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Empathic reactions of younger and older adults: No age related decline in affective responding ☆

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HIGHLIGHTS

- We assessed performance based affective and cognitive empathy in two age groups.
- Cognitive empathy for happiness and sadness was reduced for older adults.
- Older adults' affective empathy was not reduced in comparison to younger adults.
- Older adults outperformed younger adults in the facial mimicry of disgust.
- 20 s long dynamic stimuli produced continuous facial muscle reactions.

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ABSTRACT

Empathy is an important skill in all stages of life. However, previous research suggests that cognitive empathy, i.e. the ability to accurately infer another person's feelings, is reduced for older adults. Here, we suggested that investigating affective empathy in addition to cognitive empathy could provide a more complete picture of how older adults differ from younger adults in their ability to empathize with others. For this, we presented videos of spontaneous facial expressions portraying happiness, anger, sadness and disgust to 39 younger and 39 older adults. Affective responding was measured via facial mimicry and cognitive empathy was measured via decoding accuracy. We did not expect and did not find evidence for impaired affective responding to emotional expressions in old age; however, cognitive empathy was reduced for happiness and sadness. Thus, empathic reactions of older adults might not be as affected as findings based only on decoding accuracy may suggest.

Introduction

Knowing what other people feel is fundamental in all stages of life. Empathic reactions are important for our social relationships and well-being, as lower empathy is associated with reduced social functioning (Bailey, Henry, & von Hippel, 2008; Findlay, Girardi, & Coplan, 2006). However, there is evidence that one aspect of empathy – the ability to decode emotion expressions – is reduced in older compared to younger adults (for overviews see Isaacowitz & Stanley, 2011; Ruffman, Henry, Livingstone, & Phillips, 2008). Yet, there is another, implicit, facet of empathy, which consists of the affective responding to the emotional expressions of others, and which has rarely been studied in older adults. Given that implicit, automatic processes, in contrast to controlled processes, are less affected by aging (e.g., Ruffman, Ng, & Jenkin, 2009), and that emotional information becomes more salient in older age (Carstensen, Fung, & Charles, 2003), there is reason to believe that affective and cognitive empathy may be differentially affected by aging. Spontaneous reactions to emotional images are well preserved across the lifespan (Fleischman, Wilson, Gabrieli, Bienias, & Bennett, 2004; Jennings & Jacoby, 1993; Leclerc & Kensinger, 2008). Importantly, this notion is not in conflict with findings of impaired decoding accuracy for older adults, which relies more on the controlled, deliberate processing that is affected by age (Salthouse, 1996).

The goal of this research was to study empathic reactions of younger and older adults not only through explicit emotion recognition but also through the assessment of implicit affective reactions during the exposure to emotional facial expressions. In what follows, we will define empathy in the framework of this research and discuss evidence for differences between younger and older adults in empathic responding.

Empathy

Empathy is the ability to understand and respond to the emotional messages of others (Decety & Jackson, 2004) and is divided into two components (Lamm, Batson, & Decety, 2007): (1) *cognitive empathy*,

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the ability to accurately infer another person's feelings (e.g., Ickes, 1993) and (2) *affective empathy*, a process where the perception of another's emotional state generates a matching reaction in the perceiver (e.g. De Waal, 2008). Thus, empathy comprises the bottom-up process of affective resonance and top-down processes of understanding, which are influenced by other cognitive processes such as the perceiver's motivation and empathic experience (Decety, 2011). Therefore, investigating affective empathy in addition to cognitive empathy can provide a more complete picture of how younger and older adults differ in their ability to empathize with others.

Cognitive empathy and the elderly

Cognitive empathy is measured as the accuracy with which the perceiver decodes emotion expressions and research suggests reduced decoding accuracy of older perceivers. For example, Malatesta, Izard, Culver, and Nicolich (1987) assessed the decoding of facial expressions of anger, sadness and fear for women of three age-groups and found an age-related decline for all three emotions. Another series of studies found that with increasing age, participants were less accurate in decoding anger, fear and sadness in faces, but showed improved decoding of disgust (Calder et al., 2003). A meta-analytic review on emotion recognition and aging confirmed these findings (Ruffman et al., 2008). Specifically, older individual's ability to decode facial expressions of anger, sadness and fear was reduced, compared to younger individuals. Older individuals were also worse at decoding happiness and surprise, but on a smaller scale. For disgust there was a trend for better decoding in older individuals. In sum, compared to younger individuals, older individuals show reduced cognitive empathy in terms of decoding emotions expressed in faces, with the exception of disgust.

Affective empathy and the elderly

Only few studies have tapped affective empathy in the context of aging. Bailey et al. (2008) measured self-reported and performance based empathy in younger and older adults and found that the two groups differed in self-reported and performance based cognitive empathy, but not in self-reported affective empathy (no performance based measure of affective empathy was included). Even though these findings are evocative, they rely heavily on self-reports of empathy.

By contrast, the spontaneous emotional response to facial expressions provides a performance based assessment of affective empathy. Specifically, the tendency to imitate facially, vocally or posturally the people with whom we are interacting is referred to as mimicry (e.g., Hess, Philippot, & Blairy, 1999). Facial mimicry is an unconscious and automatic process that is difficult to suppress (Dimberg, Thunberg, & Elmehed, 2000). Mimicry is an important aspect of empathic responding (Lamm, Porges, Cacioppo, & Decety, 2008) and part of the empathic process (e.g., Decety & Jackson, 2004). Given that facial muscle activation does not differ as a function of age (Reminger, Kaszniak, & Dalby, 2000), facial mimicry is a possible index for the comparison of affective empathy between younger and older adults. To our knowledge, only two studies compared facial mimicry in those age groups (Bailey & Henry, 2009; Bailey, Henry, & Nangle, 2009). Bailey and colleagues measured facial mimicry of younger and older adults to anger and happiness expressions and found no differences in muscle activity between the two age groups. Bailey et al. (2009) however also found that older adults' corrugator responses to anger expressions at 500–800 ms of stimulus exposure were associated with reduced anger recognition in a subsequent Go/NoGo task and suggested that these results might be indicative of difficulties in the labeling of angry expressions. Thus, the extant evidence on anger mimicry of older adults' is mixed. Furthermore, as these studies only focused on mimicry of happiness and anger, and as decoding accuracy differs across emotions (Ruffman et al., 2008), it would be desirable to extend this line of research to a broader range of emotions.

An ecological approach

Age-related decoding differences have previously been explained by a general cognitive decline, specific neuropsychological changes and changes in affectivity (Ruffman et al., 2008). A recent review however suggested the use of static images as another possible source for the age-related differences, pleading for an ecological approach in the assessment of decoding accuracy (Isaacowitz & Stanley, 2011). Older adults have more experience with natural expressions than with static images, thus a great improvement in this investigation would be the use of natural emotion expressions such as encountered in real life.

It is also worth noting that dynamic expressions facilitate facial mimicry compared to static images (Rymarczyk, Biele, Grabowska, & Majczynski, 2011; Sato, Fujimura, & Suzuki, 2008). However, little is known about the characteristics of facial mimicry toward natural dynamic facial expressions over time. It is particularly interesting what happens with facial muscle reactions toward spontaneous expressions, as the intensity of the emotional expressions varies over time. Although no general pattern for the onset and variation of intensity of the stimuli during the 20 s long sequences can be formulated, the length of the videos allowed us to investigate in an explorative manner, how facial muscle reactions to natural expressions develop over time.

To these ends we assessed decoding accuracy and performance based affective empathy in the form of facial mimicry, toward a range of natural dynamic emotion expressions shown by younger and older adults. We expected that older adults would not show impaired empathy in terms of automatic affective responding. Thus, we expected comparable levels and time characteristics of facial muscle reactions for younger and older adults, whereas decoding accuracy of older adults should be reduced.

Method

Participants

Thirty-nine older (aged 62 to 85 years) and thirty-nine younger (aged 18 to 30 years) women participated individually in the study. They were recruited at Humboldt-Universität zu Berlin via a participant database and the Third Age University and screened for psychiatric and neurological diseases. Participants received 10 € per hour.

We used the PANAS (Positive and Negative Affect Schedule, Watson, Clark, & Tellegen, 1988; German version: Krohne, Egloff, Kohlmann, & Tausch, 1996), with short-term instruction ("How do you feel right now?") to assess current mood. As is typically found (e.g., Charles, Reynolds, & Gatz, 2001), younger participants reported less positive and more negative affect compared to the older participants. Older participants scored higher in crystallized intelligence assessed by the WST (Wortschatztest, Schmidt & Metzler, 1992), a German test in which a target word has to be identified among five pseudo-words, whereas the younger adults showed higher levels of fluid intelligence assessed by the reasoning subtest of the LPS (Leistungsprüfsystem, Horn, 1983), in which non-matching figures have to be identified among logically related figures. The two groups did not differ in educational attainment, measured by the highest educational qualification achieved. Table 1 shows the basic characteristics of the two age groups.

Stimuli

Thirty-two soundless spontaneous facial expressive sequences of 20 second length were taken from a set of such stimuli developed and validated by Fölster, Hess, Hühnel, and Werheid (submitted for publication). The expressions were filmed while younger and older participants narrated an emotional event from their life. We selected videos that had achieved the highest accuracy ratings in the validation study. This selection comprised four younger (2 female, 2 male) and four