martin, McDaniel, & Phillips, 2007). Furthermore, older adults might benefit more from context information in emotion recognition than younger adults do (Noh & Isaacowitz, 2013). Ruffman (2011) argued that even when more realistic video tasks were used, the majority of empirical

studies nevertheless pointed to a decline in emotion recognition with advancing adult age. There are a few exceptions, however, and older adults have occasionally even been found to outperform younger adults when judging affective experiences from video material on affective expressions (e.g., Sze, Goodkind, Gyurak, & Levenson, 2012). Criticism on the lack of ecological validity has also been expressed for ToM tasks that have typically used pictures or videos of posed mental states or faux pas, or sometimes comic strips or vignettes (Dziobek, 2012). Accordingly, older adults might be disadvantaged in ToM tasks as well. In their meta-analysis, Henry et al. (2013), however, reported that older adults performed worse than younger adults regardless of the task being used, including dynamic, audio-visual ToM video tasks.

To summarize, methodological shortcomings might contribute to age-related differences in emotion recognition and ToM, but they are not likely to fully explain them. Moreover, the ability to read thoughts and feelings in daily life is likely to be more than the sum of the isolated skills that have been measured in emotion recognition and ToM tasks. There certainly are situations in daily life in which it is important to read feelings from isolated sensory channels (e.g., when having a conversation with a stranger on the phone). Most everyday social interactions, however, require integrating multiple pieces of information from diverse channels such as facial and bodily expressions, prosody, and the content of the conversation, to name a few examples. Unlike the majority of the previous studies, we were therefore interested in empathic inferences that require this complex integration of skills, that is, in empathic accuracy and in potential age-related differences therein.

Age differences in empathic accuracy

Empathic accuracy is defined as the correct inference of others' thoughts and feelings and operationalized as the concordance between the self-report of a target person who

experiences thoughts and feelings and the respective judgment of the empathizer (e.g., Ickes et al., 1990). It is usually measured in live interactions or using already videotaped situations (Rollings, Cuperman, & Ickes, 2011). Both paradigms address the methodological criticism raised on emotion recognition and ToM tasks. Ecological validity is enhanced in these tasks as they target naturally occurring thoughts and feelings within a situational context. Age-fairness can be achieved by varying the age of the partners in a dyadic interaction or the target persons in the videotapes. To the best of our knowledge, the focus of studies looking at age differences in empathic accuracy until now was limited to the ability to infer feelings, not thoughts. The assessment of empathic accuracy for thoughts requires the analysis and coding of open-answer formats. It is therefore usually more difficult to implement (and in some settings not feasible) than the assessment of empathic accuracy for feelings, which can be measured with rating scales (Ripoll et al., 2013). Ickes (2011) nevertheless made a compelling case for the importance of investigating empathic accuracy for thoughts as well, showing that participants spontaneously reported more thoughts than feelings (Ickes & Cheng, 2011). This suggests that thoughts represent an important facet of people's inner experiences. Furthermore, empathic accuracy for thoughts and empathic accuracy for feelings sometimes diverge: In a study aimed at improving empathic accuracy of graduate students by using feedback, only empathic accuracy for feelings, not for thoughts, was enhanced after several weeks of training (Barone et al., 2005).

Few studies specifically investigated adult age differences in empathic accuracy for feelings. Results suggest that empathic accuracy for feelings, like emotion recognition and ToM, declines with age, and that specific features of the tasks may moderate these age differences. In a video-task study, age differences only emerged when older adults judged the feelings of a target person who talked about a topic that was presumably of little motivational

significance for older adults, but not when the topic was age-relevant, suggesting that motivational factors contribute to age differences in empathic accuracy (Richter & Kunzmann, 2011). In another study, Richter et al. (2011) assessed empathic accuracy for feelings using context-poor (without sound) or context-rich (audio-visual) videos depicting happy, sad, and angry targets. In this study, younger adults outperformed older adults in the inference of sadness and anger in both conditions, but not in the context-rich condition of happiness. The authors argued that older adults might have been more motivated to accurately judge the positive content than the negative, which is in line with the so called "positivity effect" in aging research. The positivity effect describes a tendency of older adults to be less sensitive to negative information and/or more sensitive to positive information, presumably to regulate (maintain or enhance) their emotional well-being (e.g., Carstensen & Mikels, 2005).

Both studies used video tasks to assess empathic accuracy. Although video tasks maximize internal validity with standardized assessment, they cut back on ecological validity. To investigate empathic accuracy in real-life contexts, Rauers et al. (2013) used experience sampling and showed that younger romantic couples inferred their partner's feelings in daily life more accurately than older couples did—but only when the partner was present at that time, not when the partner was absent. The authors argued that empathic accuracy in the absence of the partner was informed by knowledge about the partner, whereas in the presence of the partner, it was also informed by sensory cues such as facial emotional expressions. This study also emphasizes that age differences in empathic accuracy occur not only when judging the feelings of unfamiliar persons, but also when judging close emotional partners. A limitation of the study was the restricted age range of the partner's age, as partners in each couple were of similar ages. None of the studies included empathic accuracy for thoughts, thus missing a potentially important facet of interpersonal inferences (Ickes, 2011). In the current

study, we therefore built on previous findings concerning age differences in empathic accuracy for feelings and related skills. It also should be noted that whenever empathic accuracy for feelings is assessed separately (not together with thoughts), it is usually measured using emotion rating scales or rating dials instead of the open-answer format that was used in the classic studies conducted by Ickes. We addressed the methodological limitations of previous research discussed here and extended our research scope to incorporate empathic accuracy for thoughts.

The present study: Hypotheses

The aim of the current study was to strengthen empirical evidence on age differences in empathic accuracy for thoughts and feelings. To enhance ecological validity within the controlled environment of a laboratory, we used a dyadic interaction task to investigate interactions between unfamiliar persons that talked about personal experiences. We assumed that talking about personal events that the participants could pick themselves would make this an emotionally relevant and motivating task for older as well as for younger adults. To enhance age-fairness and generalizability, we systematically varied the age-group composition of the dyads and had younger and older adults interact either with members of the same, or members of the other age group. Another novel addition to the research on age differences in empathic accuracy was the parallel assessment of accuracy for thoughts and feelings as recommended by Ickes (2011). To our knowledge, this is the first empirical attempt to test age differences in the ability to read others' thoughts and feelings in a live interaction between unfamiliar younger and older adults. Based on empirical evidence on age differences in empathic accuracy for feelings, as well as in emotion recognition and ToM, we expected younger adults to be more accurate in judging the thoughts (Hypothesis 1) and the feelings (Hypothesis 2) of an unfamiliar interaction partner. Furthermore, we exploratively followed up

on previous research (Richter et al., 2011) that found that older adults' empathic-accuracy level was equal to younger adults' level when a context-rich and ecologically valid task was provided, but only when the stimulus material was positively valenced, not when it was negatively valenced. This was interpreted as a motivational process with which older adults try to maintain their emotional well-being. We assumed that the maintenance of well-being should also be a goal in an interaction with an unfamiliar person and were therefore interested in whether this pattern would also be found in a more realistic interaction task.

Method

Participants

Participants were 208 women from the Berlin area recruited from the participant pool of the Max Planck Institute for Human Development, Berlin, Germany, as well as from an online advertisement in the internet. We tested two age groups: $n = 102$ younger adults (age range = 20–31 years, $M = 25.95$, $SD = 3.06$), and $n = 106$ older adults (age range = 69–80 years, $M = 72.94$, $SD = 2.52$).[1] Participants were fluent in German and the sample was approximately stratified according to education, with 59% of the younger and 50% of the older adults holding a German university entrance qualification (Abitur). Participants were recruited independently from one another and were asked at first encounter whether they knew their assigned interaction partner, which was never the case. One half of the sample was paired with participants from the other age group (52 mixed-age dyads) and the other half, with partners from the same age group (52 age-homogeneous dyads: 25 younger and 27 older dyads). We

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[1] The sample size was originally set to 100 younger and 100 older adults. We oversampled two mixed-age dyads and two age-homogenous older dyads (resulting in 2 additional younger and 6 additional older participants) due to various reasons which are explained throughout the manuscript (e.g., inability to report thoughts, disregarding of the timing of the task) and due to one person quitting the study after the first session (the second session was not relevant for the current research question).

chose to investigate same-sex dyads (all participants were female) to reduce the complexity of the research design, which was optimized for the purpose of investigating age differences. Participants were told in advance that there would be a videotaped conversation and they gave their informed consent. The study consisted of two sessions, but only the first session is relevant for the current research. Participants received 50 Euro as compensation for both sessions. The study was approved by the ethics committee of the Max Planck Institute for Human Development.

Procedure

After having given written consent and answering a short questionnaire, participants had five minutes to introduce themselves to each other, and to get accustomed to the camera that was already recording them. They were then asked to think of one recent personal event during which they had felt particularly bad (e.g., angry, tense, sad, or unhappy) and another event during which they had felt particularly good (e.g., excited, happy, content, or balanced). They were told that their conversation would be about these events, with the aim of getting to know each other. Participants had a few minutes to think of events and were given the opportunity to put down notes.

During the following conversation, which lasted twelve minutes, the partners took turns in talking about their events, with three minutes for each event at their disposal. All partners were instructed to listen and, if they liked, to ask questions and make comments. Signals for the time were given by an audiotaped instruction because the experimenter left the room for the duration of the recordings. Participants started with the negative events and ended

with the positive ones because we did not want the participants to have negative feelings at the end of the task.[2]

Within the mixed-age subsample, we ensured that younger and older women started the conversations equally often; otherwise who started the conversation was randomly assigned. After filling out further questionnaires that were not relevant for the current research question and a short break, participants watched the video of their interaction, with interruptions at eight time points ("tape stops"). These tape stops were pre-defined by the experimenter, based on a time-contingent criterion: In each three-minute segment of the twelve-minute conversation, a tape stops was set at approximately one minute and at approximately two minutes, resulting in eight stops in total. The experimenters had a tolerance margin of about 15 seconds before and after the pre-defined mark. He or she defined the tape-stops at the end of naturally occurring interaction segments (e.g., the end of a sentence). This was done to prevent unnatural interruptions in the participants' speech (and potential distortions of the meaning of a sentence). At each tape stop, participants used the items described in the next section (self-report) to indicate their most important thought as well as their feelings at that particular point in the interaction. The participants then watched the video a second time, this time reporting what the conversation partner might have thought and felt at the same tape stops (judgment).

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[2] Two dyads (two age-homogeneous dyads, one young-young and one old-old) did not completely adhere to the timing of the task. Excluding these two dyads from the analyses did not change our results and we therefore chose to keep them as a part of the sample. Two other participants from two different dyads (one younger woman from a young-young dyad and one older woman from an old-old dyad) were not able or did not want to report a negative event. They instead talked about the reasons why there was nothing negative in their lives. Excluding these dyads from the analyses did not change our results, and we again chose to keep them as a part of the sample. Excluding all of these four dyads who did not completely adhere to the task did also not change the pattern of results.

This procedure of assessing empathic accuracy was similar to the "unstructured dyadic interaction paradigm" introduced by Ickes and colleagues (e.g., Rollings et al., 2011). However, we modified the procedure in several important ways: (a) the participants knew that they were being filmed (vs. being unaware of the recording), (b) the topic and timing of the conversation was semi-structured (vs. unstructured), (c) the tape stops were pre-defined (vs. freely chosen by the participants), and (d) participants were instructed to report their own thoughts and the assumed thoughts of their partner using an open-answer format; and to separately report their own feelings and the assumed feelings of their partner using rating scales (vs. reporting both thoughts and feelings together in an open-answer format). The modifications in terms of filming and structure of the conversation were made to enhance compliance and enable an emotional exchange between the strangers. We decided to pre-define the tape stops to keep the number of tape stops constant across participants. We pre-defined identical tape stops for both partners of a dyad to be able to statistically consider that the participants may project their own emotions onto the other person, which we will explain in more detail in the *Methods* section. To separate emotional states from thoughts and to make the study comparable to other age-differential studies on empathic accuracy, we specifically asked the participants to report thoughts using an open-answer format and to rate their feelings using emotion rating scales. In the following, we will refer to measures derived from the open-answer responses as "empathic accuracy for thoughts," and to measures derived from the emotion ratings as "empathic accuracy for feelings."

Measures

Self-reported thoughts and judgments of thoughts. While watching the recording of their interaction, participants wrote down their own thoughts at each tape stop, using an open-answer format. Participants were asked to focus on the most important thought that they were

having in the conversation at that particular moment when the tape stop had occurred. When watching the recording a second time, participants reported the most important thought they assumed their partner had had at that time, again using an open-answer format.

Self-reported feelings and judgment of feelings. Participants rated their own feelings and their judgments of the partner's feelings for each of the eight tape stops using nine affect items (see below). A 7-point scale ranging from 0 *(not at all)* to *6 (very much)* was used. The items were selected to cover facets of low- as well as high-arousal positive and negative affect.

Emotional valence of thoughts and feelings. Affective experiences are often categorized according to their valence into positive and negative experiences (e.g., Russell, 1980; Watson & Tellegen, 1985). This distinction has also been used for the present data and analyses. Positive affect was represented by five items (PA: happy, excited, content, comfortable, and balanced), and negative affect by four items (NA: nervous, sad, uncomfortable, and tense). The positive and negative affect items were averaged, yielding separate scores for self-reported positive and negative affect at each tape stop (average PA of personal means: younger: $M = 3.30$, $SD = 1.00$; older: $M = 3.21$, $SD = 0.93$; average NA of personal means: younger: $M = 1.38$, $SD = 0.99$; older: $M = 1.40$, $SD = 0.79$).

At each tape stop, reliability for the self-reported affect measures was good, ranging from $\alpha = .86$ to $\alpha = .92$ for positive and $\alpha = .70$ to $\alpha = .82$ for negative affect. The same aggregation was used for the judgment of the partner's feelings (average PA of personal means: younger: $M = 3.29$, $SD = 0.89$; older: $M = 3.25$, $SD = 0.95$; average NA of personal means: younger: $M = 1.15$, $SD = 0.76$; older: $M = 1.24$, $SD = 0.71$). The reliability for the judgment of partner's positive feelings was good (ranging from $\alpha = .87$ to $\alpha = .91$); for the judgment of partner's negative feelings reliability was acceptable (ranging from $\alpha = .68$ to $\alpha = .79$).

To determine the emotional experience that accompanied the self-reported thoughts, we used the personal mean of each participant for her self-reported positive and negative affect across the eight tape stops. Thought entries were regarded as accompanying positive affect when the self-reported positive affect score for that entry was higher than or equal to the personal mean of this person (positive thoughts). Following the same logic, thought entries were regarded as accompanying negative affect when the negative affect score was higher than or equal to the personal mean of this person (negative thoughts).[3] On average, 51% of each younger woman's thoughts ($SD = 11$) and 54% of each older woman's thoughts ($SD = 12$) were categorized as accompanying positive affect; and 41% ($SD = 13$) of the younger women's thoughts and 42% (SD = 13) of the older women's thoughts were categorized as accompanying negative affect.

Empathic accuracy for thoughts. Two trained coders who were blind to the hypotheses rated the similarity between the empathizer's judgment and the partner's self-reported thoughts at each tape stop. A 3-point coding system (Ickes et al., 1990) was used: essentially different content (coded 0); somewhat similar, but not the same, content (coded 1); essentially the same content (coded 2). Throughout the coding process, extensive consensus meetings were regularly held with the first author, in which disagreement between the coders was discussed until consensus was reached. Inter-rater reliability was computed using coders' ratings before the consensus meetings. Because Category 2 (essentially the same content) was only coded 14 times out of 1648, Categories 1 and 2 were collapsed into one category that we interpret as indicating that the empathizer correctly inferred the thoughts of her interaction

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[3] This procedure led to a partial overlap between "positive" and "negative" thoughts (average within-person occurrence of overlapping episodes: younger: $M = 7\%$, $SD = 10$; older: $M = 7\%$, $SD = 12$). The result pattern did not change when we repeated our analyses while excluding tape stops that had been categorized as positive and negative at the same time (e.g., tape stops at which the participant experienced mixed affect).

partner at that tape stop. The inter-rater-reliability was $\kappa = .69$, which may be considered a good reliability, given the complexity of the coding (Wirtz & Caspar, 2002).

For each empathizer, consensus coding was used to obtain an average proportion of the correctly inferred thoughts the partner had had while feeling more positive than usual (positive thoughts) or negative than usual (negative thoughts). The resulting empathic accuracy measures for thoughts had a theoretical range between 0 (none of the interaction partner's thoughts were correctly inferred) and 1 (all of the interaction partner's thoughts were correctly inferred). These measures were severely positively skewed. We therefore repeated our analyses with inverse transformed accuracy scores to approach normality. This transformation did not change the pattern of results. For reasons of parsimony and interpretability, we thus analyzed and report the untransformed scores (mean accuracy for positive thoughts: younger: $M = 0.25$, $SD = 0.21$; older: $M = 0.24$, $SD = 0.22$; mean accuracy for negative thoughts: younger: $M = 0.21$, $SD = 0.22$; older: $M = 0.15$, $SD = 0.21$). Three participants (two older women and one younger woman) were excluded from the analyses of empathic accuracy for thoughts because they were unwilling or unable to report any thoughts. One older woman had a very high score in empathic accuracy for negative thoughts (as compared to the other older women). Adjusting this score did not change the results; we therefore used the unadjusted data.

Empathic accuracy for feelings. For feelings, we chose two approaches to model empathic accuracy that we describe in more detail below: a person-level approach (comparable to empathic accuracy for thoughts) and an additional situation-level approach that allowed us to model empathic accuracy at each tape stop. We used this additional approach to demonstrate that both methodological approaches (person-level and situation-level) yield the same results for the analysis of age differences in empathic accuracy for feelings. We applied

the model only to feelings (not to thoughts) because it required interval-scaled data at each measurement occasion and that was not available for the thought data.

Person-level approach. Empathic accuracy for feelings was calculated as the Pearson correlation between the judgment of the empathizer and the self-report of the partner over the eight tape stops, yielding one score per person (person-level). As correlations generally do not follow a normal distribution, we used Fisher's z-transformation to approach normality and to make the correlations comparable across participants (Kenny, 1987). This z-transformed measure of empathic accuracy for feelings therefore had a theoretical rage of approximately $+/- 3$ (equal to $r \approx +/- 1$), with higher positive scores representing higher accuracy (positive feelings: younger: $M = 0.90$, $SD = 0.57$; older: $M = 0.82$, $SD = 0.60$; negative feelings: younger: $M = 0.86$, $SD = 0.53$; older: $M = 0.69$, $SD = 0.62$).

In the analysis of empathic accuracy for negative feelings, four participants (three older women and one younger woman) were excluded because they did not display any variation in their judgment of partner's negative affect ratings. One younger woman had a very low score in empathic accuracy for positive feelings (as compared to the other younger women). Similarly, one younger and one older woman had very low scores in empathic accuracy for negative feelings (as compared to their own age group). Adjusting these scores did not change the results; we therefore used the unadjusted data.

Situation-level approach. In this approach, we modeled empathic accuracy at each tape stop using the truth and bias model of judgment (West & Kenny, 2011). Empathic accuracy for feelings was represented as the prediction of each empathizer's judgment by the partner's self-reported feelings across the tape stops, controlling for the empathizer's own current feelings. Higher estimates for the partner's self-reported feelings represent higher empathic accuracy. Negative affect ratings displayed positive skewedness, but because an

inverse transformation that we applied with the aim to approach normality did not change the pattern of results, we again analyzed untransformed and unadjusted scores for reasons of parsimony. One observation (i.e., one tape stop for one empathizer) was missing because one older participant only completed seven of the eight judgments of partners' affect.

Methodological considerations concerning dyadic dependency

The evaluation of thoughts and feelings of one partner was likely to be influenced by the other partner, as can be expected in dyadic interactions (Kenny, Kashy, & Cook, 2006). We therefore analyzed the data using the actor-partner interdependence model (APIM; Kenny et al., 2006). The APIM controls for the dependency of the dyad members as it allows for correlated dependent variables within the dyads. The situation-level approach (concerning empathic accuracy for feelings) additionally required taking within-person interdependencies into consideration, which we will describe later with the results of these analyses. The dyad members were treated as being indistinguishable because no meaningful characteristic such as gender or social roles could be used to order the two persons in the dyad (Kenny et al., 2006). In our sample, all participants were female, all of them were empathizers as well as partners, and only in half of the sample did partners differ by age group (for a similar analytical approach, see West, Dovidio, & Pearson, 2014). All analyses were carried out using the MIXED procedure of the SAS/ STAT ® software, Version 9.2 of the SAS System for Windows (SAS Institute, 2011). We followed the recommendations by Kenny et al. (2006) and estimated all models using restricted maximum likelihood (REML) and the Satterthwaite approximation of degrees of freedom.

Results

We hypothesized that older women would be less empathically accurate than younger women in inferring their interaction partners' thoughts (Hypothesis 1) and feelings

(Hypothesis 2). We first report results for the person-level analyses of empathic accuracy for thoughts and for feelings, followed by an additional situation-level analysis of empathic accuracy for feelings.

Age differences in empathic accuracy for thoughts

We used the actor-partner interdependence model (APIM), implemented in a multilevel model with dyads members as repeated measurements within the dyads. We predicted the person-level empathic accuracy score of the empathizer for thoughts by the age group of the empathizer. Age group of the empathizer was coded as -1 for younger adults and 1 for older adults. We differentiated between thoughts accompanied by above-average positive or negative affect, respectively.

Consistent with our hypothesis, the age group of the empathizer was a significant predictor of empathic accuracy for thoughts accompanying negative affect (estimate = -0.033, $SE = 0.015$, $p = .023$, intercept = 0.180, $SE = 0.017$, $p < .001$). Relative to the average score of younger women, older women's scores were therefore about one third lower. There were no age differences for the inference of thoughts accompanying positive affect (estimate = -0.011, $SE = 0.015$, $p = .445$; intercept = 0.246, $SE = 0.016$, $p < .001$). In other words, younger women outperformed older women in empathic accuracy only for thoughts accompanying above-average negative, but not positive affect (see Figure 1).

To test whether the partner's age-group membership or the age composition of the dyad was also related to empathic accuracy, we further controlled for the age group of the partner and the interaction between both partners' age groups (age group of partner was coded as -1 for younger and 1 for older women). When controlling for the partner's age-group membership as well as the interaction between the empathizer's and the partner's age groups, the effect of the empathizer's age stayed robust for thoughts accompanying negative affect

(estimate = −0.031, *SE* = 0.015, *p* = .041) and remained non-significant for thoughts accompanying positive affect (estimate = −0.007, *SE* = 0.015, *p* = .649). For both types of thoughts, there was no significant effect of partner's age group (positive: estimate = 0.028, *SE* = 0.015, *p* = .066; negative: estimate = 0.010, *SE* = 0.015, *p* = .505) or of the interaction between empathizer's age group and partner's age group (positive: estimate = 0.010, *SE* = 0.016, *p* = .526; negative: estimate = −0.008, *SE* = 0.017, *p* = .642). In other words, only the age-group membership of the empathizer predicted empathic accuracy for thoughts, but neither the age-group membership of the partner nor the age composition of the dyad.
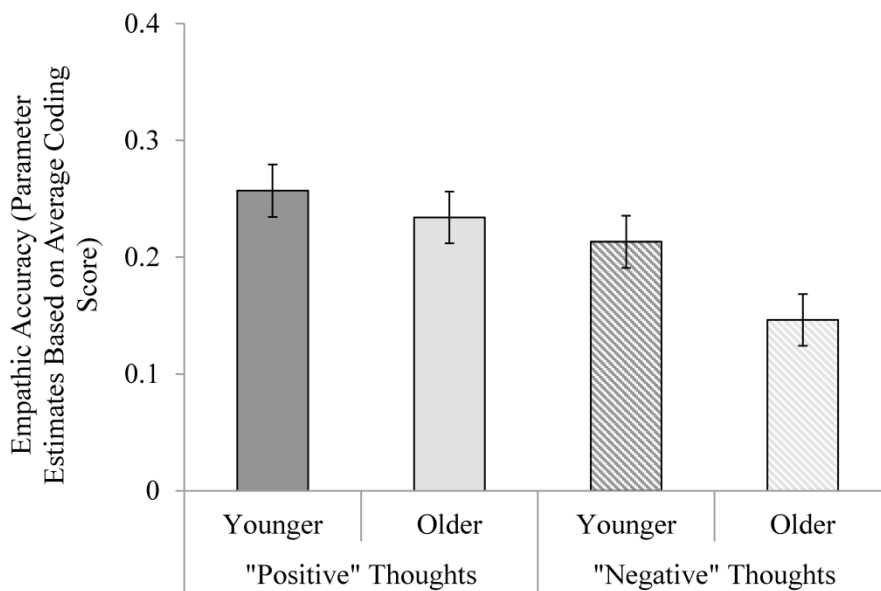

Figure 1. Empathic accuracy (model results) for partner's thoughts, subdivided according to valence. "Positive" and "negative" thoughts represent thoughts that the partner had while feeling more positive/negative than her personal average. Error bars represent ±2 *SE*. To obtain standard errors per age group, we ran complementary models with reversed dummy codes (1/0).

Age differences in empathic accuracy for feelings (person-level approach)

We again used the APIM to predict the empathizer's person-level empathic accuracy score for feelings with the age group of the empathizer. Again, age group of the empathizer was coded as *-1* for younger adults and *1* for older adults. We differentiated between positive and negative affect. Age group of the empathizer was a significant predictor of empathic accuracy for negative feelings (estimate = −0.087, SE = 0.040, p = .033; intercept = 0.775, SE = 0.042, p < .001). Relative to the average score of younger women, older women's scores were therefore about one fifth lower. There were no age differences in the ability to identify the partner's positive feelings (estimate = −0.041, SE = 0.038, p = .285; intercept = 0.859, SE = 0.047, p < .001). Corresponding to the results for empathic accuracy for thoughts, this indicates that younger women outperformed their older counterparts only in the inference of negative feelings, not positive ones. Figure 2 shows empathic accuracy scores for positive and negative feelings separately for younger and older participants.

When we again controlled for the age group of the partner and the interaction between both partners' age groups, the effect of the empathizer's age stayed robust for negative feelings (estimate = −0.088, SE = 0.040, p = .031) and remained non-significant for positive feelings (estimate = −0.036, SE = 0.041, p = .380). For both positive and negative feelings, there was no significant effect of partner's age group (positive: estimate = 0.015, SE = 0.041, p = .716; negative: estimate = −0.031, SE = 0.040, p =.446) or the interaction between the empathizer's age group and the partner's age group (positive: = −0.025, SE = 0.047, p = .597; negative: estimate = −0.066, SE =0.042, p =.118). This indicates that, again, only the age group membership of the empathizer predicted empathic accuracy for feelings, but not the age-group membership of the partner or the age composition of the dyad.
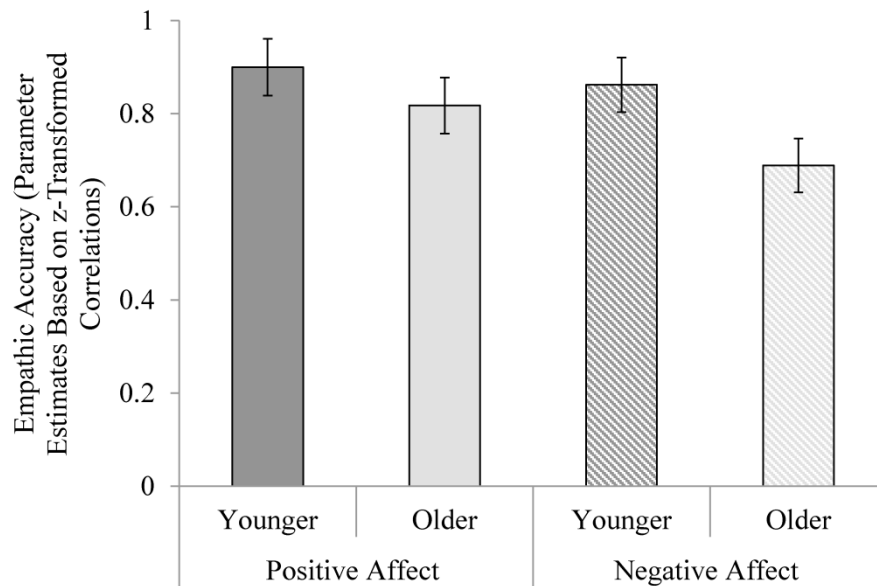
Figure 2. Empathic accuracy (model results) for partner's feelings, subdivided according to valence. Error bars represent ±2 *SE*. To obtain standard errors per age group, we ran complementary models with reversed dummy codes (1/0).

Age differences in empathic accuracy for feelings (situation-level approach)

In this analysis, we used a modified APIM, this time treating the eight tape stops as repeated measures nested within the dyads. We accounted for interdependencies arising from the repeated measurements over the eight tape stops and the dyadic interdependencies among the partners' ratings at a given tape stop by implementing a correlated residual structure using the Kronecker product structure[4] (Bolger & Shrout, 2007; Kenny et al., 2006). Which partner started the conversation was used as a random grouping factor, dividing the dyads into two equally sized groups (Olsen & Kenny, 2006). To assess age differences in empathic accuracy for feelings on a situation-level, we used the truth and bias model from West and Kenny (2011). In this model, the judgment of the empathizer is predicted by the partner's self-report

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[4] TYPE = UN@AR(1) in SAS

(the "truth") at each of the eight tape stops, while controlling for the self-report of the empathizer (the "bias"), because assumed similarity between own affect and partner's affect might affect accuracy (Kenny & Acitelli, 2001). Following West and Kenny (2011), we centered the empathizer's and the partner's self-reports (predictors) and the empathizer's judgment (dependent variable) at the personal mean of the partner's self-rating (subtracting the personal mean of the partner's self-ratings from each individual rating). We further entered age group of the empathizer as a main effect (coded −1 for younger and 1 for older adults) and—to test our hypothesis—the interaction between the self-report of the partner ("truth") and the age group of the empathizer. Again, we performed separate analyses for positive and negative affect. Parameter estimates of these models testing age differences in empathic accuracy for positive and negative affect on the situation level are shown in Table 1.

The situation-level analysis revealed that feelings of the empathizer were a significant predictor for the empathizer's judgment of the partner's feelings, indicating that participants' own emotional experiences contributed to their judgments: When they, for example, rated themselves as one unit more positively (positive affect ranging from 0–6), they rated their partner as 0.394 units more positively at the same time (all other predictors being equal). Above and beyond this assumed similarity, the partner's self-rated feelings predicted the empathizer's judgment, indicating that empathic accuracy of the empathizers was significantly different from zero. In other words, when the partner, for example, rated herself as one unit more positively, the empathizer rated her 0.315 units more positively as well, indicating that the partner's feelings were systematically related to the empathizer's judgment. The two-way interaction between the partner's self-rated feelings and the empathizer's age group was significant for negative affect, but not for positive affect. In line with the person-level analysis, the estimates indicate higher empathic accuracy of younger than of older women for negative,

but not for positive feelings. The intercept for the judgment of negative affect was significantly lower than zero. This indicates that, overall, participants underestimated their partners' negative affect (see West & Kenny, 2011, p. 364, for details). The intercept for the judgment of positive affect did not significantly differ from zero, indicating that participants did not systematically over- or underestimate their partners' positive affect.

Table 1

Actor-Partner Interdependence Model (Multilevel Modeling) Predicting Empathizer's Judgment of Partner's Positive and Negative Affect (N = 1663 observations)

Predictors	Positive affect		Negative affect	
	estimate	*SE*	*estimate*	*SE*
Constant	0.010	0.053	−0.193**	0.057
Empathizer's affect	0.394**	0.020	0.222**	0.021
Partner's affect	0.315**	0.021	0.354**	0.022
Empathizer's age group	0.057	0.054	−0.044	0.058
Partner's Affect x Empathizer's Age Group	−0.021	0.019	−0.066**	0.022

Note. We report all effects as unstandardized regression coefficients. The estimate for "Partner's Affect" reflects empathic accuracy. The estimate for "Partner's Affect x Empathizer's Age Group" reflects age differences in empathic accuracy.
*$p < .05$, **$p < .01$.

There was no main effect of the empathizer's age group on the judgment. This means that there was no evidence for differences between younger and older empathizers' judgments of their partners' positive or negative affect; neither of the age groups provided higher or lower judgments than the other group.

We then additionally controlled for partners' age-group membership (two-way interaction between the partner's self-rated affect and her age group) and age-group

composition of the dyad (three-way interaction between partner's self-rated affect, empathizer's age group, and partner's age group) as well as all lower level effects. The two-way interaction between partner's self-rated affect and empathizer's age group stayed significant for negative feelings (estimate = −0.063, *SE* = 0.022, *p* = .005) and remained non-significant for positive feelings (estimate = −0.017, *SE* = 0.020, *p* = .395). The two-way interaction between partner's self-rated affect and partner's age was not significant (positive: −0.007, *SE* = 0.020, *p* = .721; negative: −0.016, *SE* = 0.022, *p* = .484), nor was the three-way interaction between partner's self-rated affect, empathizer's age, and partner's age significant (positive: −0.014, *SE* = 0.020, *p* = .495; negative: −0.024, *SE* = 0.022, *p* = .287). This again indicates that neither the partner's age group nor the age-group composition of the dyad influenced empathizer's empathic accuracy.

Discussion

The aim of the current study was to extend empirical evidence on adult age differences in the abilities to read others' thoughts and feelings. Previous research on emotion recognition and Theory of Mind (ToM) points to a decrease of these abilities with age (Henry et al., 2013; Ruffman et al., 2008), but researchers have recently criticized the methods widely used to measure those skills as lacking in age-fairness and ecological validity (e.g., Isaacowitz & Stanley, 2011). To investigate age differences in empathic accuracy, we therefore used a dyadic interaction paradigm that captures the ability to accurately judge naturally occurring thoughts and feelings. We expected older women in our sample to perform worse than younger women in empathic accuracy for thoughts (Hypothesis 1) and for feelings (Hypothesis 2). We also explored the role of emotional valence in empathic accuracy.

Consistent with our hypotheses, we found younger women to be more accurate than their older counterparts in describing their partners' thoughts when these thoughts were accompanied by high levels of negative affect ("negative thoughts"). Younger women were also more accurate in inferring their partners' negative feelings. These findings are in line with the reviewed empirical findings on age differences in empathic accuracy as well as related constructs, such as emotion recognition and ToM. To assess empathic accuracy for feelings, we replicated and extended our results in a second analytic approach at the level of each tape stop, additionally controlling for the self-reported feelings of the empathizer as a potential bias. Above and beyond any assumed similarity between the partners, younger women were still more accurate than older women in judging their partners' negative feelings. Age group of the partner and the age-group composition of the dyads were not related to empathic accuracy for negative thoughts or feelings, emphasizing the pivotal role of the empathizer's age. In sum, these results provide further evidence that age differences in the abilities to infer negative thoughts and feelings can be observed in paradigms with enhanced age-fairness and ecological validity. Age differences in negative affect (NA) occurred reliably with different analytic approaches (i.e., a coding procedure as well as a correlational approach) and levels of analysis (i.e., person-level as well as situation-level).

We did not find age differences in empathic accuracy for the partner's positive feelings or thoughts that where accompanied by high levels of positive affect ("positive thoughts"). These results for positive affect (PA) fit in with results from a study by Richter et al. (2011), who also did not find age differences in empathic accuracy for feelings when a context-rich video task that featured a positive event was used. The authors assumed that older adults were more motivated to process positive than negative material. This explanation alludes to the "positivity effect", which denotes a motivational shift towards increasingly preferring positive

over negative information with increasing adult age (e.g., Carstensen & Mikels, 2005). This effect has been observed in attention, memory, and decision-making tasks (Scheibe & Carstensen, 2010). Although the positivity effect does not fully explain age differences in emotion-recognition tasks (Ruffman, 2011), it might still influence older adults' performance in these tasks, maybe even more so in paradigms that demand personal motivational involvement like our empathic accuracy task. We therefore consider it possible that older adults paid closer attention to their interaction partner's positive as opposed to their partner's negative affect, which may have resulted in higher empathic accuracy for positive feelings and for thoughts that were accompanied by above-average positive affect than for negative feelings and thoughts.

Concerning the valence of the thoughts, it is important to note that the valence was assigned on the basis of the accompanying emotions (rather than on the content of the thought)—it is therefore possible that in some cases, the content of the thoughts themselves was not particularly negative (e.g., when a person felt tense while disclosing a positive memory to the unfamiliar interaction partner). This may suggest that older women's interest in the accurate judgment of the conversation partner's thoughts decreased when they sensed that her mood was negative. Additionally, it is possible that already the instruction to the interaction partner to talk about something negative may have potentially triggered older empathizers to be less attentive compared to when the interaction partner was instructed to talk about a positive event. It is further important to note that the situation-level analysis for empathic accuracy for feelings did not reveal age-differential patterns of systematic over- or underestimation of positive or negative affect, meaning that older adults did not simply attribute more positive or less negative affect to their partners than younger adults did. Both younger and older women underestimated the partner's negative affect.

From the age differences in empathic accuracy for feelings one can only deduce that older women were, on average, less accurate than younger women at inferring the affective intensity of the partner's negative feelings. This difference, however, was unsystematic, that is, there was no difference between younger and older participants in their bias toward underestimating their partner's negative affect. It remains an open question whether older adults were more likely than younger adults to mistake certain negative emotions for other negative emotions. We also do not know how exactly older adults were inaccurate concerning empathic accuracy for negative thoughts. As empathic accuracy for thoughts was assessed with an open-answer format, there were more ways to be inaccurate for thoughts than there were for feelings (which were assessed with rating scales). Empathic accuracy for thoughts may therefore have been the more difficult task. Although in line with Richter et al. (2011), our findings differ from the age-related decrease in the inference of positive as well as negative emotions that has usually been observed in emotion-recognition tasks. Although age differences in emotion recognition of positively valenced stimuli are usually smaller than those observed for negatively valenced stimuli, Ruffman (2011) considered this a methodological artifact: Emotion-recognition tasks typically feature only one or two positive emotions, but many negative ones, which might make the positive emotions easier to distinguish in a multiple choice answering format. As our participants did not judge distinct emotional expressions, this possible artifact does not explain our findings.

Participants in the present study interacted with an unfamiliar person. Being confronted with an unfamiliar and therefore rather unpredictable person might have motivated them to monitor their interaction partner more carefully to understand and get to know her. In this context, it also seems possible that older adults' preference for positive emotions might become particularly salient: Whereas older adults might be motivated to perceive negative

feelings and the accompanying thoughts of close social partners (e.g., to provide support), they might not feel the same way about the negative feelings and accompanying thoughts of an unfamiliar person. In our study, older participants might have been (consciously or unconsciously) motivated to enhance the pleasantness of the short interaction, thus being more attentive towards detecting positive as opposed to negative thoughts and feelings. Our pattern of results is consistent with predictions of the positivity effect because age differences only emerged in the inference of negative thoughts and feelings, not positive ones. We did not, however, measure the motivation to attend to positive or negative feelings and their accompanying thoughts directly in the sense of a positivity effect. We therefore cannot rule out alternative or complementary explanations for our findings. It is, for example, possible that age-related neurophysiological changes caused the decline in empathic accuracy for negative material (Ruffman, 2011; Ruffman et al., 2008), as an age-related loss of gray matter in the medial prefrontal cortex has been shown to be associated with a decline in the recognition of fear (Williams et al., 2006).

Limitations and outlook

We followed the call for more ecologically valid and age-fair empirical research on age differences in the abilities to read others' thoughts and feelings and investigated empathic accuracy in dyadic interactions between younger and older women. Although we tried to maximize ecological validity, our paradigm differed from a realistic conversation in many important aspects (e.g., provision of a general topic, time limit, and camera recording). Another limitation of our design is our all-female sample; thus we cannot rule out that there might have been gender differences in our interaction task. Furthermore, our results pertain only to the interaction between unfamiliar persons. Familiarity of social partners has been shown to raise levels of empathic accuracy (Stinson & Ickes, 1992) and researchers have been

debating that age differences in the inference of thoughts and feelings might be attenuated or even disappear when judging a familiar partner (Henry et al., 2013; Isaacowitz & Stanley, 2011). At least for empathic accuracy for feelings, Rauers et al. (2013) have shown that in the presence of their romantic partners, older adults judged their partners' feelings in daily life less accurately than younger adults did. This emphasizes the existence of age differences in empathic accuracy even in close social relationships. As pointed out earlier in the discussion, these age differences in various social relationships might be differentially motivated. Another important limitation of the study is the cross-sectional design, as age-group differences do not necessarily correspond to intra-individual change with age. Furthermore, we chose to investigate two age groups only (20–31 years and 69–80 years). Future research is needed to compare performances in empathic accuracy over the lifespan. As it was not the aim of our study to determine the reasons for an age-related decline in empathic accuracy, the question of why age differences in empathic accuracy occur when they do occur is still an open research question.

Furthermore, it is still open for investigation to what extent this relative inaccuracy of older adults is adaptive or maladaptive. Although most people usually want to know what others' think and feel, there are situations in which accuracy does not help, or even damages social relationships (e.g., Ickes & Simpson, 2007; Myers & Hodges, 2009), especially concerning negative emotional content (e.g., Elfenbein & Ambady, 2002). In terms of the stranger on the subway that we introduced in the beginning, it might not be helpful or might even be distressing to accurately understand negative thoughts and feelings of an unfamiliar person on the train. On the other hand, there are situations in which older adults' inaccuracy, especially for negative thoughts and feelings, seems to be maladaptive, for example when trying to detect deceit (e.g., Ruffman, Murray, Halberstadt, & Vater, 2012; Stanley &

Blanchard-Fields, 2008). A pivotal question is therefore how these age differences in the judgment of negative thoughts and feelings relate to older adults' socio-emotional adjustment in daily life.

Conclusion

In our interactive paradigm, younger women outperformed older women only in empathic accuracy for negative, but not for positive, feelings and accompanying thoughts. These findings are consistent with a motivational perspective on age differences in empathic accuracy as they point to the positivity effect, although we cannot rule out alternative explanations for this differential effect. The current study is in line with recent studies showing that adult age differences in empathic accuracy might not be as consistent as past research on emotion recognition and ToM has suggested. It underscores that age differences in empathic skills are not universal, but qualified by situational factors, such as emotional valence.

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Chapter 3: Does Being Empathic Pay Off?—Social Implications of Empathic Accuracy in Younger and Older Women

This chapter is based on the following original article:

Blanke, E. S., Rauers, A., & Riediger, M. *(in revision).* Does being empathic pay off?—Social implications of empathic accuracy in younger and older women. *Emotion.*

Abstract

Being able to correctly infer other people's thoughts and feelings is associated with positive social outcomes in adolescents and younger adults. Evidence further suggests that such cognitive empathic skills decline across adulthood; hence, one would expect older, compared to younger, adults to face more social problems. This, however, is not the case. Older adults' social adjustment usually equals or even exceeds younger adults'. We hypothesized that this apparent paradox may be due to empathic accuracy being less consequential for older adults' social adjustment. This hypothesis was investigated in a sample including 102 younger (20–31 years) and 106 older (69–80 years) women. The ability to infer others' thoughts and feelings (empathic accuracy) was assessed using an interaction task, in which pairs of participants discussed personal events. Immediately thereafter, participants reported their satisfaction with this interaction. In a second session, they also reported their overall satisfaction with the social relationships in their daily lives. These two measures served as indicators of social adjustment. Older women were only less accurate when inferring their partners' negative affect (not positive) and reported higher social adjustment than their younger counterparts. The association between empathic accuracy and social adjustment differed according to affect valence: Only empathic accuracy for positive (but not for negative) information predicted higher social adjustment. Contrary to our hypothesis, however, there was no evidence for age differences in this association. Implications for understanding the apparent paradox of high social adjustment despite lower empathic accuracy in older adults are discussed.

Keywords: age differences, dyadic interaction, empathic accuracy, social relationships

Does Being Empathic Pay Off?—Social Implications of Empathic Accuracy

in Younger and Older Women

"If you can learn a simple trick, Scout, you'll get along a lot better with all kinds of folks. You never really understand a person until you consider things from his point of view […] – until you climb into his skin and walk around in it."

Harper Lee, To Kill a Mockingbird (p. 39)

Most researchers agree that empathy—being able to "walk around in another person's skin," as Atticus Finch put it in his advice to his daughter Scout in Harper Lee's novel— involves at least two components: the cognitive capacity to infer the thoughts and the feelings of another person (cognitive empathy), and the emotional reaction that this inference elicits (emotional/ affective empathy; e.g., Richter & Kunzmann, 2011). The current study focused on the former, cognitive empathic skills, specifically *empathic accuracy,* which is defined as the ability to correctly infer others' affective and mental states (Ickes, 1997). In line with Atticus' advice, high levels of empathic accuracy and other skills related to empathy have indeed been associated with various positive outcomes, especially in the social domain, such as higher relationship satisfaction in adolescents, and in younger and middle-aged adults (Cohen, Schulz, Weiss, & Waldinger, 2012; Haugen, Welsh, & McNulty, 2008).

To date, however, little is known about the association between empathic accuracy and such social adjustment outcomes in older adults. Whereas affective empathy seems to stay stable or even increase with age (e.g., Richter & Kunzmann, 2011; Sze, Gyurak, Goodkind, & Levenson, 2012), empirical research suggests that empathic accuracy and related *cognitive* empathic skills may decline with age (Henry, Phillips, Ruffman, & Bailey, 2013; Richter & Kunzmann, 2011; Ruffman, Henry, Livingstone, & Phillips, 2008). Based on the available

evidence, one would expect that this decline should lead to social adjustment problems for older adults. This, however, does not seem to be the case, as older adults usually report preserved social adjustment despite lower cognitive empathic abilities (Isaacowitz & Stanley, 2011). The current study specifically focused on this apparent "inaccuracy paradox" in older adults. In the following, we review empirical evidence on associations between individuals' abilities to read others' thoughts and feelings on the one hand, and their adjustment on the other. We then outline the inaccuracy paradox—of older adults maintaining high social adjustment despite declining cognitive empathic skills—and formulate a hypothesis for its resolution.

Empathic accuracy and adjustment in younger age

Consistent with common lay beliefs about empathy, empirical evidence demonstrates that empathic accuracy (as a cognitive facet of empathy) is associated with various positive social outcomes, which cover three components of *adjustment* that are according to Kwan, John, Kenny, Bond, and Robins (2004) commonly mentioned in the literature: (1) *intrapsychic aspects* (e.g., depression in women, Gadassi, Mor, & Rafaeli, 2011), (2) *interpersonal aspects* (e.g., romantic relationship satisfaction, Cohen et al. 2012; or social-support provision, Verhofstadt, Buysse, Ickes, Davis, & Devoldre, 2008), and (3) achievement aspects (e.g., psychotherapists' treatment success; Kwon & Jo, 2012). Most studies that investigate associations between empathy and related skills and adjustment, however, focus on *interpersonal* or *social adjustment*, probably because empathic skills are thought to enhance social insight into others and therefore facilitate positive social relationships. For example, the more accurately an empathizer understands a social partner's thoughts and feelings, the better he or she can react to the partner's needs by providing more effective support (Verhofstadt et al., 2008). Often it is assumed—and has in some cases also been shown empirically—that both

partners in a social relationship can profit from one partner's empathic accuracy (e.g., Cohen et al., 2012). Satisfaction with social relationships may, in turn, also influence intrapsychic adjustment (e.g., general satisfaction with life). In line with these findings, other studies have shown low levels of empathic accuracy in populations that are characterized by social adjustment problems, for example, in abusive men (Schweinle, Ickes, & Bernstein, 2002) or in patients with such psychiatric illnesses as schizotypal personality disorder (Ripoll et al., 2013). There are, however, also occasions in which high levels of empathic accuracy can have negative social consequences: In dating partners, for example, high empathic accuracy for the partner during potentially "relationship-threatening" situations (i.e., when the partner was evaluating a physically attractive potential interaction partner) predicted lower relationship stability (Simpson, Ickes, & Blackstone, 1995). Similarly, the more people were able to pick up on negative feelings (i.e., to recognize nonverbal cues from less controllable channels, such as the body or the voice) the less positively they were evaluated by their co-workers, whereas high accuracy for positive emotions was associated with more positive evaluations (Elfenbein & Ambady, 2002). Such instances of negative social consequences of high levels of empathic accuracy, however, appear to be restricted to particular situations and thus to be the exception rather than the rule. Most empirical evidence demonstrates a beneficial effect of empathic accuracy in social relationships (Ickes & Simpson, 2007).

In the following study, we therefore focused on associations between empathic accuracy and social adjustment. Specifically, we were interested in such associations in older age because there is little research on this topic to date as we discuss in the next section.

The "inaccuracy paradox" in older age: Social adjustment despite low empathic accuracy?

Older adults sometimes describe themselves as less empathic than younger adults in self-reports (e.g., Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008), but some researchers have doubted that people are able to correctly evaluate their own empathic skills. However, previous research on age differences in the ability to read emotions from facial, vocal, and bodily expressions (*emotion recognition*) has also pointed to an age-related decline (meta-analysis by Ruffman et al., 2008). A corresponding age-related decline has been documented for the ability to infer other people's mental states (*Theory of Mind [ToM]*; meta-analysis by Henry et al., 2013).

Both the assessment of emotion recognition and of TOM have been criticized for their lack of ecological validity (e.g., Dziobek, 2012; Isaacowitz & Stanley, 2011; Rauers, Blanke, & Riediger, 2013). In these assessments, non-realistic stimulus material is oftentimes used, such as still photographs of posed emotional expressions, drawings, or cartoons, usually presented without any context information. Furthermore, such measures are typically restricted to assessing specific components of empathic inferences (e.g., to identifying emotions or mental states in facial expressions), which rarely operate in isolation in real-life contexts. In contrast, empathic accuracy is a rather complex construct, which requires an empathizer to integrate information from diverse sources (e.g., facial and bodily expressions, prosody, communication content, situational context, etc.). The measurement is usually based on realistic videos containing genuine emotion expressions, or even based on real social interactions. It has therefore been speculated whether age differences that were observed mainly by utilizing rather artificial measurements also exist in such more realistic empathic-accuracy tasks.

Age differences in empathic accuracy have rarely been investigated. Initial empirical evidence suggests that age differences in empathic accuracy for feelings might be moderated by contextual factors (e.g., Rauers et al., 2013; Richter & Kunzmann, 2011). One of such moderating factors involves the valence of the inferred feelings: Older, as compared to younger, adults displayed more difficulty in the inference of negative feelings and thoughts that are accompanied by such feelings than in the inference of positive affective content (Blanke, Rauers, & Riediger, 2014; Richter, Dietzel, & Kunzmann, 2011). Occasionally, older adults have also been shown to outperform younger adults in such more realistic tasks (Sze, Goodkind, Gyurak, & Levenson, 2012). In most studies, however, even in those that used more realistic approaches, older adults perform worse than younger adults on at least some facets of the tasks (e.g., when a topic is of little relevance to them, or when the overall affective tone is negative). Neither the reasons for this presumable decline are yet understood, nor its potential consequences. If one assumes that empathic accuracy and adjustment are associated in older adults like they typically are in younger adults, older adults' typically lower levels of cognitive empathic skills should lead to lower levels of adjustment. In contrast, older adults report levels of social adjustment (e.g., satisfaction with social relationships) that are as high or even exceed those reported by younger adults (Luong, Charles, & Fingerman, 2011). These findings may be considered contradictory, which is why we refer to them as the "inaccuracy paradox."

For older adults, however, there is little empirical evidence to date on associations between cognitive empathic skills and adjustment. Existing studies have seldom investigated empathic accuracy, but focused instead on related concepts such as emotion recognition. The ecological validity of the findings obtained from these few studies might therefore be limited. One of these rare studies investigated the relationship between emotion recognition and

verbosity (extended speech that is lacking in focus or coherence; Ruffman, Murray, Halberstadt, & Taumoepeau, 2010). In this study, older men's (but not women's) verbosity towards a confederate was associated with poor emotion-recognition skills. As verbosity of a conversation partner has been linked to lower conversation satisfaction in the other partner (Pushkar et al., 2000), verbosity may be seen as a proxy for social adjustment. The other partner in this study was, however, a confederate. It therefore remains an open question how a real interaction partner may have perceived the situation. Other studies investigated the relationship between self-reported empathic skills and social outcomes in younger and older adults. In a study by Bailey, Henry, and Von Hippel (2008), for example, older adults reported lower cognitive empathy, reported fewer social activities, and also scored lower than younger adults in a performance measure of their ability to infer mental states. Whereas self-reported cognitive empathy contributed to the link between age and reduced social activity (a proxy for interpersonal adjustment), this pattern was not found for a performance measure on the ability to infer mental states.

In essence, the lack of consistent empirical evidence for associations between cognitive empathic skills and adjustment leaves the inaccuracy paradox unanswered. Important to note is that the measures differed between the studies (i.e., the studies did neither use the same measures for empathic skills nor for social adjustment). In the next section, we turn to a possible resolution of the paradox: We discuss the possibility that the associations between cognitive empathic skills (particularly empathic accuracy) and social adjustment might be attenuated in older adults.

Towards a resolution of the paradox: Is empathic accuracy less relevant for older adults' social lives?

Why is it the case that older adults appear to be socially well adjusted, although their cognitive empathic skills decline? In their review, Luong et al. (2011) suggested that social relationships might get better with age because of within-person changes and changes within the environment. These reasons might also account for the inaccuracy paradox. Possible within-person factors could be that older adults tend to focus more strongly on close and rewarding relationships (e.g., family members and close friends) than younger adults do and may actively discard non-rewarding social relationships (Carstensen, 1992). This might attenuate the importance of empathic accuracy for older adults' social lives: Flury and Ickes (2001, 2006) suggested that high levels of empathic accuracy may be especially important for positive relationship outcomes in the formative stages of relationships, when the partner's behavior is still relatively unpredictable and therefore more challenging to accommodate to. This suggestion was based on studies that found a decline of empathic accuracy in long and close relationships (e.g., Thomas, Fletcher, & Lange, 1997).

In a longitudinal study with couples, Kilpatrick, Bissonnette, and Rusbult (2002) not only found a decline in the level of empathic accuracy following the first year of marriage, but also a decline in the association between empathic accuracy and accommodative behavior (i.e., behaving conciliatory rather than retaliatory in a conflict situation) as well as between empathic accuracy and couple well-being. In contrast, relationship-specific motives (such as commitment) and behavioral habits (such as accommodative behavior) continued to predict couple well-being also in long-term relationships. The authors speculated that empathic accuracy may be necessary for positive relationship functioning at the beginning of a partnership. Over time, relationship-specific motives and habits may take over this role. Flury and

Ickes (2001, 2006) pointed out that an attenuated association between empathic accuracy and relationship satisfaction might depend more on closeness than on relationship length per se. In everyday interactions between close social partners, moderate levels of empathic accuracy might suffice to activate learned behavioral strategies and to maintain harmonic relationships (e.g., being able to clarify misunderstandings; Ickes & Simpson, 2007). Age-related changes in social networks imply that older adults preferably interact with close social partners with whom they have already developed relationship-specific interaction patterns. The importance of empathic accuracy for high relationship satisfaction might therefore be less than for younger individuals who more frequently also interact with less familiar or emotionally close social partners.

In addition to these factors within the individual, additional factors pertaining to older adults' environment may contribute to understanding the inaccuracy paradox. For example, both younger and older adults seem to treat older adults more favorably and forgivingly than they do younger adults (e.g., Miller, Charles, & Fingerman, 2009). This implies that older adults may not necessarily receive negative feedback, even when their lower levels of cognitive empathic skills indeed lead them to act less appropriately in social interactions (e.g., verbose; Ruffman et al., 2010). Older adults might therefore not realize their "empathic mistakes" and, in addition, social partners might be more willing to forgive them. This way, both older adults and their social partners could maintain high levels of satisfaction with their relationships, despite older adults' declining empathic skills.

In sum, the research reviewed suggests that, even if empathic skills might indeed decline with age, this does not necessarily threaten older adults' harmonic relationships within their networks of close social partners. And even if older adults make "empathic mistakes," their social partners might treat them forgivingly, so that both—older adults and their social

partners—maintain high levels of relationship satisfaction. In contrast, younger adults might need comparatively higher levels of empathic accuracy to navigate their more diverse social networks. Younger adults might also be treated with less forgiveness when they are inaccurate, so that their inaccuracies indeed harm their own as well as their social partners' relationship satisfaction. From this review of the literature, we hypothesized that empathic accuracy should be less predictive of social adjustment in older than in younger adults. In the following, we describe our research design and the hypotheses in more detail.

The current study: Hypotheses

In the current study, we addressed a research gap by investigating the association between empathic accuracy and adjustment in younger and older adults. Specifically, we focused on social adjustment. Whereas most age-comparative studies limited empathic accuracy to the inference of feelings, we assessed empathic accuracy for thoughts and for feelings. This was recommended by Ickes (2011), who pointed out that empathic accuracy for thoughts and for feelings may sometimes diverge. We suspected that in a task with high ecological validity, participants would be motivated to display high levels of empathic accuracy (e.g., Isaacowitz & Stanley, 2011). We therefore developed a dyadic interaction task that approximated a realistic situation. The interaction task was designed to meet two ends: first, to assess empathic accuracy in a relatively natural but still standardized situation, and second, to investigate whether differences in empathic accuracy were related to differences in social adjustment. Participants were asked to engage in a conversation with another participant. We ensured that both partners in this interaction task had not known each other before the laboratory session. This recruitment criterion was imposed to rule out the possibility that relationship closeness or length might influence the interaction partners' empathic accuracy (Flury & Ickes, 2001, 2006) and potentially obscure associations between empathic

accuracy and social adjustment. We chose communication satisfaction, assessed following the interaction, as an immediate, or proximal, indicator of social adjustment. In addition, participants' satisfaction with their existing real-life social network was measured as a more distal and general indicator of social adjustment. We included the latter measure because the ability to read the emotional expressions of strangers has been related to relationship functioning in real-life relationships (e.g., relationship well-being; Carton, Kessler, & Pape, 1999).

We hypothesized that both partner's empathic accuracy would contribute to both partners' communication satisfaction: More accurate empathizers may, for example, be able to offer their conversation partner consolation in case negative events are being shared, or they may rejoice in the partner's positive event disclosures. The partner may act in a friendlier manner towards the empathizer in return, which may lead to mutual satisfaction with the conversation. We assumed that mutual associations, which have been documented before (e.g., Cohen et al., 2012), derive from such dyadic feedback loops (e.g., Zaki & Ochsner, 2011). In addition, we hypothesized that the association between participants' empathic accuracy and the two indicators of social adjustment would be attenuated for older adults. For communication satisfaction, this hypothesis was based on the assumption that social partners might treat older adults more favorably and forgiving (Miller et al., 2009). For satisfaction with social relationships, we additionally assumed that empathic accuracy might be less important for social adjustment in older adults' social networks than in younger adults'.

In an exploratory approach, we followed up on previous research suggesting that the valence of inferred thoughts and feelings may be important in the association between cognitive empathic skills and social outcomes (e.g., Elfenbein & Ambady, 2002) and analyzed empathic accuracy for positive and negative affect separately.

Method

Participants

Our sample consisted of 208 women from two age groups: $n = 102$ younger adults (age range = 20–31 years, $M = 25.95$, $SD = 3.06$) and $n = 106$ older adults (age range = 69–80 years, $M = 72.94$, $SD = 2.52$). Participants attended two sessions, but one older woman dropped out after the first session. We investigated only women to reduce the complexity of the design, which will be described in the next section. Participants were recruited from the participant pool of the Max Planck Institute for Human Development, Berlin, Germany, as well as via online advertisement. All participants were fluent in German and the sample was approximately equally stratified by education (59% of the younger and 50% of the older adults held a German university entrance qualification).

Procedure

The study consisted of two sessions. In the first session, participants were paired with an interaction partner from either their own (52 dyads: 25 younger, 27 older) or from the other age group (52 dyads), to control for potential influences of the age of the interaction partner on empathic accuracy and social adjustment. As part of the empathic accuracy task, the dyads engaged in a conversation that was videotaped. Participants were informed about the video recording during recruitment and gave their informed consent prior to the first session. After filling out a short questionnaire, the dyads had five minutes to get acquainted with each other in an unstructured conversation and to get used to the camera filming. This was followed by a pre-structured conversation, in which participants talked about positive and negative events in their lives. Participants were told that the aim of this conversation was to get to know each other. Prior to the conversation, participants were given a few minutes to think about one positive and one negative event that they wanted to tell their conversation partner about.

During the conversation, each participant had three minutes to talk about each event (resulting in a total of twelve minutes for the entire conversation). The experimenter left the room for the duration of the recordings. Adherence to the prescribed timing of the conversation was ensured through an audiotaped instruction. Participants took turns in talking and listening, and were informed that they could ask each other questions or make comments if they liked. In the mixed-age group, we ensured that the younger and older women started the conversation equally often. In the age-homogenous groups, we randomly determined who started the conversation. All participants started with their negative events and finished with the positive events, so that the conversation ended on a positive note.[1]

Directly following the conversation participants answered several questions, including a measure of communication satisfaction that we describe in more detail below. After a short break, they worked on the empathic accuracy task. For this task, the experimenter used a time-contingent criterion to define eight time points ("tape stops") in the video-recorded conversation. Each tape stop was set at approximately 1 min and at 2 min within each 3 min segment of the conversation, with a tolerance margin of about 15 s before and after this mark. This procedure was applied to preserve the meaning of participants' sentences. Participants viewed the video and reported their own thoughts and feelings at each of these tape stops. They then watched the video a second time and reported their partner's assumed thoughts and feelings ("judgment") at each of these time points.

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[1] Two age-homogeneous dyads (one young-young and one old-old) did not adhere to the time structure of the conversation. Excluding these two dyads from the analyses did not change our results, and we therefore kept them as a part of the sample. Two other participants from two different dyads (one younger woman from a young-young dyad and one older woman from an old-old dyad) also deviated from the instruction for the conversation in that they were not able or did not want to report a negative event. Instead, they talked about the reasons why there was nothing negative in their lives. Excluding these dyads from the analyses did not change the pattern of results, and we again chose to keep them as a part of the sample. Excluding all of these four dyads (who did not completely adhere to the task) also did not change the pattern of results.

The second session consisted of groups of up to eight persons. Each participant completed a set of instruments on her own. These included a measure of satisfaction with social relationships which we will describe later. Prior to data collection the ethics committee of the Max Planck Institute for Human Development had approved of the study.

Measures

Empathic accuracy. Empathic accuracy was operationalized as the similarity between the interaction partner's self-reported thoughts and feelings and the empathizer's judgment of the interaction partner's thoughts and feelings. It is important to note that both interaction partners provided data both as empathizers (i.e., they inferred their partner's thoughts and feelings) and as partners (i.e., their own thoughts and feelings were inferred by their interaction partner). Information on these respective roles in the statistical models and will be denoted accordingly ("empathizer" and "partner").

Empathic accuracy for feelings. Participants reported their own feelings and judged their partner's feeling at each tape stop (i.e., each time the film was stopped, they judged the feelings they and their partner had had in that moment during the interaction). They rated five items for positive affect (PA: happy, excited, content, comfortable, and balanced) and four items for negative affect (NA: nervous, sad, uncomfortable, and tense) on a 7-point scale ranging from 0 *(not at all)* to 6 *(very much)*. The positive and negative affect items were averaged into personal means at each tape stop for self-reported affect (average PA of personal means for younger women: $M = 3.30$, $SD = 1.00$; for older women: $M = 3.21$, $SD = 0.93$; average NA of personal means for younger women: $M = 1.38$, $SD = 0.99$; for older women: $M = 1.40$, $SD = 0.79$), as well as for the judgment of the partner's affect (average PA of personal means for younger women: $M = 3.29$, $SD = 0.89$; for older women: $M = 3.25$, $SD = 0.95$; average NA of personal means for younger women: $M = 1.15$, $SD = 0.76$; for older women: M

= 1.24, SD = 0.71). The reliability for the self-reported affect measures was good at each tape stop, ranging from α = .86 to α = .92 for positive and α = .70 to α = .82 for negative affect. The reliability for the judgment of partner's positive feelings was also good (ranging from α = .87 to α = .91) and that for the judgment of partner's negative feelings was acceptable (ranging from α = .68 to α = .79).

Empathic accuracy for feelings was then calculated as the Pearson correlation between the judgment of the empathizer and the self-report of the partner over the eight tape stops. As correlations do not follow a normal distribution, we used Fisher's z-transformed scores, yielding a theoretical range of approximately +/- 3 (equal to $r \approx$ +/- 1), with higher positive scores representing higher accuracy (positive feelings, younger women: M = 0.90, SD = 0.57; older women: M = 0.82, SD = 0.60; negative feelings, younger women: M = 0.86, SD = 0.53; older women: M = 0.69, SD = 0.62). Age differences were only evident in empathic accuracy for negative feelings, but not for positive feelings (see Blanke et al., 2014). Four participants (three older women and one younger woman) from three dyads did not display any variation in their judgment of their partner's negative affect ratings and were excluded from the analysis of empathic accuracy for negative feelings. One younger woman had very low scores in empathic accuracy for positive feelings (as compared to the other younger women). Similarly, one younger and one older woman had very low scores in empathic accuracy for negative feelings. These outliers were adjusted to a score equal to three standard deviations below the subsample mean (Field, 2009).[2]

Empathic accuracy for thoughts. Participants reported their own and their partner's thoughts at each tape stop using an open-answer format. Participants were asked to only report the most important thought that they (or their partner) had had at that particular moment in the

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[2] The pattern of results stayed the same when we did not adjust for these outliers.

interaction. The similarity between the partner's self-report and the empathizer's judgment was coded by two trained coders for each of the eight tape stops per person. The coders used a 3-point coding system (Ickes, Stinson, Bissonnette, & Garcia, 1990): Partner's self-report and the empathizer's judgment refer to (a) essentially different content (coded 0); (b) to somewhat similar, but not the same, content (coded 1); and (c) to essentially the same content (coded 2). The first author held extensive meetings regularly with the coders, in which disagreement between the coders was discussed until a consensus was reached. As Category 2 (essentially the same content) was only coded 14 times out of 1648 observations, Categories 1 and 2 were collapsed into one category. We interpreted this category as indicating that the empathizer had correctly inferred the partner's thoughts at that tape stop. The codings prior to reaching consensus were used to obtain the inter-rater reliability ($\kappa = .69$). As the coding was rather complex, this reliability can be considered good (Wirtz & Caspar, 2002).

A proxy for the valence of the thoughts was obtained on the basis of the self-reported feelings: The partner's thoughts that were accompanied by high self-reported positive affect (equal to or higher than her personal average in the task) were regarded as positive. Accordingly, the partner's thoughts that were accompanied by high self-reported negative affect were regarded as negative. On average, according to this categorization about half of the thoughts were positive (older women: $M = 51\%$, $SD = 11$; younger women: $M = 54\%$, $SD = 12$) and slightly fewer thoughts were negative (older women: $M = 41\%$, $SD = 13$; younger women: $M = 42\%$, $SD = 13$).[3]

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[3] There was a partial overlap between thoughts categorized as positive and negative (average within-person occurrence of overlapping episodes for younger women: $M = 7\%$, $SD = 10$; for older women: $M = 7\%$, $SD = 12$). We therefore repeated our analyses while excluding tape stops that had been categorized both as positive and as negative (e.g., tape stops at which the participant experienced mixed affect). This did not change the pattern of results, and we therefore decided to not exclude these stops from our reported analyses.

The final empathic accuracy measure for thoughts was the averaged coding across all tape stops for a given valence. The measure ranged from 0 (no accuracy) to 1 (perfect accuracy). As reported in Blanke et al. (2014), age differences were only evident in empathic accuracy for negative thoughts, but not for positive thoughts (mean accuracy for positive thoughts, younger women: $M = 0.25$, $SD = 0.21$; older women: 0.24, $SD = 0.22$; mean accuracy for negative thoughts, younger women: $M = 0.21$, $SD = 0.22$; older women: 0.15, $SD = 0.21$). The measures were severely positively skewed, and we used an inverse transformation of the variables in the analyses to approach normality (Tabachnick & Fidell, 2007). Three participants (two older women and one younger woman) from two dyads were unwilling or not able to report any thoughts and were excluded from the analyses of empathic accuracy for thoughts.

Social adjustment. We obtained two measures of social adjustment: After the conversation in the first testing session, we assessed communication satisfaction. We consider this to be a proximal indicator of social adjustment because it pertained to the same situation in which we measured empathic accuracy. In a second session, we additionally assessed a more distal, global indicator of social adjustment by asking participants how satisfied they were with their social relationships in everyday life.

Communication satisfaction. Communication satisfaction was assessed using a measure of interpersonal communication satisfaction (Hecht, 1978), as previously used by VanLear (1991). The scale includes eight items (e.g., "I enjoyed our conversation", "We each got to say what we wanted", and "I feel the other person valued what I had to say"), which were assessed on a 7-point scale ranging from 0 (*agree not at all*) to 6 (*agree very much*). The first author translated the scale into German and modified its wording to fit the specific interaction setting of the present study. The German version displayed a good reliability in our

sample (α =.84). Assessment followed directly after the interaction had taken place (together with other measures that are not relevant for the current purposes). On average, participants were very satisfied with the conversation (younger women: M = 4.98, SD = 0.64; older women: M = 5.18, SD = 0.75). Communication satisfaction was substantially negatively skewed, and we used a reflected, logarithmized score for the analyses (Tabachnick & Fidell, 2007). There were age differences in communication satisfaction: As indicated by a multilevel model controlling for dyadic interdependencies, older adults were more satisfied with the conversation (estimate = −0.027, SE = 0.010, p = .009) and this was independent of their interaction partner's age.[4]

Satisfaction with social relationships. To obtain a measure of participants' satisfaction with their existing social relationships, we first asked participants to list all important social partners, using a modified version of the circle diagram by Antonucci (1986). The diagram showed the word "I," surrounded by three concentric, empty circles. In these circles, participants put down the initials of all social partners who were important in their lives (with the proximity of the circles to the "I"-circle representing the closeness to the social partners). Participants strongly varied in the number of persons that they listed, ranging from 3 to 64 people (younger women: M = 19.88, SD = 10.68; older women: M = 17.93, SD = 10.66). The scores were skewed and were logarithmized before we performed a t-test, which resulted in no

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[4] To test age differences in communication satisfaction, the dyadic structure of the conversation needed to be accounted for. We therefore used the actor-partner interdependence model, which was also used for the main analyses and is described in more detail in the *Methods* section. Communication satisfaction was predicted by the empathizer's age group (coded *−1* for younger and *1* for older women). Older women were more satisfied with the conversation than younger women were (estimate = −0.027, SE = 0.010, p = .009; intercept = 0.257, SE = 0.011, p < .001). When additionally testing for influences of the partner's age (coded *−1* for younger and *1* for older women) or the age composition of the dyad, the empathizer's age group remained significant (estimate = −0.028, SE = 0.011, p = .008), whereas the partner's age group (estimate = −0.008, SE = 0.011, p = .436) and age-group composition (estimate = −0.005, SE = 0.011, p = .632) did not predict communication satisfaction.

significant age differences between younger and older women in the mean number of reported persons (t[204] = 1.90, p = .059). Participants rated the social partners they had named on a number of dimensions, including satisfaction with the relationship. The measure ranged from 0 (*not satisfied at all*) to 6 (*very satisfied*). To measure satisfaction with social relationships, we calculated each participant's mean satisfaction across all reported relationships (younger: M = 4.54, SD = 0.65; older: M = 4.75, SD = 0.79). In comparison to the rest of the older subsample, two older women reported extremely low satisfaction with their relationships. These scores were adjusted to a score equal to three standard deviations below the subsample mean of older women (Field, 2009). One older woman did not report her social relationships. Older women rated their social relationships as being significantly more satisfying than younger women did (t[204] = −2.24, p = .026).[5]

Analytic strategies

To investigate the association between empathic accuracy and social adjustment, we used the empathic accuracy scores obtained in the first session to predict a proximal and a distal indicator of social adjustment, that is, communication satisfaction (pertaining to the interaction partner in the laboratory) and satisfaction with social relationships (pertaining to participants real-life social networks) respectively. To analyze the predictive value of empathic accuracy for communication satisfaction, we used the actor-partner interdependence model (APIM; Kenny, Kashy, & Cook, 2006), which allows for correlated dependent variables within the dyads and thereby statistically accounts for the interdependency of the dyad members. The APIM was implemented in a multilevel model, with dyad members modeled as repeated measurements within the dyad. As in Blanke et al. (2014), we treated the dyads as indistinguishable. We used the MIXED procedure of the SAS/ STAT ® software, Version 9.2

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[5] The pattern of results stayed the same when we did not adjust for these outliers.

of the SAS System for Windows (SAS Institute, 2011), and estimated the models using restricted maximum likelihood (REML) and the Satterthwaite approximation of degrees of freedom (Kenny et al., 2006). A pseudo R^2 for each model was also calculated according to Kenny et al. (2006). For the distal indicator of social adjustment, we did not assume any interdependencies between the dyad members: Satisfaction with social relationships in daily life was measured in the second session, and the dyad members had not known each other prior to the study. They were thus not included in each other's social networks. To test the hypothesized effects of the empathizer's empathic accuracy on her own satisfaction with social relationships and the hypothesized moderation by age, we used multiple regression analyses (REG procedure of SAS).

Results

We had expected to find associations between empathic accuracy and social adjustment in both age groups, but had assumed that these associations would be more pronounced in younger than in older women. We next present the results of the analyses testing this hypothesis for the two facets of empathic accuracy, empathic accuracy for thoughts and for feelings. In addition, we differentiate between thoughts accompanied by positive and negative affect above the respective personal averages (also referred to as positive and negative thoughts), and between positive and negative feelings. For each skill facet, we tested associations with two indicators of social adjustment, namely, immediate communication satisfaction and general satisfaction with real-life relationships. In essence, a relatively consistent pattern of results emerged for these two indicators, as we describe next in more detail.

Empathic accuracy and communication satisfaction

In the APIM predicting the partners' communication satisfaction, both partners' (grand-mean centered) empathic accuracy scores served as predictors. Additional predictors

were both partners' age groups (coded −*1* for younger adults and *1* for older adults), the interaction between the empathizer's age group and her empathic accuracy score, as well as the interaction between the partner's age group and her empathic accuracy score.

Empathic accuracy for feelings. For positive feelings, there was a significant effect of the empathizer's empathic accuracy on communication satisfaction, indicating that the empathizers' empathic accuracy for positive feelings was positively associated with their own communication satisfaction (see Table 1). This was not the case for negative feelings. Furthermore, the partner's empathic accuracy was not associated with the empathizer's communication satisfaction, neither for positive feelings nor for negative feelings.

Contrary to our hypothesis concerning the inaccuracy paradox, there was no evidence for an interaction between the empathizer's empathic accuracy and her age group, nor was there an interaction between the partner's empathic accuracy and her age group.[6] These results suggest that associations of empathic accuracy for positive feelings and communication satisfaction were comparable for younger and older women. To determine the predictive value

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[6] In an additional analysis, we ruled out that the association between empathic accuracy and communication satisfaction varied in relation to the age composition of the dyad. The results indicated that neither the empathizer's nor the partner's age group nor the age composition of the dyad influenced the association between empathic accuracy for feelings and communication satisfaction. For this analysis, we incorporated the three-way interaction between the empathizer's empathic accuracy and both the empathizer's and the partner's age group. We further added the three-way interaction between the partner's empathic accuracy and both age groups (as well as all lower-level interactions). The effect of the empathizer's empathic accuracy for positive feelings remained significant (estimate = −0.039, SE = 0.019, p = .039), and the effect of empathizer's empathic accuracy for negative feelings remained non-significant (estimate = −0.025, SE = 0.019, p = .193). The main effect of the empathizer's age group remained significant (positive feelings: estimate = −0.028, SE = 0.010, p = .007; negative feelings: estimate = −0.028, SE = 0.011, p = .012). The three-way interactions were non-significant. This was the case for empathic accuracy for positive feelings (Empathizer's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = −0.015, SE = 0.019, p = .433; Partner's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = 0.030, SE = 0.019, p = .117) as well as for negative feelings (Empathizer's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = −0.004, SE = 0.019, p = .834; Partner's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = 0.011, SE = 0.019, p = .561).

of empathic accuracy for positive feelings for communication satisfaction, we again removed all predictors except for the empathizer's empathic accuracy from the model (estimate = −0.039, $SE = 0.018$, $p = .035$) and calculated the pseudo R^2. Empathic accuracy for positive feelings explained 1.71 % of the variance of communication satisfaction.

Empathic accuracy for thoughts. For empathic accuracy for thoughts, we found the same pattern of results as for feelings: Empathic accuracy predicted the empathizer's own communication satisfaction only when it referred to her partner's positive thoughts, that is, to thoughts that the partner had while experiencing levels of positive affect that were above her own personal average (see Table 2). This means that, in line with our hypothesis, empathic accuracy for positive thoughts was positively associated with the empathizer's own communication satisfaction. In contrast, there was no such effect when the partner's thoughts were accompanied by her above personal-average negative feelings (negative thoughts): For negative thoughts, there was no association of empathic accuracy with the empathizer's own communication satisfaction. Furthermore, the partner's empathic accuracy did not significantly predict the empathizer's communication satisfaction, neither for positive thoughts nor for negative thoughts. In other words, in contrast to our hypothesis, there was no evidence that empathic accuracy was related to the other person's communication satisfaction.

Contrary to our hypothesis towards the resolution of the inaccuracy paradox, there also was no interaction between the empathizer's empathic accuracy and her age group. Likewise, there was no interaction between the partner's empathic accuracy and the partner's age group. In other words, there was no evidence that the association between empathic accuracy and communication satisfaction was more pronounced in younger women than it was in older

women.[7] This suggests that associations of empathic accuracy for positive thoughts and communication satisfaction were comparable for younger and older women. To determine the predictive value of empathic accuracy for positive thoughts for communication satisfaction, we removed all predictors except the empathizer's empathic accuracy from the model (estimate = 0.218, SE = 0.077, p = .005) and calculated the pseudo R^2. Empathic accuracy for positive thoughts explained 3.22% of the variance in communication satisfaction.

Empathic accuracy and satisfaction with social relationships

We predicted the empathizer's satisfaction with her social relationships with the empathizer's grand-mean-centered empathic accuracy score, the empathizer's age group (again coded −1 for younger adults and 1 for older adults), as well as the interaction between the empathizer's empathic accuracy and her age group in a multiple regression.

Empathic accuracy for feelings. In contrast to the results for communication satisfaction, neither empathic accuracy for positive feelings nor empathic accuracy for negative feelings predicted satisfaction with social relationships in either age group (see Table 3). There was no significant interaction between age group and empathic accuracy.

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[7] The same control analysis as for empathic accuracy for feelings was carried out for empathic accuracy for thoughts. These three-way interactions proved to be non-significant for positive thoughts (Empathizer's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = 0.096, SE = 0.078, p = .221; Partner's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = −0.016, SE = 0.078, p = .842). The three-way interactions were also non-significant for negative thoughts (Empathizer's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = 0.007, SE = 0.079, p = .924; Partner's Empathic Accuracy x Empathizer's Age Group x Partner's Age Group: estimate = 0.096, SE = 0.079, p = .22[5]). The effect of the empathizer's empathic accuracy for positive thoughts remained significant (estimate = 0.220, SE = 0.078, p = .005), and the effect of empathizer's empathic accuracy for negative thoughts remained non-significant (estimate = 0.018, SE = 0.079, p = .821). Furthermore, the main effect of the empathizer's age group remained significant (positive thoughts: estimate = −0.027, SE = 0.011, p = .012; negative thoughts: estimate = −0.029, SE = 0.011, p = .009).

Table 1

Empathic Accuracy for Feelings: Actor-Partner Interdependence Model (Multilevel Modeling) Predicting the Empathizer's Communication Satisfaction.

Predictors	Positive feelings				Negative feelings			
	estimate	*95% CI: LL*	*95% CI: UL*	*SE*	*estimate*	*95% CI: LL*	*95% CI: UL*	*SE*
Constant	0.257**	0.235	0.280	0.011	0.262**	0.239	0.285	0.012
Empathizer's accuracy	−0.039*	−0.076	−0.002	0.019	−0.026	−0.064	0.011	0.019
Partner's accuracy	−0.002	−0.039	0.035	0.019	0.017	−0.020	0.055	0.019
Empathizer's age group	−0.029**	−0.050	−0.009	0.011	−0.029**	−0.050	−0.007	0.011
Partner's age group	−0.008	−0.029	0.012	0.011	−0.006	−0.028	0.015	0.011
Empathizer's Accuracy x Empathizer's Age Group	−0.016	−0.052	0.020	0.018	−0.002	−0.040	0.036	0.019
Partner's Accuracy x Partner's Age Group	0.027	−0.009	0.063	0.018	0.022	−0.016	0.060	0.019
N	208				202			
Pseudo R^2 in %	4.83				3.22			

Note. CI = confidence interval; LL = lower limit, UL = upper limit. We report all effects as unstandardized multilevel regression coefficients. Note communication-satisfaction scores were reflected and logarithmized. The direction of the interpretation is therefore reversed for all estimates.

p < .05, **p* < .01.

Table 2

Empathic Accuracy for Thoughts: Actor-Partner Interdependence Model (Multilevel Modeling) Predicting the Empathizer's Communication Satisfaction.

Predictors	Positive thoughts				Negative thoughts			
	estimate	*95% CI: LL*	*95% CI: UL*	*SE*	*estimate*	*95% CI: LL*	*95% CI: UL*	*SE*
Constant	0.258**	0.236	0.280	0.011	0.259**	0.236	0.282	0.012
Empathizer's accuracy	0.238**	0.086	0.390	0.077	0.023	−0.130	0.176	0.078
Partner's accuracy	−0.079	−0.231	0.073	0.077	0.016	−0.137	0.169	0.078
Empathizer's age group	−0.029**	−0.050	−0.008	0.011	−0.027*	−0.049	−0.006	0.011
Partner's age group	−0.001	−0.022	0.020	0.011	−0.006	−0.028	0.015	0.011
Empathizer's Accuracy x Empathizer's Age Group	0.071	−0.079	0.222	0.076	−0.034	−0.186	0.118	0.077
Partner's Accuracy x Partner's Age Group	−0.013	−0.163	0.137	0.076	0.018	−0.134	0.170	0.077
N	204				204			
Pseudo R^2 in %	5.74				0.95			

Note. CI = confidence interval; LL = lower limit, UL = upper limit. We report all effects as unstandardized multilevel regression coefficients. Positive thoughts denote instances in which the partner's thoughts were accompanied by positive affect that was equal to or higher than the partner's personal average. Negative thoughts denote instances in which the partner's thoughts were accompanied by negative affect that was equal to or higher than the partner's personal average.

Note that communication-satisfaction scores were reflected and logarithmized. For the estimates of the main effects of empathizer's and partner's age group, the direction of the interpretation is therefore reversed. This is not the case for the estimates of empathic accuracy for thoughts which were additionally inversely transformed.

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

Empathic accuracy for thoughts. The results for predicting satisfaction with social relationships were similar to those for predicting communication satisfaction: For thoughts accompanied by above-average positive feelings (positive thoughts), the empathizer's empathic accuracy predicted her own general satisfaction with her social relationships (see Table 4). This indicates that the more accurately empathizers could recognize their interaction partner's positive thoughts, the more positively they evaluated their own social relationships in real life. No such effect was found for empathic accuracy for the partner's thoughts that were accompanied by above-average negative feelings (negative thoughts). Again, contrary to our hypothesis for the inaccuracy paradox, there was no significant interaction between age group and empathic accuracy, neither for positive thoughts nor for negative thoughts. This indicates that associations between empathic accuracy for positive thoughts and satisfaction with social relationships were comparable for younger and older women. Empathic accuracy for negative thoughts was not predictive of satisfaction with social relationships in either age group. When all the predictors except for the empathizer's empathic accuracy for positive thoughts were removed, the variable explained 2.54% of satisfaction with social relationships ($b = -0.820$, $SE = 0.358$, $p = .023$).

Table 3

Empathic Accuracy for Feelings: Multiple Regression Predicting the Empathizer's Satisfaction with Social Relationships

Predictors	Positive feelings				Negative feelings			
	estimate	*95% CI: LL*	*95% CI: UL*	*SE*	*estimate*	*95% CI: LL*	*95% CI: UL*	*SE*
Constant	4.643**	4.545	4.740	0.049	4.638**	4.539	4.737	0.050
Empathizer's accuracy	−0.060	−0.228	0.109	0.085	0.116	−0.057	0.290	0.088
Empathizer's age group	0.109*	0.011	0.206	0.049	0.117*	0.017	0.216	0.050
Empathizer's Accuracy x Empathizer's Age Group	−0.102	−0.270	0.066	0.085	0.070	−0.103	0.244	0.088
N	206				202			
R^2 in %	3.38				3.62			

Note. CI = confidence interval; LL = lower limit, UL = upper limit. We report all effects as unstandardized regression coefficients.
*$p < .05$, **$p < .01$.

Table 4

Empathic Accuracy for Thoughts: Multiple Regression Predicting the Empathizer's Satisfaction with Social Relationships

Predictors	Positive thoughts				Negative thoughts			
	estimate	*95% CI: LL*	*95% CI: UL*	*SE*	*estimate*	*95% CI: LL*	*95% CI: UL*	*SE*
Constant	4.653**	4.557	4.749	0.049	4.646**	4.547	4.745	0.050
Empathizer's accuracy	−0.822*	−1.519	−0.126	0.353	−0.103	−0.803	0.597	0.355
Empathizer's age group	0.106*	0.010	0.202	0.049	0.106*	0.007	0.205	0.050
Empathizer's Accuracy x Empathizer's Age Group	−0.602	−1.298	0.095	0.353	0.233	−0.467	0.933	0.355
N	204				204			
R^2 in %	6.15				2.37			

Note. CI = confidence interval; LL = lower limit, UL = upper limit. We report all effects as unstandardized regression coefficients. Positive thoughts denote instances in which the partner's thoughts were accompanied by positive affect that was equal to or higher than the partner's personal average. Negative thoughts denote instances in which the partner's thoughts were accompanied by negative affect that was equal to or higher than the partner's personal average. Note the inverse transformation of empathic accuracy for thoughts: The direction of the interpretation is therefore reversed.

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

Discussion

In the current study, we outlined the paradox that older adults appear to maintain high levels of social adjustment despite age-related declines in cognitive empathic abilities. We investigated the hypothesis that the association between empathic accuracy and indicators of social adjustment might be attenuated with age. We tested this hypothesis regarding various facets of this skill that pertained to participants' accuracy at inferring thoughts or feelings that were either positive or negative in valence. Across these multiple constructs, a relatively consistent pattern of results emerged: The higher participants' levels of empathic accuracy for the unfamiliar interaction partner's positive feelings and positive thoughts (i.e., for thoughts that were accompanied by positive feelings) were, the more satisfied they were with the communication. Furthermore, higher participants' levels of empathic accuracy for the interaction partner's positive thoughts were associated with higher general satisfaction with the participants' own existing social network in real life. The abilities to read negative thoughts or feelings were not predictive of the social outcomes. We found no support for our hypothesis that age moderated the association between empathic accuracy and social outcomes. In the following, we discuss these findings in more detail according to their conceptual relevance.

Empathic accuracy and social adjustment: What's age got to do with it?

In line with previous research on social relationships in old age (Luong et al., 2011), older women evaluated their communication with the unfamiliar partner in the first testing session more positively than younger women did. This effect was independent of the interaction partner's age. Older women also rated their social relationships in daily life as more satisfying than younger women did. As discussed elsewhere (Blanke et al., 2014), older

adults showed the assumed deficits in empathic accuracy only in the abilities to infer negative thoughts and feelings (not positive).

Because social networks and interactions differ between adults from different age groups (e.g., Luong et al., 2011) and because the relevance of empathic accuracy for social outcomes may differ in various social settings (e.g., Flury & Ickes, 2001; Ickes & Simpson, 2007), we had hypothesized that the relationship between empathic accuracy and social adjustment would be attenuated in older adults as compared to younger adults. The current results do not support this hypothesis. We found no evidence that the associations between empathic accuracy and social adjustment varied with age. Also contrary to our hypothesis, the partner's empathic accuracy did not contribute to the empathizer's satisfaction with the communication. This hypothesis had been informed by the theoretical notion that social interactions involve dynamic feedback loops between the empathizer and the partner (Zaki & Ochsner, 2011), and by past results showing mutual benefits of empathic accuracy for both partners (e.g., Cohen et al., 2012). The fact that the current data do not reflect such dynamics may be due to the limited duration of the conversation in the present study. There was possibly not enough time for feedback loops to unfold between the unfamiliar partners.

We nevertheless found empirical support as hypothesized for a relationship between the empathizer's empathic accuracy and social outcomes: The empathizer's empathic accuracy for positive thoughts and, in the case of communication satisfaction, also for positive feelings was associated with her own social adjustment. This was independent of the empathizer's age group. In other words, the associations between empathic accuracy and social adjustment were comparable for younger and for older adults. According to the effect sizes, however, the contribution of empathic accuracy to social adjustment was small. Obviously, there are factors other than empathic accuracy and age that account for interpersonal differences in social

adjustment, such as personality (Lopes, Salovey, & Straus, 2003). Other empathic skills could contribute to social adjustment as well, for example, emotional empathy, which has been shown to predict prosocial behavior (Sze, Gyurak, et al., 2012). It is interesting to note that associations between empathic accuracy were evident only for positive thoughts and feelings, not negative thoughts and feelings, as we discuss next.

The role of valence

In line with previous research (Ickes & Simpson, 2007) and, as hypothesized, the empathizer's ability to pick up on positive information implied benefits: Her empathic accuracy for positive thoughts and, in the case of communication satisfaction, also for positive feelings, was associated with her own social adjustment (whereas there were no such effects regarding empathic accuracy for negative thoughts and negative feelings). A similar pattern of results was also observed for the distal social outcome—satisfaction with social relationships in daily life. This social outcome was predicted only by empathic accuracy for positive (not negative) thoughts. It is possible that the abilities to pick up on a social partner's positive thoughts and feelings elevate the empathizer's own emotional well-being by enabling the empathizer to rejoice in the other's positive experiences, leading to a more satisfactory social relationship. This is not likely to be the case for negative thoughts and feelings, which may help to understand the valence-specific pattern.

In the current study, the empathizer's communication satisfaction benefitted only from her own empathic accuracy, not from her partner's. This means that the more the empathizer was able to understand her interaction partner's thoughts and feelings, the better the *empathizer* liked the conversation (whereas the partner's evaluation of the conversation was unrelated by the empathizer's empathic accuracy). On the basis of previous research, we had assumed that empathic accuracy could facilitate positive interpersonal behavior (e.g., social

support; Verhofstadt et al., 2008), which, in turn, would benefit both partners' communication satisfaction. We assumed that empathic accuracy may need to be expressed through inter-personal behavior in order for the other partner to appreciate being understood and supported. In the course of the short conversation, however, there might not have been enough time to do so. The assumed and theoretically grounded mutual effects may, however, indeed exist regarding real-life social partners. This remains an open question because we did not assess such potential effects that the empathic skills of the participants' social partners might have.

The valence-specific pattern of the results for satisfaction with social relationships in daily life may imply that it is more difficult to react to a social partner's negative thoughts and feelings (than to her positive thoughts and feelings) in a way that the partner will appreciate. In line with this notion, Gable, Gosnell, Maisel, and Strachman (2012) concluded that enacted social support in response to the disclosure of negative events has been linked to mixed outcomes, whereas enacted social support upon the disclosure of positive events has con-sistently been found to be associated with positive outcomes. For example, Gable, Gonzaga, and Strachman (2006) found dating partner's reactions to discussions of positive events to be more strongly associated with relationship well-being and break-up two month later than reactions to negative-event discussions. In a study investigating healthy and diseased elderly couples, healthy participants' satisfaction with life (which may be considered a proxy for intrapsychic adjustment) was predicted by their partners' ability to recognize positive emotions (not negative); the opposite was true for the diseased couples (Petrican, Moscovitch, & Grady, 2014). In line with previous research (Gable et al., 2006), the authors suggested that in the healthy couples, the partner's response to shared positive information might be especially important for relationship well-being. In the couples with one disabled partner, in contrast, the ability to pick up on negative emotional information might be particularly

important to provide effective support (caregiver) and to recognize limits to the caregiver's ability to carry this burden (diseased partner). These findings further underline the role of the valence of the inferred emotions for associations between empathic abilities and adjustment.

Whereas empathic accuracy for positive information may hence generally be linked to positive adjustment outcomes in healthy adults, this may not be the case for empathic accuracy for negative information: In particular, empathic accuracy for negative information and social adjustment may often not be related—or they may, in some situations, even be negatively associated. An example of such a negative social outcome would be decreased relationship well-being in spouses who are highly motivated to read each other's negative thoughts and feelings in conflict situations (Ickes & Simpson, 2007). These results therefore show that the valence of empathic inferences should be considered in predicting social outcomes from empathic abilities. In addition to these differences based on valence, we also found differences with regard to the type of inference. We discuss next how the findings on empathic accuracy for thoughts differed from those on empathic accuracy for feelings.

Empathic accuracy for thoughts and feelings

Research on empathic accuracy has sometimes focused only on empathic accuracy for feelings (e.g., Rauers et al., 2013; Richter & Kunzmann, 2011; Ripoll et al., 2013). More frequently, however, empathic accuracy for thoughts and for feelings has been combined into one composite measure (e.g., Ickes et al., 1990).We differentiated between empathic accuracy for thoughts and for feelings because Ickes (2011) pointed out that this distinction can be relevant: Empathic accuracy for thoughts and feelings may sometimes diverge. Our data support this recommendation: Empathic accuracy for positive thoughts predicted both a proximal and a distal social outcome, whereas empathic accuracy for positive feelings pre-dicted only the proximal outcome of communication satisfaction, but not the global indicator

of general satisfaction with social relationships in daily life. It is possible that inferring thoughts was more difficult than inferring feelings; empathic accuracy for thoughts might therefore be a more discriminative measure to identify accurate empathizers in the conversation task. Barone et al. (2005) proposed that feelings might be more easily inferred from sensory cues such as facial or bodily expressions, whereas thoughts might be less accessible.

It is, however, important to note that we used the partner's self-reported feelings both as a proxy to categorize the thoughts *and* as the criterion for the empathizer's accuracy for feelings; the measure of empathic accuracy for thoughts was therefore not independent from the measure of empathic accuracy for feelings. Compared to the inference of thoughts, the inference of feelings might have been additionally facilitated in the current study: the assessment of empathic accuracy for feelings (with rating scales) was more structured than the assessment of empathic accuracy for thoughts (with an open-answer format). Further research is needed to disentangle the differential benefits of high levels of empathic accuracy for thoughts as compared to those for feelings.

The inaccuracy paradox revised

In this study, we described the phenomenon that older adults maintain high levels of social adjustment despite having lower empathic-accuracy skills than younger adults do. We had hypothesized that age might moderate the association between empathic accuracy and social adjustment, but did not find evidence for this hypothesis. Instead, we found empathic accuracy for positive thoughts and feelings to be predictive of social adjustment for younger and older women, and there were no age differences in this regard. In contrast, empathic accuracy for negative thoughts and feelings was not predictive of the social outcomes—neither in younger nor in older women. Previous studies have suggested that older adults might show

deficits more reliably in empathic accuracy for negative information than in empathic accuracy for positive information (Blanke et al., 2014; Richter et al., 2011). Integrating past and present findings may offer an interesting possibility in resolving the inaccuracy paradox: The skill to read negative thoughts and feelings may decline with age, however, this skill may not be as predictive of social outcomes as the skill to read positive thoughts and feelings is—and the latter ability might indeed remain more stable with age. In essence, the current findings may therefore suggest that the age-related decline in empathic accuracy is not as detrimental for social outcomes as one may have previously expected.

Limitations and Outlook

To our knowledge, this study is the first to examine the association between empathic accuracy for thoughts and feelings and social adjustment in younger and older women. Strengths of the study lie in the relatively ecologically valid and age-fair empathic accuracy task as well as in the inclusion of both a proximal and a distal indicator of social adjustment, which provided an opportunity to evaluate potential social implications of declining empathic accuracy with age. There are, however, limitations to the generalizability of the results, one of them being the focus on women. Our data therefore do not allow for any conclusions regarding interactions between males or interactions between persons of different genders. Furthermore, the results rely on a cross-sectional design that contrasted only two age groups. Longitudinal research is needed to understand how empathic accuracy changes throughout the lifespan and how associations with social outcomes may change as well. As our data is correlational, it cannot tackle questions of causality. For example, it is also possible that persons with highly satisfactory social relationships were more likely to accurately decode positive thoughts and feelings of an unfamiliar interaction partner (Flury & Ickes, 2001, 2006). Furthermore, this study did not aim to investigate the underlying mechanisms of the

association between empathic accuracy and social outcomes, which have been described as a "black box" (Elfenbein, Foo, White, Tan, & Aik, 2007, p. 217). Zaki and Ochsner (2011) pointed out that these mechanisms are still subject to future research, which may involve identifying highly complex feedback-loops between interaction partners.

In contrast to the performance-based measure of empathic accuracy, social adjustment was measured using self-report. To measure communication satisfaction, we obtained reports from both interaction partners and were thus able to test for possible interpersonal effects. In the case of satisfaction with social relationships, we were able only to use self-report measures, and to investigate intrapersonal associations. These self-reports might have been positively biased for older adults, who might tend to evaluate interpersonal interactions generally more positively than younger adults do (e.g., Ruffman, 2011). This could potentially diminish the predictive value of empathic accuracy because of increased error variance.

Furthermore, we used empathic accuracy scores, as obtained in an interaction with a stranger in the laboratory, as an approximation to participants' empathic accuracy in daily life. As empathic accuracy may vary depending on the relationship between interaction partners (Stinson & Ickes, 1992) and depending on the situation (Rauers et al., 2013), a composite measure of empathic accuracy across different persons and situations may be more predictive of satisfaction with social relationships in daily life. Future research is also needed to identify specific social situations in which empathic accuracy for negative information might relate to positive social outcomes. Finally, we only measured a cognitive component of empathy, namely empathic accuracy. To obtain a more comprehensive picture of the associations between empathic skills and social adjustment, both cognitive and emotional components of empathy should be considered in the future.

Conclusion

In conclusion, we found support for the idea that empathic accuracy "pays off"—for younger as well as for older women. We found no evidence for our hypothesis that the relationship between empathic accuracy and social adjustment varies with age. Instead, we found comparable associations in younger and older women between the abilities to infer positive thoughts and feelings in a conversation with an unfamiliar interaction partner and satisfaction with social situations or relationships. These effects were evident only for empathic accuracy for positive (but not for negative) thoughts and feelings, emphasizing the importance of considering valence when investigating social implications of empathic accuracy. Older adults' skills may decline primarily in those abilities that have limited implications for social adjustment. It may therefore be possible to maintain high levels of social adjustment despite age-related losses in empathic-accuracy skills. This possibility is a promising avenue for future research.

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Chapter 4: What do You See When You Look at Me? Interpretation of Emotional Facial Expressions and Recognition Accuracy in Younger and Older Adults

This chapter is based on the following original article:

Blanke, E. S., Rauers, A., Studtmann, M., & Riediger, M. *(submitted).* What do you see when you look at me? Interpretation of emotional facial expressions and recognition accuracy in younger and older adults.

Abstract

Emotion recognition is often measured by asking participants to correctly choose emotion labels (e.g., happiness) that describe facial expressions. These labels are closely related to the underlying emotional experience (e.g., feeling happy), but the stimuli can also be interpreted differently (e.g., as conveying thoughts, action tendencies, or action requests) and in a multifunctional way (i.e., as conveying multiple interpretations at the same time). For the first time, we explored whether younger adults interpret the stimuli differently than older adults, who typically display lower accuracy in emotion-recognition tasks. These facial emotion-recognition stimuli have been criticized for their lack of ecological validity. Participants' subjective interpretations of the stimuli may be a limiting factor in this regard: We assumed that the less participants would interpret such stimuli as conveying emotional experiences, the less accurate they would label the emotional expressions using emotion labels. We hypothesized this effect to be more pronounced in older adults than in younger adults. These hypotheses were tested in a sample of 48 younger (20−30 years) and 48 older adults (70−78 years). Facial-expression interpretations were multifunctional, with comparable ratings in younger and older adults. As expected, younger adults outperformed older adults in the emotion-recognition task. Only in older adults (not in younger), the interpretation of the stimuli as conveying emotional experiences (but no other interpretations) predicted their recognition performance. We interpret this finding as pointing to the importance of task validity when assessing age differences in emotion recognition.

Keywords: age differences, emotion components, emotion recognition, facial expressions, task validity

What do You See When You Look at Me? Interpretation of Emotional Facial

Expressions and Recognition Accuracy in Younger and Older Adults

How do people interpret emotional facial expressions of other persons? They often think of them in terms of the underlying *emotional experience* (e.g., a smiling face reflects that the person feels happy; Ekman, Friesen, & Ancoli, 1980). There are, however, other ways as well to interpret emotional facial expressions: A smile, for example, may also convey a cognitive appraisal of the situation (e.g., "I just received a gift"; Scherer & Ellgring, 2007; Scherer & Grandjean, 2008), or a behavioral tendency (e.g., "I want to jump up and down"; Frijda, Kuipers, & ter Schure, 1989), or a social message (which could also imply an action tendency or an request, e.g., "Let's play! "; Fridlund, 1994). In fact, many emotion researchers assume that emotional facial expressions are multifunctional and may thus be conceived of as conveying different kinds of information at the same time (e.g., Scherer & Grandjean, 2008).

The ability to recognize emotions from facial expressions has been associated with various positive social outcomes, such as adjustment in school-girls (Leppänen & Hietanen, 2001) or relationship well-being in students (Carton, Kessler, & Pape, 1999). In facial emotion-recognition tasks, a facial expression is usually presented with a number of emotion labels (such as happiness, anger, or fear); participants are then asked to choose the label that best describes the expression. Research suggests that people are fairly able to perform this multiple-choice test not only based on emotions, but also on appraisals, social messages, or action tendencies (Scherer & Grandjean, 2008; Yik & Russell, 1999). Nonetheless, people can typically categorize facial emotional stimuli more accurately with regard to the targeted emotion (e.g., "anger") than with regard to specific interpretation components such as action tendencies (e.g., "I want to hit this person"; Scherer & Grandjean, 2008). When forced to

choose just one interpretation component, most participants are more likely to subjectively interpret emotion-recognition stimuli in terms of emotional experiences (subjective feelings) than as action tendencies or action requests (Horstmann, 2003). This could be due to a "special status" of the emotional-experience component in the emotion process (e.g., feeling angry; Scherer, 2004, p. 138), as this component may integrate information from the other components as well, and is very strongly coupled with the verbal emotion label (e.g., anger). Whereas the study conducted by Horstmann (2003) investigated whether expressions were appraised as *either* emotional experiences *or* other components, in the current study, we explored the degree to which different components may be *co-represented* when facial emotional stimuli are appraised.

In general, facial emotion-recognition stimuli have been criticized for lacking ecological validity because they usually feature static posed and stereotypic emotional expressions whereas spontaneous expressions are dynamic and more subtle (e.g., Blanke, Rauers, & Riediger, 2014; Isaacowitz & Stanley, 2011). In part, this problem of limited ecological validity may derive from the interpretation of the facial stimuli: Participants who interpret the facial stimuli as being less indicative of an underlying emotional experience may perceive the task (trying to find the correct emotion label) as being less reasonable. This could limit the face validity (participants do not agree that the task measures emotion-recognition ability) and the ecological validity of the task (the stimuli do not resemble spontaneous emotional facial expressions). The tendency to interpret the stimuli as conveying emotional experiences could therefore serve as a proxy for higher perceptions of task validity. Interindividual differences in this tendency may have consequences for emotion-recognition performance: It has been shown that people who doubt the face validity of cognitive tasks are less motivated and, as a consequence, perform worse (e.g., Chan, Schmitt, DeShon, Clause, & Delbridge, 1997).

Similarly, participants have also been shown to perform better in more realistic emotion-recognition tasks (Richter, Dietzel, & Kunzmann, 2011). Because we assumed that stronger interpretation of the stimuli as conveying emotional experiences may reflect higher acceptance of the task, we hypothesized that stronger emotional-experience interpretations would be associated with enhanced performance in emotion-recognition tasks, as tasks high in face- and ecological validity should motivate participants to perform well.

Research suggests that such motivational factors may become more important with increasing adult age. In particular older adults' motivation has been assumed to suffer from artificial emotion-recognition tasks, as these may not enable or motivate them to use their accumulated social experiences in the task (Isaacowitz & Stanley, 2011). This suggestion has been brought forward as a potential explanation for the age-related decline that has been demonstrated in empirical studies on emotion recognition (see meta-analysis by Ruffman, Henry, Livingstone, & Phillips, 2008). Indeed, older adults' performance seems to be enhanced in tasks with higher ecological validity (e.g., in the cognitive domain; Kliegel, Martin, McDaniel, & Phillips, 2007) and age differences in the inference of emotions may also be reduced in more realistic tasks (Blanke et al., 2014; Rauers, Blanke, & Riediger, 2013; Richter et al., 2011). In the current study we therefore investigated both younger and older adults and predicted the enhancing effect of emotional-experience interpretations on emotion-recognition performance to be stronger for older than for younger adults, as older adults seem to be especially motivated to perform well in tasks that they perceive as reasonable. As there is, to our knowledge, no research on adult age differences in the interpretation of emotional facial stimuli in terms of their components (e.g., emotional experiences or action tendencies), we investigated such differences between younger and older adults in an exploratory manner.

Method

Participants

Ninety-six participants were recruited from the Berlin area from the participant pool of the Max Planck Institute for Human Development, Berlin, Germany. We tested two age groups: $n = 48$ younger adults (age range = 20–30 years, $M = 25.67$, $SD = 2.72$; 50% female), and $n = 48$ older adults (age range = 70–78 years, $M = 73.47$, $SD = 2.50$; 50% female). The sample was approximately stratified according to education level; 52% of the younger and 38% of the older adults held a German university entrance qualification (Abitur). All partici- pants were German native speakers. This study was part of an investigation that comprised two sessions, of which only the second session was relevant for the current research question. Younger participants received 30 Euros as compensation for both sessions. Older adults took longer to complete all measures and received 40 Euros. The ethics committee of the Max Planck Institute for Human Development approved this study.

Procedure and Measures

Participants gave their informed consent in the first session, in which they worked on tasks irrelevant for the current study. In the second session, in addition to other tasks, participants worked on an emotion-recognition task and then on a task on the subjective interpretation of emotional facial expressions (facial-interpretation task). These tasks were administered on PCs and presented with DMDX (Forster & Forster, 2003).

Emotion-recognition task. The emotion-recognition task featured 48 pictures portraying five emotions (anger, happiness, sadness, disgust, fear) and a neutral expression. The expressions were taken from the FACES database (Ebner, Riediger, & Lindenberger, 2010) and were poses by different younger and older men and women (twelve of each group), to ensure age- and gender-fairness. For each picture, participants selected one of six possible

response options. Pictures and response options were presented in eight different orders within the different age and gender groups to minimize order effects. To correct for possible response biases (i.e., choosing one emotion label more often than others), we calculated the unbiased hit-rate of the emotion-recognition performance (Wagner, 1993), which denotes the joint probability that an emotion label is chosen and that this label is correct (range: 0–1; younger adults: $M = 0.72$; $SD = 0.11$; older adults: $M = 0.56$, $SD = 0.15$). One younger adult had an unusually low emotion-recognition score; this score was adjusted to three standard deviations below the mean score of the reference groups (younger adults).[1]

Facial-interpretation task. The facial-interpretation task featured 20 different pictures[2] from the FACES database (Ebner et al., 2010) depicting five emotions (anger, happiness, sadness, disgust, fear). Response options were presented in four different orders within the different age and gender groups. The order of the pictures was randomized. Following the procedure reported by Horstmann (2003), all five emotions were posed by four younger posers, two male and two female. In this task, the idea was introduced to the participants that facial expressions may convey different information, such as that a person is feeling something (emotional experience), or thinking something (cognition; similar to an appraisal), or that a person intends to do something (action tendency), or wants something from the perceiver (action request). On a 4-point scale from 1 *(not at all)* to 4 *(very clearly)*, partici-pants rated the degree to which they saw each of the four components represented in each picture: an emotional experience (younger adults: $M = 3.52$, $SD = 0.39$; older adults: $M = 3.66$, $SD = 0.39$), a cognition (younger adults: $M = 2.81$, $SD = 0.57$; older adults: $M = 3.13$,

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[1] The pattern of results stayed robust when repeating the analyses without correcting this outlier.
[2] The facial-interpretation task featured one picture of a smiling young woman that was also shown in the emotion-recognition task. When this picture was excluded from the interpretation rating scores, the results remained unchanged.

$SD = 0.66$), an action tendency (younger adults: $M = 2.30$, $SD = 0.50$; older adults: $M = 2.39$,

$SD = 0.78$), and an action request (younger adults: $M = 1.96$; $SD = 0.40$; older adults: $M =$

1.90, $SD = 0.58$). We adjusted one older adult's unusually high action-request rating to three

standard deviations above the mean score of the reference group (older adults).[3]

To determine the mean rating differences within the different interpretation compo-

nents and between participants, we used a repeated measures ANOVA. The four interpre-

tation components (within factors) as well as age and gender (between factors) predicted the

interpretation ratings. The intensity of the ratings of all four interpretation components differed

significantly from each other (main effect, Greenhouse-Geisser corrected: $F[2.73] = 216.07$,

$p < .001$, partial $\eta^2 = .70$; pairwise comparisons, Bonferroni-corrected: all $p < .001$). There

were no age differences ($F[1] = 2.94$, $p = .090$, partial $\eta^2 = .03$), no gender differences

($F[1]) = 0.00$, $p = .994$, partial $\eta^2 < .001$), and no interactions between any of the variables (all

$p > .05$). These results indicate that participants, independent of their age and gender,

interpreted the facial expressions most strongly as conveying emotional experiences, and to

lesser degrees (but significantly different from one another and in this order), cognitions,

action tendencies, and action requests.

Results

We hypothesized that the more the participants interpreted facial stimuli as conveying

emotional experiences, the better they would be at recognizing the depicted emotions; this

association was hypothesized to be stronger for older than for younger adults. To test these

hypotheses, we performed stepwise multiple regression analyses in IBM SPSS Statistics 20 for

Windows, Version 20.0 (IBM Corp., Released 2011) predicting emotion-recognition accuracy

(unbiased hit-rates). In a first step (Model 1 in Table 1), we entered the interpretation ratings

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[3] The pattern of results stayed robust when repeating the analyses without correcting this outlier.

for emotional experiences, and, to check for other potential interpretation influences, interpretation ratings for cognition, action tendency, and action request (all grand-mean centered). As predicted, the more the participants interpreted the stimuli as conveying emotional experiences, the better they performed in the emotion-recognition task, but there were no significant effects for the other interpretation ratings (thoughts, action tendencies, or action requests). In a second step, we also tested for age and gender differences in emotion recognition (Model 2 in Table 1). Age group was coded −1 for younger and 1 for older adults, and gender was coded −1 for females and 1 for males. As to be expected, there was a main effect of age group, indicating that younger adults outperformed older adults in the emotion-recognition test, but there were no gender differences.

We then tested whether stronger emotional-experience interpretation ratings would be especially predictive of older adults' emotional-recognition performance (Model 3 in Table 1) by further including the interaction between these ratings and the age group. We also exploratively tested such age moderations for the other interpretation components. Only the hypothesized interaction (Emotional Experience x Age) was significant. To follow up on this, we omitted all variables except for the emotional-experience ratings and ran two separate models for the younger and the older adults. Figure 1 illustrates that the more the older participants interpreted the stimuli as conveying emotional experiences, the better they performed in the emotion-recognition task ($b = .230$, $SE = .045$, $p < .001$, $R^2 = .360$, 95% CI [.139, .322]), but that this was not the case for younger adults ($b = .053$, $SE = .042$, $p = .218$, $R^2 = .033$, 95% CI [−.032, .138]).[4]

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[4] We repeated this analysis using the percentage of correct answers as an indicator of emotion-recognition performance and also using a percentage score that did not include participants' performance on neutral expressions as neutral expressions were also not part of the facial-interpretation task. The effect remained significant.
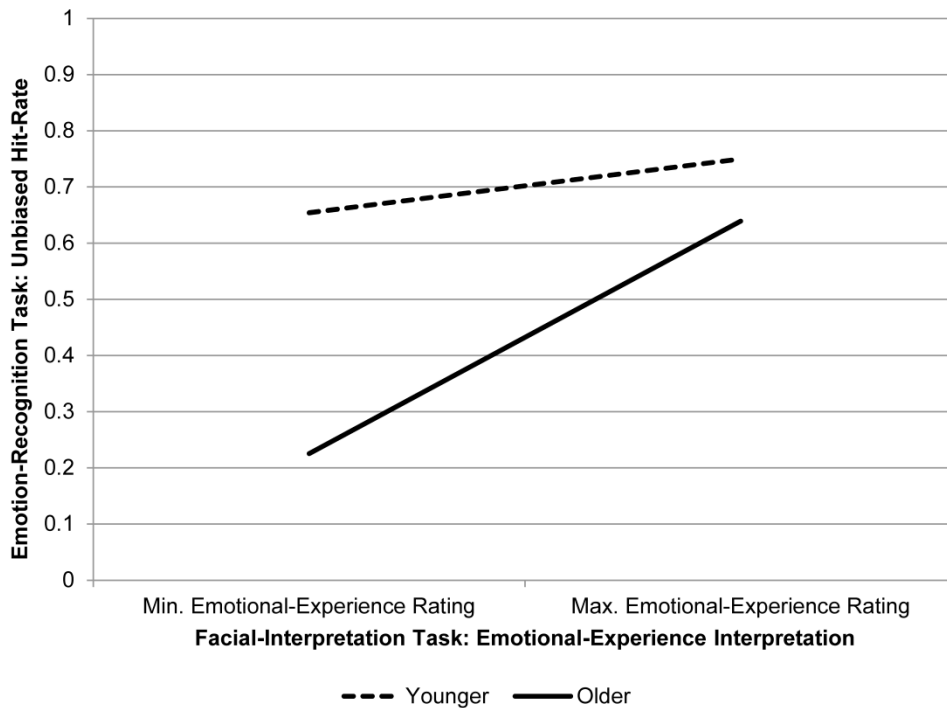
Figure 1. Moderation of the association between the emotional-experience interpretation of the facial stimuli and the emotion-recognition performance by age group. "Min/Max Emotional-Experience Rating" represents the minimum/maximum emotional-experience interpretation rating observed in the sample.

In a final model (Model 4 in Table 1), we tested whether gender would additionally moderate the relationship between age and emotional-experience interpretation ratings by including the threefold interaction between these ratings, age, and gender as well as the lower level interactions and the main effects. The interaction between the emotional-experience interpretation ratings and age stayed significant, but was not further qualified by gender.

Table 1

Multiple Regression Models Predicting Facial Emotion-Recognition Performance (Unbiased Hit-Rate; N = 96).

Predictors	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Constant	.642* (.015)	.642* (.012)	.637* (.013)	.637* (.012)
Emotional experience	.125* (.041)	.145* (.033)	.143* (.032)	.126* (.034)
Cognition	−.054 (.027)	−.015 (.023)	−.024 (.023)	
Action tendency	.025 (.029)	.027 (.023)	.045 (.024)	
Action request	.017 (.036)	−.003 (.029)	−.016 (.031)	
Age		−.091* (.013)	−.091* (.013)	−.090* (.012)
Gender		−.020 (.013)	−.018 (.012)	−.018 (.012)
Emotional Experience x Age			.089* (.032)	.089* (.034)
Cognition x Age			.015 (.023)	
Action Tendency x Age			−.030 (.025)	
Action Request x Age			.040 (.031)	
Gender x Age				.006 (.012)
Emotional Experience x Gender				.044 (.034)
Emotional Experience x Age x Gender				−.020 (.034)
R^2	.107	.434	.503	.484

Note. We report all effects as unstandardized regression coefficients with the standard error in brackets.

*$p < .01$ (none of the *p*-values were between .01 and .05).

Discussion

In the current study, we explored subjective interpretations of emotional facial stimuli in younger and older adults and related these interpretations to their emotion-recognition performance. The results support the claim that people, independent of their gender or age, interpret emotional facial stimuli as conveying different components at the same time, but most strongly as conveying emotional experiences. In line with previous research (Ruffman et al., 2008), younger adults outperformed older adults in the emotion-recognition task. Only the emotional-experience interpretations (and not the other interpretations) were associated with emotion-recognition performance in older (but not in younger) adults. Perceiving the task as meaningful may therefore be more important for older adults' emotion-recognition per-formance than for younger adults' performance. Future age-comparative emotion-recognition studies might take such age-differential effects of stimuli perception into account.

It should, however, be noted that we did not directly ask participants about their perceptions of task validity or their performance motivation. In this correlational study, we also cannot draw conclusions on causality. It is possible, for example, that older adults who found the emotion-recognition task more difficult subsequently attributed their low performance to the characteristics of the task (as the interpretation task followed the emotion-recognition task). The order of the tasks may have additionally primed the participants to interpret the facial expressions more in terms of emotional experiences than in terms of other components. A randomized order of the tasks would therefore be desirable for future research. Furthermore, the stimuli were posed facial expressions; it is open to further investigation whether spontaneous facial expressions would also be more likely to be interpreted in terms of emotional experiences than in terms of other components. The current study therefore provides first empirical evidence for possible associations between the subjective interpretation of

emotional facial stimuli and emotion-recognition performance. The results suggest that participants of different age groups interpret these stimuli similarly and in a multifunctional fashion. However, only emotional-experience interpretations predicted emotion-recognition performance, and this was only true for older adults. We interpret the results as pointing to the importance of a valid assessment of emotion-recognition skills in terms of face validity and ecological validity, particularly in age-comparative research.

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Chapter 5: Weißt du, was ich fühle? – Empathische Fähigkeiten im Lebensverlauf

Teaser

„Wie geht es dir?", ist häufig nur eine höfliche Floskel. Entsprechend oberflächlich ist oft die

Antwort. Zu erkennen, wie es anderen wirklich geht, ist hingegen nicht leicht. Untersuchungen

legen nahe: Je akkurater wir unsere Mitmenschen verstehen, desto besser ist das soziale

Miteinander. Ein noch recht junger Zweig der Lebensspannenpsychologie interessiert sich für

diese wichtigen empathischen Fähigkeiten und untersucht, wie sie sich im Laufe des Lebens

verändern. „Altert" die Fähigkeit, andere zu verstehen? Und was heißt das für das soziale

Miteinander?

        Stichworte: Altern, Emotionserkennung, Empathische Fähigkeiten, Psychologie der

Lebensspanne

Weißt du, was ich fühle? – Empathische Fähigkeiten im Lebensverlauf

Warum interessiert uns, was andere Menschen fühlen?

Stellen Sie sich eine Gruppe von Jägern und Sammlern in der Altsteinzeit vor. Einer der Jäger entdeckt plötzlich im hohen Gras ein Raubtier. Seine hochgezogene Stirn, seine weit aufgerissenen Augen, sein leicht geöffneter Mund und seine erstarrte Körperhaltung signalisieren seinen Gefährten: Achtung! Gefahr!

Evolutionär betrachtet stellte das Erkennen von Emotionsausdrücken vermutlich einen Vorteil für das Überleben dar. Auch heutzutage ist das Erkennen von Emotionen bei anderen Menschen noch von großer Bedeutung, vor allem für das soziale Miteinander: Wenn man weiß, was jemand anderes fühlt und vielleicht sogar denkt, kann man besser auf diese Person reagieren, sich also in einer Art und Weise verhalten, die den Bedürfnissen aller Beteiligten gerecht wird.

Studien mit Jugendlichen, sowie Erwachsenen jüngeren und mittleren Alters haben zum Beispiel gezeigt, dass das korrekte Erkennen des emotionalen und mentalen Zustands eines Beziehungspartners mit einer höheren Beziehungszufriedenheit zusammenhängt. In einigen Ausnahmefällen können derartige empathische Fähigkeiten zwar auch negative Auswirkungen haben (etwa wenn das korrekte Erkennen negativer Gefühle des Partners zu eigenen negativen Gefühlen führt), in den meisten Situationen sind empathische Fähigkeiten jedoch förderlich für soziale Beziehungen (Rollings, Cuperman, & Ickes, 2011). Dies gilt nicht nur für die Beziehungszufriedenheit in Paarbeziehungen, sondern beispielsweise auch für den Therapieerfolg in der Psychotherapie oder die Trainingszufriedenheit bei Athleten.

Wie erkennt man, was andere Menschen fühlen?

Es gibt unterschiedliche Möglichkeiten, den Gefühlszustand eines Menschen zu erkennen: Seine Äußerungen und deren Klangverlauf (Prosodie), sein Gesichtsausdruck, seine Köperhaltung, aber auch der situationelle Kontext können Aufschluss über die Befindlichkeit geben. Eine weitere Möglichkeit, Zugang zu den Gefühlen anderer Menschen zu finden, ist das emotionale Mitschwingen. Dies ist eine emotionale Reaktion auf die Gefühle eines anderen Menschen, bei welcher dessen Gefühle nachempfunden und miterlebt werden. Die eigenen Gefühle entsprechen dabei den Gefühlen des anderen Menschen oder sind diesen sehr ähnlich. Diese beiden Komponenten, das eher kognitiv ausgerichtete Erkennen der Gefühle und die emotionale Reaktion auf die Gefühle anderer Personen, werden auch als kognitive und emotionale (oder affektive) Empathie bezeichnet. Kognitive und emotionale Empathie können voneinander getrennt in Erscheinung treten, wie sich eindrucksvoll bei Menschen mit Hirnschädigungen (Läsionen) oder psychischen Störungen zeigt: So haben beispielsweise Menschen mit dem Asperger-Syndrom (einer Form des Autismus) vor allem Probleme beim Erkennen von Emotionen bei anderen Menschen, nicht jedoch im emotionalen Mitschwingen (Dziobek et al., 2008). In der Regel treten im Alltag jedoch beide Mechanismen zusammen auf (Zaki & Ochsner, 2011). Vom Empathiebegriff werden häufig emotionale Reaktionen abgegrenzt, die sich von den Gefühlen des anderen Menschen unterscheiden, wie zum Beispiel Mitleid (z. B. Walter, 2012).

Wie misst man diese Fähigkeiten in der Forschung?

Um kognitive Empathie zu erfassen, wurden Probanden in der Vergangenheit häufig um Selbsteinschätzungen ihrer empathischen Fähigkeiten gebeten (Selbstberichtsmaße). Es ist jedoch fraglich, ob Menschen in der Lage sind, selbst zu bewerten, wie gut sie die Gefühle anderer erkennen. Daher versucht die Forschung zunehmend, empathische Fähigkeiten mit

objektiveren Leistungsmaßen zu erfassen. Besondere Bedeutung besitzt hierbei das dem Begriff der kognitiven Empathie verwandte Konzept der Emotionserkennung (z. B. Ekman et al., 1987). Emotionserkennung wird meist gemessen, indem den Probanden Fotos oder Videos gezeigt werden, in denen authentische oder posierte Emotionsausdrücke in Gesichtern, Körperhaltungen oder Stimmen dargestellt werden. Die Probanden sollen dann aus mehreren vorgegebenen Antworten die richtige herauszusuchen.

Ein weiteres Leistungsmaß zur Erfassung kognitiver Empathie ist die empathische Akkuratheit. Zur Messung werden meist reale Gespräche zwischen zwei Probanden im Labor aufgezeichnet oder Videoaufzeichnungen authentischer Situationen genutzt (Rollings et al., 2011). Empathische Akkuratheit beschreibt, wie gut es dem Probanden gelingt, die Gedanken und Gefühle der videoaufgezeichneten Person zu erschließen. Dafür wird ermittelt, wie gut die Bewertung des Probanden mit dem Selbstbericht der videoaufgezeichneten Person über-einstimmt. In der jüngeren Vergangenheit wurde empathische Akkuratheit auch außerhalb von Laborkontexten durch Experience-Sampling erfasst, also in realen Lebenskontexten zum Beispiel mit Hilfe von Smartphones untersucht (z. B. Rauers, Blanke, & Riediger, 2013).

Die Messung von *emotionaler* Empathie (also dem gefühlsmäßigen Mitschwingen) wird (neben Selbstberichtsmaßen) häufig als die Übereinstimmung der aktuellen Gefühlslage des Probanden mit der einer anderen Person, zum Beispiel eines Protagonisten in einem Video, definiert (z. B. Richter & Kunzmann, 2011). Mitunter wird auch die Übereinstimmung zwischen Personen in physiologischen Maßen herangezogen, wie zum Beispiel der Herzrate.

Empathische Fähigkeiten von der Kindheit bis ins Erwachsenenalter

Bereits Neugeborene reagieren auf den emotionalen Ausdruck ihrer Interaktionspartner und ahmen manche Ausdrücke nach. Empathie setzt allerdings in der Regel voraus, dass Personen zwischen sich selbst und anderen unterscheiden können. Dies ist typischerweise erst

im Laufe des zweiten Lebensjahrs der Fall. Während der Kindheit und Jugend nehmen empathische Fähigkeiten zu, wobei beispielsweise auch Jugendliche subtile Unterschiede zwischen emotionalen Gesichtsausdrücken im Durchschnitt noch weniger gut erkennen als junge Erwachsene. Diese Altersunterschiede in frühen Lebensphasen werden mit neuronalen Reifungsprozessen in bestimmten Hirnrealen wie der Amygdala und dem Präfrontalen Kortex in Zusammenhang gebracht. Diese Reifungsprozesse erstrecken sich zum Teil bis ins Jugendalter und darüber hinaus (Somerville, Fani, & McClure-Tone, 2011).

Lange Zeit lag das Hauptinteresse der Entwicklungspsychologie auf der Frage, wie sich empathische Fähigkeiten von der Geburt bis in junge Erwachsenenalter entwickeln. Ein relativ junger Zweig der Psychologie der Lebensspanne, um den es in diesem Artikel verstärkt gehen soll, interessiert sich jedoch gerade für die Frage: Wie geht es danach mit der Entwicklung empathischer Fähigkeiten weiter?

Veränderung empathischer Fähigkeiten im Erwachsenenalter

Man könnte annehmen, dass die Fähigkeit, Gefühle bei anderen Menschen zu erkennen, im Erwachsenenalter weiterhin besser wird. Schließlich können täglich neue Erfahrungen in der sozialen Interaktion mit anderen Menschen gesammelt werden. Tatsächlich scheint die Fähigkeit zur Emotionserkennung jedoch mit höherem Erwachsenenalter nachzulassen. Dies wurde in einer Metaanalyse mit 28 Studien für die Fähigkeiten festgestellt, Emotionen vor allem in Gesichtern, aber auch anhand der Körpersprache und der Prosodie zu erkennen (Ruffman, Henry, Livingstone, & Phillips, 2008). In der Metaanalyse wurden die Leistungen jüngerer Erwachsener (im Mittel 19−30 Jahre) mit denen älterer Erwachsener (im Mittel 65−77 Jahre) verglichen. Diese Altersgruppen wurden ausgewählt, da nur wenige Studien Erwachsene mittleren Alters untersuchten. Daher ist es nicht geklärt, wann eine Abnahme in Emotionserkennungsfähigkeiten einsetzt. Es gibt jedoch Hinweise darauf, dass es

sich um eine graduelle Abnahme handelt, die mitunter bereits im mittleren Erwachsenenalter nachweisbar ist, aber sich erst verstärkt im hohen Erwachsenenalter zeigt. Auch warum eine Abnahme dieser Fähigkeiten mit dem Alter erfolgt, ist bislang nicht hinreichend untersucht. Zwar ist weitreichend bekannt, dass manche kognitive Fähigkeiten mit dem Alter abnehmen, wie etwa die Verarbeitungsgeschwindigkeit oder bestimmte Problemlösefähigkeiten. Diese allgemeine Abnahme kognitiver Fähigkeiten mit dem Alter konnte das Befundmuster in der Emotionserkennung jedoch nicht umfassend erklären. Entsprechend werden auch andere Erklärungsansätze diskutiert. Unter anderem wurde zum Beispiel spekuliert, dass altersbedingte Veränderungen im frontalen und temporalen Hirnvolumen sowie Veränderungen im Zusammenhang mit Neurotransmittern eine Rolle spielen könnten (Ruffman et al., 2008).

Manche Forscher vermuten, dass die tatsächlichen Altersunterschiede bislang überschätzt wurden, da die eingesetzten Messmethoden ältere Menschen benachteiligen könnten (z. B. Isaacowitz & Stanley, 2011). So wurde unter anderem kritisiert, dass Emotionserkennungsaufgaben häufig nur emotionale Ausdrücke jüngerer Personen als Stimuli nutzen. Diese Kritik beruht auf der Annahme, dass Menschen möglicherweise emotionale Ausdrücke (z. B. Gesichtsausdrücke) ihrer eigenen Altersgruppe besser lesen können als die einer anderen Altersgruppe. Die empirische Befundlage zu dieser Annahme ist allerdings bisher gemischt, und auch in Studien mit altersfaireren Stimuli zeigten sich die bekannten Altersunterschiede (z. B. Riediger, Voelkle, Ebner, & Lindenberger, 2011). Abbildung 1 zeigt ein Beispiel eines altersfairen Sets von emotionalen Gesichtsausdrücken.

Ärger   Ekel   Angst   Trauer   Freude   Neutral

Abbildung 1. Beispiele aus einer Datenbank mit altersfairen mimischen Emotionsausdrücken von Erwachsenen unterschiedlichen Alters (Ebner, Riediger, & Lindenberger, 2010).

Zusätzlich wurden die in Emotionserkennungsaufgaben eingesetzten Stimuli als eher alltagsfern kritisiert: Die Bilder (oder zum Teil auch Videos) zeigen in der Regel posierte Emotionen ohne den dazu gehörigen situationellen Kontext. Die Anforderungen an empathische Fähigkeiten in Emotionserkennungsaufgaben unterscheiden sich somit stark von denen des realen Lebens. Es wurde daher bezweifelt, ob die so gemessenen Fähigkeiten eine gute Annäherung an empathische Fähigkeiten im Alltag darstellen (z. B. Rauers et al., 2013). Diese Zweifel werden dadurch bestärkt, dass ältere Menschen zwar bei der Emotions-erkennung im Labor mehr Fehler machen als jüngere, im Alltag aber die aufgrund dieses Defizits zu erwartenden sozialen Einschränkungen ausbleiben. Im Gegenteil sind ältere Menschen sehr zufrieden mit ihren sozialen Beziehungen, und bisweilen sogar zufriedener als jüngere Menschen (Luong, Charles, & Fingerman, 2011). Dieses paradoxe Bild könnte damit zusammenhängen, dass Laboraufgaben nur einen kleinen Ausschnitt der vielen Fähigkeiten messen, die im Umgang mit anderen im Alltag wichtig sind. So mag es älteren Menschen zwar schwerer fallen, in Gesichtern zu lesen, aber möglicherweise können sie dies mit anderen Fähigkeiten kompensieren. Diesen Schluss legt eine Studie nahe, welche empathische Akkuratheit bei jüngeren und älteren Paaren untersuchte (Rauers et al., 2013). Die Teilnehmer trugen Smartphones bei sich, während sie ihrem normalen Alltag nachgingen. Über einen

längeren Zeitraum hinweg signalisierten ihnen die Telefone sechs Mal täglich, ihre eigenen

Gefühle und die Gefühle ihres Partners oder ihrer Partnerin zu bewerten (siehe Abbildung 2).
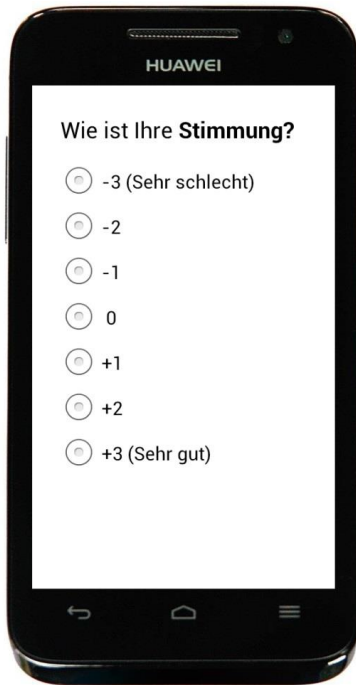

Abbildung 2. Empathische Akkuratheit kann im Alltag mit Hilfe von zeitlich gekoppelten Smartphones erfasst werden: Zwei Personen können damit ihre eigene aktuelle Gefühlslage und die ihres Partners bewerten (Beispiel angelehnt an Rauers et al., 2013).

Ältere Menschen waren zwar durchschnittlich schlechter als jüngere darin, die Gefühle

ihres Partners oder ihrer Partnerin zu bestimmen, wenn die Person anwesend war. Wenn es

aber darum ging einzuschätzen, wie sich der jeweils andere gerade fühlte, wenn die Paare

nicht zusammen waren, waren beide Altersgruppen durchschnittlich gleich gut. Es scheint

daher, dass viele Paare Wissen übereinander besitzen, welches ihnen hilft, ihre Gefühle selbst

bei Abwesenheit des anderen wechselseitig einschätzen zu können (zum Beispiel: Wenn mein

Partner einkaufen geht, ist er üblicherweise gestresst.). Diese wichtige Fähigkeit könnte

älteren Menschen im Umgang mit vertrauten Personen Orientierung bieten und so dazu

beitragen, dass ältere Menschen trotz einer gewissen Abnahme empathischer Fähigkeiten sehr zufriedenstellende Sozialbeziehungen haben. Auch weitere Studien legen nahe, dass zwar isolierte empathische Fähigkeiten mit dem Alter abnehmen, aber andere erhalten bleiben. Zum Beispiel scheinen ältere Menschen vor allem bei Aufgaben, die sich um negative Themen drehen oder nur geringe Relevanz für sie haben (z. B. Jobwechsel), weniger empathisch akkurat zu sein, nicht jedoch bei Aufgaben, die altersrelevantere Themen betreffen (Richter, Dietzel, & Kunzmann, 2011; Richter & Kunzmann, 2011). Dies könnte auch auf motivationale Unterschiede zwischen jüngeren und älteren Erwachsenen hindeuten. Auch die Fähigkeit, emotional mit anderen Menschen mitzuschwingen, scheint nicht mit dem Alter abzunehmen (Richter & Kunzmann, 2011).

Entwicklungsunterschiede – oder Unterschiede zwischen Geburtskohorten?

Ob die bisher festgestellten Altersunterschiede eine Entwicklung innerhalb von Personen über unterschiedliche Lebensphasen hinweg widerspiegeln, ist nicht geklärt. Es wäre stattdessen auch möglich, dass es sich um sogenannte Kohorteneffekte handelt, also um stabile Unterschiede zwischen Geburtsjahrgängen, die etwa aus unterschiedlichen historischen Kontexten resultieren können. Beispielsweise war das Kommunizieren über Gefühle vor hundert Jahren in vielen Situationen weniger üblich und akzeptiert, als dies heutzutage der Fall ist. Ob solche Merkmale historischer Sozialisationskontexte zu Unterschieden in empathischer Akkuratheit beitragen, lässt sich jedoch nicht durch querschnittliche Vergleiche von Personen unterschiedlicher Altersgruppen beantworten, auf denen die zitierten Studien beruhen. Hierfür sind längsschnittliche Studien notwendig, in denen dieselben Personen wiederholt über einen längeren Zeitraum untersucht werden. In einer solchen längschnittlichen Studie über einen Zeitraum von 12 Jahren zeigte sich, dass sich ältere Teilnehmer im Vergleich zu den jüngeren zwar selbst als weniger empathisch beschrieben, die selbstberichtete Empathie nahm im

Studienzeitraum jedoch nicht weiter ab (Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008). Dies legt die Vermutung nahe, dass es sich um einen Kohorteneffekt handeln könnte: Möglicherweise ist es heutzutage üblicher, über die Gefühle anderer nachzudenken, als dies früher der Fall war. Ähnliche längsschnittliche Untersuchungen, die Leistungsmaße nutzen, stehen aber bislang aus.

Zusammenfassung und Ausblick

Empathische Fähigkeiten gelten als zentral für menschliche Beziehungen. Sie umfassen kognitive ebenso wie emotionale Komponenten (das *Erkennen* ebenso wie das *Mitempfinden* von Gefühlen anderer Menschen). Diese facettenreichen Fähigkeiten entwickeln sich in jahrelangen Reifungs- und Lernprozessen während der Kindheit und Jugend. Im Laufe des Erwachsenenalters scheinen neueren Forschungsergebnissen zufolge einige isolierte Fähigkeiten im Bereich der kognitiven Empathie wieder abzunehmen (z. B. die Fähigkeit, emotionale Gesichtsausdrücke zu deuten). Die Gründe für diese Abnahme sind bisher nicht abschließend geklärt. Es gibt jedoch auch zahlreiche empathische Fähigkeiten, die bis ins höhere Erwachsenenalter erhalten bleiben. So sind auch ältere Erwachsene in der Lage, Kontext und erworbenes Wissen über nahestehende Personen nutzen, um deren Gefühle zu erschließen. Auch das emotionale Mitschwingen scheint dem Alter zu trotzen: Ältere Personen sind nach wie vor in der Lage, sich mit anderen zu freuen oder mit ihnen zu weinen. Diese vom Abbau ausgeschlossenen Fähigkeiten könnten ein Grund dafür sein, dass ältere Erwachsene trotz Verlusten in einzelnen Bereichen sehr gute Beziehungen zu ihren Mitmenschen haben.

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Chapter 6: General Discussion

This dissertation aimed at broadening the knowledge about adult age differences in empathic skills: When age differences may occur, what consequences they might have, and whether considering aspects of the assessment paradigms, especially issues of ecological validity, may offer a useful framework for understanding these patterns.

Past research suggests that the ability to read others' thoughts and feelings declines with age, as older adults reliably perform worse than younger adults in tests that measure empathic abilities such as emotion recognition (Ruffman, Henry, Livingstone, & Phillips, 2008) and Theory of Mind (ToM; Henry, Phillips, Ruffman, & Bailey, 2013). As empathic skills have been linked to various positive outcomes like affiliation or relationship satisfaction (e.g., Hall, Andrzejewski, & Yopchick, 2009), an age-related decline in these skills has been speculated to impact older adults' social lives. Most studies that reported associations between empathic skills and social adjustment, however, were conducted with children or younger to middle-aged adults. As the few existing studies with older adults produced mixed results, it is uncertain how an age-related decline in empathic skills may affect older adults' social lives. Furthermore, it has been debated whether an age-related decline in empathic skills really exists as tests that measure emotion recognition and ToM have been criticized for various reasons; first and foremost for their lack of ecological validity (e.g., Dziobek, 2012; Isaacowitz & Stanley, 2011). In line with this criticism, empirical evidence for an age-related decline in empathic accuracy (an integrative measure of cognitive empathic skill that can be assessed more realistically) is more ambiguous than the rather clear evidence for emotion recognition and ToM. My coauthors and I therefore empirically investigated whether (1) age differences

between younger and older women exist in an interactive empathic-accuracy task with high ecological validity (Chapter 2), (2) which social implications empathic accuracy has in younger and older women (Chapter 3), and (3) whether age differences in emotion recognition are related to the interpretation of the stimuli as an indicator of task validity (Chapter 4). To disseminate knowledge of age differences in empathic skills, we further wrote a review on the subject, which is addressed to the general German speaking public (Chapter 5). In this *General Discussion*, the empirical findings reported in Chapters 2−4 are summarized and integrated. Strengths and limitations of the current research are pointed out; an outlook on future research and a final conclusion are provided.

6.1 Summary and Integration of the Findings

The results that were reported in the empirical chapters (Chapters 2−4) are briefly summarized in Table 1. In Chapter 2, my coauthors and I followed the call for a more realistic measurement of empathic skills (e.g., Dziobek, 2012; Isaacowitz & Stanley, 2011). Empathic accuracy was assessed in a novel paradigm, in which dyads of younger and older women interacted with each other (either in same-age or in mixed-age dyads). We distinguished empathic accuracy for thoughts and for feelings, and further differentiated between positive and negative affect for both facets. Due to the accumulated empirical findings on age differences in empathic skills, we expected to find age differences in both facets and affective valences. Younger women, however, only outperformed older women in negative affect (both concerning empathic accuracy for thoughts and for feelings), but not in positive affect. A similar finding was obtained in a previous study on age differences in empathic accuracy for feelings (Richter, Dietzel, & Kunzmann, 2011).

Table 1

Summary of the Empirical Studies

Aims	Sample	Findings	Evaluation
Chapter 2 aimed at strengthening empirical evidence on age differences in empathic accuracy as measured in a realistic dyadic interaction setting.	Data set I: $N = 208$ women $n = 102$ younger (20–31 years) $n = 106$ older (69–80 years)	Younger women only outperformed older women in the inference of negative feelings and thoughts accompanying such negative feelings ("negative thoughts"). There were no age differences in the inference of positive feelings and thoughts accompanying such positive feelings ("positive thoughts"). The age-group membership of the interaction partner did not influence these results. The results for empathic accuracy for feelings stayed significant when controlling for the empathizers' own feelings.	The hypothesis of an age-related decline in empathic accuracy was only confirmed for negative, not for positive affect. Age differences in empathic accuracy can be qualified by situational circumstances (e.g., the valence of the inferred content). These age differences may be understood in terms of motivation and in line with the positivity effect. Using more realistic empathic accuracy paradigms may help to identify situations in which older adults exhibit problems in the inference of others' thoughts and feelings, and situations in which they do not.
Chapter 3 aimed at investigating associations between empathic accuracy and social adjustment in younger and in older adults.	Data set I (see Chapter 2)	Older women were more satisfied with the conversation in a dyadic interaction and also more satisfied with their social contacts in general. For younger and older women, the *empathizer's* empathic accuracy for the partner's positive thoughts and feelings was associated with the *empathizer's* conversation satisfaction; this was not the case for the *partner's* accuracy. Empathizer's accuracy for positive thoughts was further associated with her own satisfaction with her social relationships. Age did not moderate the associations. There were no associations between empathic accuracy for negative thoughts or feelings and the outcomes.	The results indicate that empathic accuracy for positive thoughts and feelings seems to be important for younger and for older women's social adjustment. The results support the view that empathic accuracy for positive and for negative affect may serve different goals. If empathic accuracy for negative content is impaired in old age, as suggested by the present findings, then this may not be as big a problem as one could have anticipated based on past research (as empathic accuracy for negative content did not predict the social outcome measures).
Chapter 4 aimed at exploring subjective interpretations of facial emotion-recognition stimuli in younger and older adults, and at investigating associations between such interpretations with recognition performance.	Data set II: $N = 96$ adults $n = 48$ younger (20–30 years) $n = 48$ older (70–78 years) 50% female in both groups	Younger and older adults interpreted the stimuli most strongly as conveying emotional experiences, but also (in this order) as conveying cognitions, action tendencies, and action requests. Younger adults outperformed older adults in the emotion-recognition task, as expected. Higher emotional-experience interpretation ratings predicted emotion-recognition performance in older, but not in younger adults.	Younger and older adults seem to interpret facial emotional stimuli in a multi-functional way. Stronger interpretations of the stimuli as conveying an emotional experience predicted better emotion-recognition performance in older, but not in younger adults. Older adults may need to perceive the emotion-recognition stimuli as conveying emotional experiences—and therefore the task as reasonable and meaningful—in order to perform well. This may highlight the importance of task validity when investigating age differences in empathic skills.

Both the current and this previous study are in line with predictions of the positivity effect. The positivity effect denotes a motivational shift in older adulthood (as compared to younger adulthood) away from negative information towards positive information to maintain or enhance emotional well-being (e.g., Carstensen & Mikels, 2005). In the case of the current study, older adults may have tried to regulate their own emotional well-being during the conversation with the stranger in the dyadic interaction paradigm by attending more closely to positive than to negative information, resulting in more accurate judgments for the partner's positive than the negative affect.

The positivity effect has mostly been rejected as an explanation for age differences in emotion-recognition ability (Isaacowitz & Stanley, 2011; Ruffman, 2011; Ruffman et al., 2008) as younger adults occasionally also outperform older adults in emotion recognition of positive affect. Furthermore, older adults usually have no problems in inferring the negative emotion of disgust. The current study, however, adds to the empirical evidence that age differences observed in rather artificial emotion-recognition tasks may not translate into more realistic tasks. My coauthors and I assume that older adults were less motivated to infer negative affect (and the emotion of disgust was not part of the negative affect assessment in this study). As it is discussed in more detail in the next section, other explanations than motivation may help to explain age differences in the inference of negative affect. Since the recognition of various negative emotions (such as disgust, anger, and fear) is associated with different regions in the brain (e.g., Sprengelmeyer, Rausch, Eysel, & Przuntek, 1998), emotion-specific impairments may exist in older adults (e.g., Ruffman et al., 2008).

Noteworthy, the factor of emotional valence also seems important for understanding the results reported in Chapter 3. These results support the assumption that empathic accuracy for positive affect contributed to the participants' well-being: The more the participants were

able to infer their interaction partners' positive affect, the more satisfied they were with the conversation. Furthermore, empathic accuracy for thoughts accompanying positive feelings was associated with younger and older adults' satisfaction with their social relationships in daily life.

The findings relate to the notion that sharing *positive* events with a social partner and the support received after such sharing may be particularly good for the relationship (as compared to negative events; e.g., Gable, Gonzaga, & Strachman, 2006; Gable, Gosnell, Maisel, & Strachman, 2012). Empathic accuracy for negative affect, in contrast, was not significantly associated with the social outcomes in the current study. This is in line with the observation that empathic accuracy for negative content may not always be beneficial. Whereas empathic accuracy for positive material is usually related to positive social outcomes, empathic inferences for negative content have sometimes even been shown to be associated with negative outcomes, such as lower relationship stability in couples (Simpson, Ickes, & Blackstone, 1995), or lower adjustment at the workplace (Elfenbein & Ambady, 2002). This is not to say that the correct inference of others' negative thoughts and feelings is never helpful or never promotes social well-being, but it could be speculated that the association between higher empathic accuracy and positive social outcomes may be more context-specific in negative affect than it is in positive affect.

Based on previous empirical findings (e.g., Cohen, Schulz, Weiss, & Waldinger, 2012), my coauthors and I hypothesized in Chapter 3 that both the empathizer and the partner would profit from each other's empathic accuracy because of feedback-loops between the partners (e.g., an accurate inference of one partner enables this partner to provide effective social support, which is appreciated and reciprocated by the other partner). Unexpectedly, only the empathizer's empathic accuracy (but not the partner's) predicted the empathizer's

communication satisfaction. We assume that this may be, at least in part, due to the limited duration of the interactions: The partners had only three minutes to talk about the events *and* to react to their respective narratives. It is possible that there was not enough time for feedback-processes to unfold. Furthermore, empathic skills oftentimes only reflect an internal process (e.g., the empathizer understands a social partner's thoughts and feelings), but empathic skills do not necessarily imply behavioral actions (e.g., prosocial behavior) that the other partner can react on. This may also explain why the effect sizes of the associations between empathic accuracy and social outcomes were small. It may be the case that other variables, possibly also other empathic skills like empathic concern, are more important than empathic accuracy in predicting social adjustment. In a study involving a coalition game, self-reported empathic concern was, for example, more predictive of game success than self-reported perspective taking; the reverse was true for a war game in which it was important to understand the opponent's strategy (Gilin, Maddux, Carpenter, & Galinsky, 2013). This study therefore suggests that empathic concern for others can be more important for social harmony than the correct inference of other persons' perspectives.

In Chapter 3, we further assumed that age would moderate the association between empathic accuracy and social adjustment, which, however, was not the case (instead, both younger and older women's empathic accuracy for positive affect was related to the social outcomes). We had derived this hypothesis as an explanation for the "inaccuracy paradox" of older adults maintaining high social adjustment despite declining cognitive empathic skills. In contrast to the premise of declining cognitive empathic skills, older adults (compared with younger adults) only showed lower empathic accuracy for negative affect—the affect facet that turned out to be uncorrelated with the social outcomes. If these findings generalize to other situations as well, diminished empathic accuracy for negative affect may not be very

harmful for older adults' social lives—it may even be adaptive in some situations (e.g., when trying to maintain social harmony). This study is one of the few studies that investigated the assumed link between performance-based cognitive empathic skills and social adjustment in different age groups, and therefore contributes to filling this research gap. Further studies are needed to clarify in which situations age differences in empathic accuracy occur and why, and to differentiate situations in which accuracy for positive and/or negative content may be helpful, from situations in which accuracy may not be relevant or potentially even harmful.

        To further accumulate support for the assumption that the way in which empathic skills are assessed contributes to age differences therein, we investigated another cognitive empathic skill, namely emotion recognition, in Chapter 4. To our knowledge for the first time, we explored age differences in participants' interpretations of facial emotion-recognition stimuli and related these interpretations to their recognition accuracy. In line with componential emotion theories, both younger and older adults interpreted the pictures as conveying not only emotional experiences, but also cognitions, action tendencies, and action requests (in this order of intensity). Interestingly, younger and older adults' interpretations of the pictures were similar, but their interpretations had different effects when predicting the emotion-recognition performance: The interpretation of the stimuli as conveying an emotional experience was only predictive of older adults' emotion-recognition performance, but not of younger adults': The more the older adults agreed that the stimuli conveyed emotional experiences, the more accurately they recognized the depicted emotions. In our view, this finding may suggest that it is more important for older adults than it is for younger adults to perceive emotion-recognition tasks as reasonable and realistic to perform well.

        Younger adults clearly outperformed older adults in the prototypical emotion-recognition paradigm, which may, at least in part, be due to older adults' subjective inter-

pretations of the stimuli. In the dyadic empathic accuracy task, however, older women's accuracy was comparable to younger women's when reading their unfamiliar interaction partners' positive thoughts and feelings, and older women only displayed less accurate inferences concerning negative affective content. However, only empathic accuracy for positive affect, not negative, predicted the women's immediate satisfaction with the conversation and their satisfaction with social relationships in general. These findings may indicate that age differences in empathic skills do not impact older adults lives as strongly as one might have suspected.

As pointed out, the current research had several strengths. Age differences in empathic accuracy for thoughts and feelings were, to our knowledge for the first time, assessed in a dyadic interaction task featuring younger and older unfamiliar participants. To investigate how age differences in empathic skills impact older adults' social lives, we tested associations between empathic-accuracy performance and proximal and distal social adjustment outcomes. To further underline the role of the assessment paradigm in the investigation of age differences in empathic skills, the relationship between subjective interpretations of emotion-recognition stimuli and test performances were examined. This set of studies therefore broadens the knowledge about age differences in empathic skills (particularly empathic accuracy), about potential moderators of such age differences, and about associations of empathic accuracy with social outcomes in people of different age groups. The studies further underline the role of ecological validity in the assessment of age differences in empathic skills. However, the studies also had limitations, which are discussed in the next section.

6.2 Limitations of the Current Research

Samples. Data set I included 208 younger and older women (age ranges: 20−31 years, 69−80 years). The focus on women was due to the already complex research design, which featured 52 mixed-age dyads and 52 age-homogenous dyads. Although gender differences in empathic accuracy may be negligible when participants are instructed in a way that does not prime gender stereotypes (Ickes, Gesn, & Graham, 2000), we cannot draw any conclusions on gender differences. In future studies, it would be very interesting to investigate mixed-gender samples as well to exclude any effect of gender on the reported findings concerning empathic accuracy. Data set II comprised 96 younger and older adults (age ranges: 20−30 years, 70−78 years, 50% female). In this study, we were able to explore gender differences, which, however, were not present. Both data collections only covered two age groups of younger and older adults, assuming a linear relationship between age and the observed variables. Future research should also include middle-aged adults or preferably use age as a continuous variable to further investigate empathic development across the lifespan.

Cross-sectional designs. The studies assessed age differences in empathic skills cross-sectionally. Differences between persons, however, do not necessarily reflect change within persons over time. It is therefore possible that age-related differences as found in Chapters 2−4 are due to differences in the birth cohorts rather than differences between persons of various age groups. Longitudinal designs are needed to investigate this possibility (for an example, see Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008).

Correlational designs. In all reported analyses, associations between predictors and outcomes were correlational; it is therefore not possible to draw any causal conclusions. We assume, for example, that people who inferred their interaction partner's positive thoughts and feelings more accurately enjoyed the conversation more. It may, however, be the case that

participants who generally enjoy interactions more and who are very satisfied with their social relationships have more opportunity to practice their empathic accuracy for positive affect in these positive relationships, and are therefore more accurate when inferring positive content (for a similar suggestion, see e.g., Carton, Kessler, & Pape, 1999).

Focus on cognitive empathic skills vs. emotional reactions. This thesis focused on cognitive empathic skills (the inference of others' thoughts and feelings) because my coauthors and I were interested in adult age differences which were not to be expected in emotional empathic skills (affective reactions towards others). Concerning social outcomes such as communication satisfaction, it may, however, not only be important to infer an interaction partner's thoughts and feelings, but also to emotionally react to these thoughts and feelings, for example, with empathic concern, which the studies did not address.

Underlying mechanisms. In line with the positivity effect in old age, we assume that older women were less motivated than younger women to attend to and to infer the negative thoughts and feelings of an unfamiliar interaction partner (as reported in Chapter 2). However, we did not assess such motivational differences. It is also possible that other factors than motivation play a role in the observed age differences in empathic accuracy (e.g., neuro-psychological changes or cohort differences). We also did not assess the underlying mech-anisms for the associations between empathic accuracy and social adjustment (Chapter 3). It is therefore not clear how the empathizer's empathic accuracy may have fostered the social outcomes, especially since the partner's empathic accuracy was not associated with them. In Chapter 4, we assume that people who perceive a task as reasonable are more motivated to perform well in that task. As motivation was not explicitly assessed, future research is needed to test this mediating mechanism. Considerations of such potential underlying mechanisms are invaluable for scientific progress, as they contribute to generating new hypotheses and may

also offer a framework for understanding empirical findings. However, a direct investigation of these mechanisms was beyond the scope of the presented studies.

   Ecological validity. My coauthors and I designed a modified dyadic interaction paradigm to investigate age differences in empathic skills, which was presumably less artificial than other frequently used measures (i.e., people's accuracy in labelling emotional stimuli, such as pictures). This interaction, however, differed from everyday social interactions in various ways: the conversation topic was fixed (i.e., emotional events), the interaction partner to whom participants were asked to confide these events was a stranger (vs. a confidant), there was only a limited amount of time (i.e., three minutes for each person and each topic), and participants were recorded with a video camera. Thus, it is possible that participants may still have experienced the interaction as somewhat artificial—even though the situation was, within the boundaries of the laboratory setting, designed towards enhancing ecological validity. In data set II, it should be noted that there was no direct question on the perceptions of artificiality and it can thus only be assumed that participants who rated the facial expressions as conveying less emotional experiences perceived such stimuli as more artificial.

6.3 Implications for Future Research and for Practice

   The empirical findings reported in this thesis may inspire future research on the topic of age differences in empathic skills and potential implications of such age differences. It could be especially interesting to isolate situations in which age differences occur, to further investigate why they occur, and which consequences they may have. To identify such situations, my coauthors and I suggest that realistic paradigms should be used that place empathic skills within a meaningful situational context. Furthermore, process models are needed to specify how empathic skills in such situations lead to particular social outcomes. As

the current research emphasizes, empathic skills for positive and for negative affect should be differentiated as both facets may (a) vary differentially when assessing interindividual differences (such as age differences), and may (b) relate differentially to social outcomes. In emotion-recognition tasks, such a differentiation is often not feasible as the tasks usually include several negative, but only one positive emotion (happiness). Ideally, a wide range of empathic skills, including cognitive and emotional facets should be measured to capture the concept of *empathy*. Longitudinal studies are favorable to test for cohort differences in empathic skills and to learn more about the long-term trajectory of empathic skills across the lifespan. To test whether it is really motivation that drives age differences in empathic skills, it may be fruitful to manipulate experimentally the motivation to be accurate.

Whether age differences in empathic skills exist, why they might exist, and what kind of consequences such age differences may have, are important questions for aging societies. Especially concerning situations in which empathy is very relevant, such as psychotherapy sessions, it would be important to know more about age differences in empathic skills. In a study by Kwon and Jo (2012), more experienced therapists were more empathically accurate for their clients' thoughts in recorded therapy sessions and the clients were more satisfied with these counselors. The average counselor in the study was about 48 years old (age-range 25−54 years) and—although not explicitly stated in the study—counseling experience should be strongly correlated with chronological age. It may therefore be interesting to know whether older (but more experienced) counselors would exhibit declining skills in empathic accuracy. This study further implies that empathic skills can be trained (see also e.g., Marangoni, Garcia, Ickes, & Teng, 1995). Whereas there is a growing industry of "brain jogging" games to maintain or improve of cognitive skills in old age, there are, to our knowledge, no such programs that are specifically designed to enhance older adults' emotional abilities. Whether

or not such programs could help older adults to improve their skills, and whether such an improvement is really necessary, are interesting future questions.

6.4 Conclusion

This thesis investigated age differences in empathic accuracy in a novel dyadic interaction task, social consequences of empathic accuracy, and the association between the interpretation of traditionally used facial emotion-recognition stimuli and emotion-recognition performance. The results suggest that age difference in empathic accuracy may be context-dependent, with older adults displaying less accuracy for negative affect than younger adults. There was, however, no empirical evidence for social implications of such age differences regarding negative affect. Older adults' performance in the traditional emotion-recognition task was predicted by their subjective interpretations of the stimuli as conveying emotional experiences. Indirectly, these studies suggest that age-related differences may not merely reflect differences in the level of empathic skills, but also differences in motivation. My coauthors and I discussed this possibility regarding the motivation for attending to positive and negative information, and regarding task motivation as a function of task validity.

Future research might build on these findings to further differentiate when and why older adults are less empathic than younger adults, and what the implication of such age differences may be. In the light of these promising avenues for future research, I agree with Barack Obama's statement that I quoted in the beginning of this thesis: I hope that we will talk more about empathy.

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Curriculum Vitae

List of Publications

indicates publications that are part of the thesis

Publications

*Blanke, E. S., Rauers, A., Studtmann, M., & Riediger, M. (*submitted*). What do you see when you look at me? Interpretation of emotional facial expressions and recognition accuracy in younger and older adults.

*Blanke, E. S., Rauers, A., & Riediger, M. (*submitted*). Weißt du, was ich fühle? – Empathische Fähigkeiten im Lebensverlauf [Do you know what I feel?—Empathic abilities across the lifespan].

*Blanke, E. S., Rauers, A., & Riediger, M. (*in revision*). Does being empathic pay off?—Social implications of empathic accuracy in younger and older women. *Emotion.*

*Blanke, E. S., Rauers, A., & Riediger, M. (2014). Nice to meet you—Adult age differences in empathic accuracy for strangers. *Psychology and Aging*. Advance online Publication. doi: 10.1037/a0038459

Rauers, A., **Blanke, E.,** & Riediger, M. (2013). Everyday empathic accuracy in younger and older couples: Do you need to see your partner to know his or her feelings? *Psychological Science*, *24*, 2210-2217. doi:10.1177/0956797613490747

Blanke, E. (2011). *Ich weiß, was du fühlst: Empathische Akkuratheit in Paarbeziehungen junger und älterer Erwachsener [I know how you feel – Empathic accuracy in younger and older couples]* (Unpublished diploma thesis). Freie Universität Berlin, Germany.

Conference Presentations

Blanke, E. S., Rauers, A., & Riediger, M. (2014, November). *Does being empathic pay off?—Social implications of empathic skills in younger and older women.* Paper presented at the 67th Annual Scientific Meeting of the Gerontological Society of America in Washington D.C., USA.

Blanke, E. S., Rauers, A., & Riediger, M. (2014, September). *Warum sich Gedankenlesen in jedem Alter lohnt – Empathische Akkuratheit und Interaktionszufriedenheit im frühen und späten Erwachsenenalter [Why mind reading pays off at every age—Empathic accuracy and interaction satisfaction in younger and older adults].* Paper presented at the 49th Meeting of the German Psychological Association in Bochum, Germany.

Blanke, E., Rauers, A., & Riediger, M. (2014, March). *Reading others' thoughts and feelings—Age differences and social implications.* Paper presented at the Consortium of European Research on Emotion Conference 2014 in Berlin, Germany.

Blanke, E., Rauers, A., & Riediger, M (2014, February). *Nice to meet you—Empathic accuracy and social outcomes in zero-acquaintance dyads.* Poster presented at the 15th Annual Conference of the Society for Personality and Social Psychology in Austin, Texas, USA.

Blanke, E., Rauers, A., & Riediger, M. (2013, September). *Schön, Sie kennen zu lernen—Interpersonale Kompetenzen gegenüber Fremden im Altersvergleich [Nice to meet you—Age differences in interpersonal competencies towards strangers].* Poster presented at the 21st Meeting of the unit for developmental psychology of the German Psychological Association in Saarbrücken, Germany.

Blanke, E. , Bartz, J., Bullig, H., Chwiekowsky, C. , Dern, S., Elias, R.,…Dziobek, I. (2012, February). *Go with the Flow? Zusammenhänge zwischen Flow-Zustand und Spezialinteressen bei Autisten [Go with the Flow? Associations between flow state and special interests in autism].* Poster presented at the 5th Scientific Meeting for Autism Spectrum Conditions in Augsburg, Germany.

Rauers, A., **Blanke, E.,** & Riediger, M. (2011, November). *Empathic accuracy in younger and older couples—Reconsidering age differences.* Paper presented at the 64th Annual Scientific Meeting of the Gerontological Society of America in Boston, Massachusetts, USA.

Rauers, A., **Blanke, E.** & Riediger, M. (2011, September). *„Altert" die Fähigkeit zur Wahrnehmung der Gefühle anderer tatsächlich? Ein Methodenvergleich [Does the ability to read others' emotions actually age? Comparing methods].* Paper presented at the 20th Meeting of the unit for developmental psychology of the German Psychological Association in Erfurt, Germany.

Rauers, A., **Blanke, E.,** & Riediger, M (2011, January). *Reading others' emotions in everyday life—A dyadic experience-sampling study.* Poster presented at the 12th Annual Conference of the Society for Personality and Social Psychology in San Antonio, Texas, USA.

Erklärung

Hiermit versichere ich, dass ich die vorliegende Arbeit selbstständig verfasst habe. Andere als die angegebenen Hilfsmittel habe ich nicht verwendet. Die Arbeit ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

Berlin, 2015   _____

                                                    Unterschrift (Elisabeth S. Blanke)