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Emotional Aging: Taking the Immediate Context Seriously

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The authors provide a review of selected laboratory research on age differences in emotional functioning. The authors propose that this research area would benefit from an ecological approach in which the immediate context of emotional functioning is more explicitly considered. More specifically, to date many laboratory studies have used stimuli and tasks with little ecological validity and did not explicitly consider the possibility that the research setting and stimulus material might have age-differential effects on the outcome measures. This practice may have led to inconsistent findings across studies and narrow or incorrect conclusions in terms of older adults’ emotional functioning.

Researchers interested in emotional aging have proposed that skills and processes related to emotion may not display the age-related losses that have been documented for many cognitive processes and skills (e.g., Carstensen, 2006; Charles & Luong, 2013). To this end, a prominent theory of emotional aging, socioemotional selectivity theory (SST), has stated that, with increasing age, individuals become more motivated to cultivate their emotional skills so as to maintain or even improve the quality of their social relationships and emotional well-being (e.g., Carstensen, 2006). SST states that the mechanism underlying these age-related gains in emotional functioning involves the perception of future time left in life, which becomes increasingly reduced as people age; this makes individuals focus on maximizing meaningful, positive affective experiences, particularly in close social relationships.

A similarly prominent theory of emotional aging, dynamic integration theory (DIT; Labouvie-Vief, 2003) also proposes that the quality of emotional experience improves with age. DIT states, however, that this age-related improvement is a by-product of age-related decline in cognitive resources. More specifically, diminishing cognitive resources, particularly those referring to basic information-processing functions, make it increasingly more difficult for the older individual to represent affectively-laden situations in complex and differentiated ways. Instead of engaging in the effortful process of making sense of their own and other people’s negative and/or ambivalent emotions, older adults increasingly tend to focus on often effortless and cognitively undemanding strategies of affect optimization (e.g., by preemptively avoiding negative experiences).
and potentially stressful situations rather than confront these situations). As a consequence, older adults’ affective experiences are often more positive and less negative than those of the young.

These two theories of emotional aging have motivated numerous laboratory and field studies interested in age differences in basic emotional processes and more complex emotional competencies and, thus, have been extremely useful in advancing our knowledge about age and emotion. Rather than focusing on the obvious differences between the two theories, we would like to highlight one characteristic that both theories have in common: namely, they have focused on describing and explaining general age-related changes in emotional functioning. Thus, the prevailing question has been whether emotional competence in old age is a theme of loss, stability, or gain. Interestingly, despite their different putative mechanisms, both theories state that older age is a time of emotional gains. This is not to say that researchers working in this field have been unaware of the role that the broader and immediate context of individuals can play in emotional functioning and its development over the life span (e.g., Charles & Luong, 2013). However, these differences in context have not been systematically addressed and have not been incorporated into the existing theories.

And yet, lately, there has been increasing awareness of contextual variations in individual and age-related differences in emotional functioning (e.g., Brose, Scheibe, & Schmiedek, 2013; Kunzmann, Rohr, Wieck, Kappes, & Wrosch, 2017; Troy, Shallcross, & Mauss, 2013; Wieck & Kunzmann, 2015). Two factors may be responsible for this trend. First, empirical evidence for age differences in emotional functioning often is more heterogeneous than one would expect on the basis of the two broad theories outlined above. In fact, for many realms, the current evidence speaks for a heterogeneous pattern of age differences, with some studies suggesting age-related improvement, other studies age-related stability, and yet other studies age-related deterioration (see review by Kunzmann & Wrosch, 2017). These heterogeneous findings raise questions about what factors moderate potential age differences in emotional functioning. As we review, there is a small, but growing, number of studies suggesting that variations in the immediate context that evoke emotional responses and require emotional skills may be a factor that can explain part of the inconsistent evidence.

A second and related reason for the increased interest in the effects of the immediate context on age differences in emotional functioning may be the recurring attention to issues related to the concept of ecological validity in the field of psychological aging (e.g., Freund & Isaacowitz, 2013; Isaacowitz & Stanley, 2011). This concept, once introduced by Brunswik (1952), clearly has a long history in psychology (Hammond & Stewart, 2001). Since Brunswik’s time, the idea that ecologically valid research is highly desirable has been accepted generally; however, it has also become evident that there is no clear consensus on exactly what is meant by ecological validity (e.g., Bronfenbrenner, 1977; Hammond & Stewart, 2001). On a general level, ecological validity has often been taken to refer to whether one can generalize from observed behavior in an empirical study to natural behavior in the world. On more specific levels, ecological validity encompasses several dimensions that all involve a concern with representativeness and naturalness; for example, of the setting of a study, the particular stimuli that are being used, the responses and behaviors that are elicited, or the time points that are sampled (e.g., Dhami, Hertwig, & Hoffrage, 2004; Fiedler, 2011). Brunswik himself, as well as the many researchers that have become interested in the concept of ecological validity since Brunswik, have noticed the difficulties associated with designing studies that meet all criteria for representativeness and naturalness (Brunswik, 1952). A theoretical problem is to define the appropriate reference
classes; for example, it often is difficult if not impossible to precisely define the reference class of stimuli and population parameters are influenced by multiple factors, including participants’ age, habits, or traits. Thus, the question arises “representative for what?” Naturalness is a similarly elusive concept given the lack of criteria that could help determine the right degree of naturalness of laboratory settings, stimuli, or tasks.

Despite these challenges to applying ecological validity in practice, we agree with many other researchers that though ecological validity should be considered an ideal that one may never fully achieve, it may still guide the conceptualization of empirical studies and the interpretation of the respective findings (e.g., Dharm et al., 2004; Fiedler, 2011). Seen in this light, and as eloquently discussed by Bronfenbrenner (1977, p. 514), rigor and relevance, systematic experimentation and naturalistic observation, are not incompatible but complementary. As we discuss, an approach to experimentation that selects and executes designs with an awareness that the ultimate goal is to understand phenomena as they occur in the real world (of which the laboratory is a tiny fraction) will force us to consider that age differences in emotional functioning may be dependent on the immediate situation. Thus, taking into account parameters of the immediate situation can contribute to a more nuanced understanding of age differences in emotional outcomes.

In the remainder, we first provide a brief discussion of two highly related aspects of ecological validity that refer to the immediate situation in which emotions are experienced and expressed, that is, the research setting and the stimuli used. Subsequently, we review past work interested in age differences in three realms of emotional functioning: affective information processing, emotional reactivity, and emotion perception. This review is selective rather than comprehensive; our goal is to illustrate that a consideration of the two aspects of ecological validity, research setting and stimuli, may help make sense of the often inconsistent findings in the field of emotional aging and should, thus, receive greater attention in theoretical and empirical work.

TWO DIMENSIONS OF ECOLOGICAL VALIDITY

The Research Setting

According to Brunswik (1955), a key issue regarding the ecological validity of the research setting is its representativeness and naturalness, with the idea that the research setting should contain crucial features of naturalistic settings. Thus, ecological validity involves maintaining the integrity of the real-life situation in the experimental context while remaining faithful to the larger social and cultural context. Is the experimental set up the most appropriate setting for the issue under investigation? Is the setting an important part of the individual’s everyday life? Is it truly relevant to the phenomenon that is being considered? Following Bronfenbrenner (1977), the research setting may be defined by the factors place (e.g., at home, in school, at the physician’s office), time (e.g., daytime, weekdays vs. weekends), physical features (e.g., in a comfortable and pleasant environment), activity (e.g., a conversation about the events of the day), and role (e.g., daughter, mother, friend). With few exceptions, the operation of these factors and their potential relevance to the phenomenon under consideration (e.g., the ability to perceive others’ emotions accurately) has been largely ignored in current laboratory work in the
study of emotional aging. As Bronfenbrenner (1977) once said about his field “much of contemporary developmental psychology is the science of the strange behavior of children in strange situations with strange adults for the briefest possible periods of time” (p. 513). This criticism most likely still applies to date and certainly generalizes to the field of emotional aging. That is, many experiments, including our own, take place in an unfamiliar and socially isolated situation, in which participants passively process more or less personally irrelevant information and their activity is limited to responding to computer-based standardized questions by pressing certain computer keys.

The Research Stimuli

Perhaps the most often considered aspect of ecological validity refers to the stimuli under examination. Do the stimuli represent actual occurrences in the real world? What is the importance of the stimuli in the population of possible stimuli? Are the stimuli familiar and relevant to the participant? The problem that stimuli used in experiments are often artificial in that they critically differ from the real world has been discussed in many psychological disciplines, including child development (e.g., Montague & Walker-Andrews, 2001) and cognitive psychology (Dhami et al., 2004). As to our own field, we believe that an awareness of the benefits of selecting and shaping stimuli on the basis of explicit theoretical considerations as to their meaningfulness for a given phenomenon in the real world could certainly be increased. As is discussed below, there is a small but increasing body of evidence in the field of emotional aging, suggesting that the use of stimuli that are similar to real-life situations and that evoke the responses or skills that are of interest can contribute to a more nuanced understanding of age differences (and similarities) in emotional functioning.

Summary

Research setting and stimuli are two important and related aspects of ecological validity. Other dimensions are likely important as well, such as the time points sampled or the behavioral responses elicited. However, we believe that focusing specifically on these two interrelated aspects of the immediate context is especially relevant to viewing previous experimental work on emotional aging in a different light. In the following, we provide such a discussion and focus on laboratory work interested in age differences in three domains: affective information processing, emotional reactivity, and emotion perception.

EMPIRICAL RESEARCH INTERESTED IN THE AGE-RELATED POSITIVITY EFFECT

As a first example, we consider work interested in a phenomenon central to current conceptualizations of SST, the age-related positivity effect: defined as older adults’ tendency to prioritize affectively positive over affectively negative information in attention and memory (e.g., Mather, 2012). SST states that older adults’ affective information processing is focused on the positive because of their chronically activated goals related to emotional meaning and satisfaction. Put differently, because older adults’ top priority is to feel good, they prioritize positive over negative information. Initial research on age differences in the processing of emotional information
consistently supported the positivity effect in attention (e.g., Isaacowitz, Wadlinger, Goren, & Wilson, 2006a, 2006b; Mather & Carstensen, 2003) and memory (e.g., Charles, Mather, & Carstensen, 2003; Kennedy, Mather, & Carstensen, 2004). At the same time, it became evident that more than a few studies have not found evidence for overall age differences in the processing of affective information (see meta-analysis by Murphy & Isaacowitz, 2008). A factor that may partly explain this inconsistent evidence and, thus, moderate age differences in affective information processing refers to what Reed and colleagues (2014) have called processing constraints (e.g., instructions to remember the to be presented information later or to evaluate certain aspects of the information at encoding). The authors state that these processing constraints would activate situation-specific goals (e.g., to competently evaluate the stimulus material) that override older adults’ chronically activated top priority goal: namely, to feel good in the moment. They conclude:

because of the disproportionate impact of processing constraints on positivity, it is imperative to recognize and assess the consequences of often unintended methodological alterations in this area of study. As illustrated in the present meta-analysis, merely notifying participants that their memory will be tested before presenting stimuli significantly reduces age differences in preferential processing, in large part by eliminating older adults’ natural prioritization of positive over negative information, (Reed et al., 2014, p. 12)

The authors then recommend that researchers interested in age differences in the processing of emotional information should remove all potential constraints or barriers and use particular instructions (to watch stimuli passively as one would watch TV) and stimuli (stimuli that are not consequential and of little significance) so as to maximize their chances to actually find support for the positivity effect.

**Considering Research on the Age-Related Positivity Effect from an Ecological Validity Perspective**

Seen from the perspective that we advocate in this article, the authors’ conclusions and recommendations appear problematic. First, it cannot be ruled out that positivity effects are limited to rather specific types of situations. As noted by Reed and colleagues (2014), as soon as older adults are minimally motivated to engage with the offered information, they process positive and negative information equally. Perhaps assuming that older adults prefer emotion regulatory goals by default is a serious simplification? Older adults may indeed have several similarly important and identity-forming goals (e.g., feel good, be generative, grow personally). Depending on the immediate situation, one or several of these goals may be activated and may together determine affective information processing. On the basis of the currently available evidence, it is unclear if the “feel good” goal is in any way more fundamental or more often salient and preferred than other types of goals.

Seen from a somewhat different angle, given that the vast majority of past studies interested in the age-related positivity effect used stimuli and tasks with minimal significance to participants, the salience of the “feel good” goal in real life is largely unknown. Real-life affective information processing rarely is an end in itself. Instead, it is often consequential in that it serves various purposes beyond the immediate situation. Consistent with this idea, functional emotion theories have made the point that neglecting the processing of affectively negative information can have enormous costs (e.g., Ekman, 1999; Levenson, 1994). For example, what might happen
if we persistently overlook a friend’s disappointment about something we did? What might happen if we were to ignore negative news about our health or that of close others? Of course, one can treat situations that are unsuitable to detect a positivity effect in older adults as exceptions and continue to selectively choose those stimuli and research settings that reliably produce the desired result. However, if the goal is to better understand how older adults process affective information in contexts other than the laboratory, it is more promising to actually investigate affective information processing via laboratory paradigms that better match younger and older adults’ everyday life contexts and to begin to systematically test characteristics of the immediate situation that either eliminate or enhance positivity effects. Thus, rather than instruct researchers to narrow the context and goals to get the effect, researchers should be varying the context and goals to understand the different age patterns observed under different everyday goal conditions.

Research varying the cognitive load of affective information processing tasks by introducing dual task conditions in which individuals visually process affective information while they engage in an affectively neutral and unrelated auditory task is one case in point. Consistent with the idea that positivity effects in attention and memory result from goal-related cognitive resource-demanding “top-down” processes, this research found that older adults’ positivity effects are eliminated under cognitive load (Mather, 2012). Viewed from an ecological validity perspective, an obvious question is how many daily life situations may exist that allow the older individual to focus only on the processing of affective information. Perhaps not many, given that affectively laden situations (particularly social encounters) often involve active rather than passive processing of more than one type of information (affective, perceptive, or conceptual) conveyed by more than one source in often inconsistent ways.

It is also important to note that a few laboratory studies interested in the age-related positivity effect did use meaningful stimuli. One such study examined age differences in information acquisition and recall in the health care realm (Löckenhoff & Carstensen, 2007). Using computer-based scenarios, younger and older adults reviewed choice criteria that contained positive, negative, or neutral information about different physicians and health care plans. Participants reviewed the choice criteria under one of three conditions: information-focus condition (“as you review the information, please focus on the specific facts and details”), no-focus condition, or emotion-regulation focus condition (“as you review the information, please focus on how you are feeling”). As the authors predicted, there was no evidence for an age-related positivity effect under the information-focus instruction, but older, as compared to younger, adults reviewed relatively more positive than negative material in the no-focus and emotion-regulation focus conditions. This study provides important information about the mechanisms that can account for the age-related positivity effect as its findings demonstrate that it is not age per se that drives this effect, but motivational orientations that can be activated by situational characteristics. From an ecological validity perspective, however, the question arises how often people have no particular goal or an emotion-regulation goal while they process information that can inform their decisions in real-life, particularly if these decisions are important and consequential. We assume that most (older) individuals would adopt what Löckenhoff and Carstensen (2007) have called an information-focus and, thus, would not show a positivity effect. More generally speaking, when interpreting this and other similar laboratory findings, it seems important to keep in mind that certain experimental manipulations (in this case, a focus on how one feels during information acquisition) may create conditions in the laboratory that rarely occur in real life.
A recent study from one of our laboratories also suggested that age-related positivity effects may often be overwritten in laboratory contexts that mimic real-life situations. This work has investigated potential age-related positivity effects using the most familiar, everyday possible task: changing channels on a TV. In this TV-watching paradigm, channel choices varied in both valence and arousal. Participants were asked to change channels and watch whatever was interesting to them. Across two studies, the most consistent age pattern was not about valence but about arousal: older individuals selected more low arousal choices (Sands, Garbacz, & Isaacowitz, 2016). Thus, “everyday” contexts may point away from the importance of valence alone in motivating age difference, thus reinforcing the importance of considering a range of contexts and goal states that may be typical in everyday life rather than simply honing in on the one that most consistently yields age differences in valence processing.

AGE DIFFERENCES IN EMOTIONAL REACTIONS TO NEGATIVE STIMULI

Research on age differences in emotional reactivity, the capacity to spontaneously react to emotional stimuli, also revealed a heterogeneous pattern of findings, with some studies suggesting an age-related decrease, other studies age-related stability, and yet other studies an age-related increase (see review by Kunzmann & Wrosch, 2017).

In this work, adults of different age groups are often presented with emotion-evoking stimuli, particularly pictures from the International Affective Picture System (Lang, Bradley, & Cuthbert, 2008), film clips (Levenson, 2000), or audiotapes (Charles & Carstensen, 2008) and emotional reactions are assessed either online (e.g., cardiovascular or facial expressive reactions) or shortly after the stimulus presentation (e.g., self-reported subjective reactions). According to earlier reviews, there is much age similarity in emotional reactivity, at least on the levels of subjective feelings and facial expressions. For example, Levenson (2000) concluded from his review of relevant laboratory work that “emotion represents one of the few psychological domains in which functioning is well preserved and even improves with age” (p. 138). In the meantime, however, a number of laboratory studies interested in age and emotional reactivity have yielded a more mixed pattern of findings, suggesting that such general conclusions may be in need of qualification.

Critical for the present considerations, there is a small but growing body of evidence suggesting that the immediate situation, particularly age differences in the personal relevance of emotion-evoking stimuli, can partly explain the mixed evidence. More specifically, studies that have presented stimuli that presumably are highly relevant to older adults, for example, film clips of middle-age and older adults dealing with age-typical losses of loved ones, life-threatening diseases such as Alzheimer’s, and their own death and dying, consistently elicited greater emotional reactions, particularly sadness, in older than younger adults. In addition, the often documented age-related decrease in cardiovascular reactivity was not evident (Kunzmann & Grühn, 2005; Kunzmann & Richter, 2009) or even reversed, with older adults exhibiting greater physiological reactions during exposure to loss-related stimuli than their younger counterparts (Seider, Shiota, Whalen, & Levenson, 2011). It has been suggested that the high prevalence of the theme of loss may sensitize older adults to loss-related issues. For example, the appraisal of a situation as irreversible loss is likely to be more readily accessible in old age than at earlier phases in the life-span and older adults should grasp the many aspects and
implications of a fundamental loss more immediately and comprehensively than young adults. These factors most likely contribute to older adults’ enhanced emotional reactions to loss-related stimuli.

Further refining this idea, related research suggests that topics of great personal relevance in young adulthood, but not in old age, consistently elicit greater emotional reactions in younger than older adults. Specifically, younger adults reacted with greater negative emotions, particularly anger and anger-related emotions, when being exposed to stimuli of interpersonal conflict. These stimuli have been hypothesized to be of greater personal relevance to younger than older adults because younger adults are much more likely and willing to engage in interpersonal confrontation (e.g., Luong, Charles, & Fingerman, 2011) and have a stronger need to pursue their goals in situations in which these are threatened because they are ignored or intentionally blocked by others. More generally speaking, processes of tenacious goal pursuit in the face of obstacles have been shown to be particularly frequent and adaptive in young adulthood but not in old age (e.g., Heckhausen, Wrosch, & Schulz, 2010). It has been suggested that the high need for goal achievement may sensitize younger adults to issues related to interpersonal conflict, particularly if a conflict results from one party ignoring or thwarting the other party’s goals. The consequences of not being able to achieve a personal goal may generally be more deleterious for and, thus, more readily available to younger adults than to older adults. This, in turn, most likely contributes to younger adults’ enhanced emotional reactions.

Given that the different types of situations characterized above typically elicit different negative emotions (losses typically elicit sadness, whereas the appraisal that one’s goals are ignored or blocked by others typically elicit anger), one of us has proposed a discrete emotions theory to affective aging (DEA; Kunzmann & Wrosch, 2017). DEA states that anger is a negative emotion that is particularly salient (i.e., more frequently experienced and, if elicited, more intense) in young adulthood, whereas sadness is a negative emotion that is particularly salient in old age. Seen in this light, and as discussed above, higher negative reactions in a particular age group partly result from the emotion-evoking stimuli being particularly relevant to the members of this age group. Thus, relatively high levels of sadness reactivity in old age or relatively high levels of anger reactivity in young adulthood are not necessarily a sign of dysfunction in the respective age group. Instead, DEA assumes that, to the extent to which these negative emotions promote progress in dealing with the eliciting age-typical problems, they may even be adaptive. For example, sadness experience may facilitate older adults’ adjustment to irreversible losses in that they facilitate processes of goal disengagement; anger may facilitate younger adults’ tenacious goal pursuit when obstacles occur. Thus, in the longer run, both negative emotions can be functional at different phases in the adult life-span in that they contribute to mastering age-differential opportunities and constraints (for initial evidence, see Haase, Seider, Shiota, & Levenson, 2011).

A second recent theoretical advancement, the strength and vulnerability model (SAVI; Charles & Luong, 2013) also suggests that the immediate situation can affect older adults’ emotional reactions, particularly negative emotions as experienced in response to daily stressors. Consistent with SST (Carstensen, 2006), the model poses that older adults’ strengths lie in their high motivation and expertise to engage in effective emotion regulation so as to minimize negative reactions to stressors. As an extension of SST, SAVI draws attention to older adults’ physiological vulnerabilities that can make it difficult for them to play out their emotion regulatory strengths under high emotional arousal, for example, when being exposed to serious
and complex stressors affecting multiple life domains. Thus, on a typical day with no stressors or only minor stressors present, older adults should experience less negative affect than their younger counterparts. However, in situations characterized by chronic and serious stressors, these age differences are thought to be nonsignificant or even reversed, with older adults experiencing higher negative affect than young adults.

Consistent with this idea is laboratory work suggesting that older adults react to low arousal negative pictures from the International Affective Picture System (Lang et al., 2008) with less unpleasantness than their younger counterparts, whereas this age difference was nonsignificant if the negative pictures were highly arousing (Streubel & Kunzmann, 2011). Other laboratory work has suggested that older adults even experience greater unpleasantness in response to highly arousing negative unpleasant than their younger counterparts (e.g., Grühn & Scheibe, 2008). These higher emotional costs for older adults may be one explanation for a greater reluctance to highly arousing negative stimuli in older as compared to younger adults (e.g., Sands & Isaacowitz, 2017).

Together, the SAVI model and DEA lead to the conclusion that a full understanding of age differences in emotional reactivity requires considering the immediate negative emotion-evoking situation. SAVI focuses on the intensity of the emotion-arousing situation (e.g., by considering that stressors can differ in terms of complexity and seriousness) and suggests that older adults’ heightened negative reactivity under highly arousing conditions (e.g., when exposed to complex and serious stressors) may be a sign of dysfunction (i.e., an emotion regulatory deficit). In contrast, DEA focusses on the type of emotion-arousing situation (i.e., on what is at stake in a given situation) and suggests that older adults’ heightened negative reactivity in situations that are relevant given their age is not necessarily a sign of dysfunction. If negative emotions in such situations promote adaptive ways in dealing with the challenges and opportunities that emerge, they may even be adaptive.

Considering Research on Age Differences in Emotional Reactivity from an Ecological Validity Perspective

The work reviewed above can be considered ecologically valid in several respects. For example, many studies were based on context-rich and sometimes dynamic emotional stimuli. These methods have yielded findings that are nuanced and not all are indicative of age-related gains. However, it also needs to be noted that the evidence for age differences in emotional reactivity to date largely depends on studies that used standardized stimuli that required passive processing by the participants. Only very few laboratory studies on emotional reactivity have used so-called internal stimuli; that is, stimuli that are generated by the participants themselves, such as engaging in a relived emotion task (e.g., Kunzmann, Rohr, Wieck, Kappes, & Wrosch, 2017; Labouvie-Vief, Lumley, Jain, & Heinze, 2003; Levenson, Carstensen, Friesen, & Ekman, 1991). In such tasks, participants select and recall a situation from their own life that made them feel a particular target emotion. Given that each participant is free to choose an emotion-evoking event that is personally meaningful and relevant, the relived emotion paradigm may be considered more ecologically valid than paradigms that present unfamiliar external stimuli. For example, though an external stimulus such as a film clip about a woman having Alzheimer’s disease may generally be of great relevance, particularly to older individuals, there certainly are considerable
individual differences in personal relevance at any age, depending on whether one actually knows someone (e.g., husband, friend, grandmother), who has been diagnosed with this illness.

At the same time, it is clear that the relived emotion paradigm also has its problems in terms of ecological validity. Perhaps most critical, it is not the “original” emotional reaction at the time of the actual event that is being observed and assessed, but the emotional reaction as it is remembered and relived in the laboratory. Events in the more distant past might take on new meaning or less emotional intensity as individuals reappraise or come to terms with these events with the passage of time. These emotion regulatory processes may be age differential with older individuals being more motivated and skilled at reappraising negative events so as to make them less negative, more positive, or both than young adults (e.g., Blanchard-Fields, 2007; Carstensen, 2006). Viewed from this perspective, broadening the current research through paradigms that involve real, meaningful, and active emotion-evoking encounters, allowing an assessment of emotional reactions in real time, appears mandatory.

It also is remarkable that the majority of past work has used individualized settings in which participants privately process emotional information and focus on their inner feelings rather than communicate their feelings in the context of social interactions with others. Given that most if not all emotions are experienced and expressed in social contexts (e.g., with friends, family members, coworkers, or strangers), this focus on individualistic settings seems highly unfortunate, at least when considered from an ecological validity perspective.

Notably, the very few age-comparative studies that have used social interaction paradigms are limited to the dyadic level in which two individuals interact. In addition, only very few types of social interactions have been realized so far, particularly, interactions between strangers (Luong & Charles, 2014) and spouses (e.g., Carstensen, Gottman, & Levenson, 1995). Thus, our current knowledge about age differences in emotional reactions in the context of social interactions is still limited and one exciting direction for future research is to explore the extent to which such age differences are specific to certain types of social interactions. For example, according to SST, older adults should be particularly likely to down-regulate relationship-hurting aggressive emotions, such as anger, hostility, or contempt in close social relationships, making this a social context in which one would expect more pronounced age differences in certain negative emotional reactions than in other social contexts (e.g., more distant relationships).

**AGE DIFFERENCES IN EMOTION PERCEPTION**

Research interested in age differences in emotion perception has perhaps considered issues related to the ecological validity of the stimuli and research setting most explicitly. Indeed, researchers now refer to *emotion perception* rather than *emotion recognition* given compelling evidence that emotions are not automatically recognized in faces but rather are perceived as part of a constructive process integrating facial and contextual cues (Barrett, Mesquita, & Gendron, 2011). To begin, much of the earlier relevant work used emotion perception tests that required individuals to identify a single emotion that was presented in decontextualized (e.g., the situation causing a particular emotion was irrelevant or unknown) and compartmentalized (i.e., in only one modality) format. In these tests, older adults perform less well than younger adults as suggested by a meta-analysis published in 2008 (Ruffman, Henry, Livingstone, & Phillips, 2008) and many individual studies published since then (e.g., Sze, Goodkind, Gyurak, & Levenson, 2006).
Although the effects of age may somewhat differ across specific emotions, and it is not entirely clear if age-related deficits are typically already evident in middle-age adults (e.g., Isaacowitz et al., 2007), the findings have been taken to suggest lower emotion perception performance in older than younger adults.

There is a small but growing body of evidence suggesting, however, that this conclusion may be premature given that the typical emotion perception tasks rarely match emotion perception as it occurs in real-life contexts. Consequently, these tasks do not tap into older adults’ experience base and relevant bodies of pragmatic knowledge about the self, others, and the world. In terms of the two-component model of intelligence (Baltes, 1987), older adults’ emotion perception performance should improve to the extent to which emotion perception tasks tap into their acquired bodies of pragmatic knowledge and do not rely on cognitive processes related to mechanic-fluid cognitive abilities.

A handful of studies have tested this idea by using tasks that present emotions dynamically, in multiple modalities, and in a socially embedded manner. For example, Sze and colleagues (2012a) asked young, middle-age, and older adults to view 12 interactions of couples discussing important marital topics. For each conversation, participants continuously rated how they thought the designated target person (husband or wife) was feeling during the interaction. The authors operationalized emotion perception accuracy as degree of congruence between participants’ target ratings and the targets’ self-ratings on a moment-to-moment basis. As the authors predicted, in comparison to the two younger age groups, older adults performed worse in a traditional emotion perception task, but better in the ecologically valid film-based task.

Although this evidence is promising, at least one problem with the authors’ conclusion that it was only the context richness of the emotion perception task that raised older adults’ performance remains. Namely, the newly developed interactive task required participants to make overall judgments of valence rather than specific judgments pertaining to the intensity of discrete emotions. Given that overall valence ratings are relatively easily made, one cannot exclude the possibility that older adults’ relatively good performance was partly due to the fact that the task was relatively easy, and it remains an open question whether similar enhancement effects are evident in more difficult context-rich tests.

In fact, findings from another previous study that manipulated contextual richness and kept the moderately difficult rating part of the task constant across conditions suggested that context richness per se does not moderate age differences in empathic accuracy (Richter, Dietzel, & Kunzmann, 2010). Two additional laboratory studies further suggested that it is only if a moderately difficult emotion perception task is context rich and highly familiar or personally relevant that older adults perform at a similar level as young adults (Richter & Kunzmann, 2011; Wieck & Kunzmann, 2015). In both studies, younger and older adults viewed film clips of target persons who authentically experienced and expressed emotions while talking about autobiographical episodes. All film clips were context rich and depicted emotions dynamically in various modalities. However, older adults consistently performed worse in these context-rich tasks if the topic of the autobiographical episodes was not particularly familiar and relevant to them but instead referred to age-typical experiences and problems in young adulthood (e.g., happiness about passing a final exam or sadness about the failure of one’s first love). If the topic was old-age relevant (e.g., sadness about the death of a loved-one, happiness about having grandchildren), however, age-related deficits in emotion perception performance became nonsignificant.
Stanley and Isaacowitz (2015) provided consistent evidence in a laboratory study that presented younger and older adults with short film clips of either same-age strangers or romantic partners spontaneously experiencing and expressing each of several discrete emotions (e.g., sadness, anger, fear, disgust). In this task, older adults’ performance was significantly improved when they were asked to perceive their romantic partner’s emotions rather than the emotions of a stranger. As the authors argued, the greater familiarity and personal relevance of the romantic partner task most likely raised older adults’ performance so that their deficits became smaller.

Together the available evidence to date strongly suggests that if a task is context rich, highly familiar, and personally relevant, older adults’ emotion perception performance will reliably increase, in many situations, to the level of young adults’ performance.

A limitation of the studies reviewed so far is, however, that the effects of familiarity and personal relevance could not be disentangled. Could it be that a task’s personal relevance and, thus, purely motivational factors can raise older adults’ emotion perception performance? Or is the personal relevance of a task a necessary but not sufficient condition for older adults’ improved emotion perception performance? This question was addressed in a study by Zhang, Fung, Stanley, Isaacowitz, and Ho (2013) who varied the age relevance of the emotion perception task by manipulating the task instruction rather than the task itself. The authors found that the nature of age differences in emotion perception indeed was dependent on the age relevance of the instruction, with older adults exhibiting enhanced emotion perception performance when the task instruction was consistent with the hypothesized goals of old age (i.e., when emotional closeness between the participant and the to-be-recognized target was enhanced).

Taken together, there is promising evidence for the idea that age differences in emotion perception that have been found when traditional stimuli are used will not be evident if emotion perception is tested via more ecologically tasks with stimuli that tap into processes that are well matched to the accumulated knowledge base and interests of older adults. Future research is clearly needed that reveals the processes that may underlie the effects of familiarity (e.g., which bodies of knowledge or type of information may best help older adults improve their emotion perception accuracy?) and personal relevance (e.g., how could one measure the hypothesized greater effort and engagement that older adults exhibit in highly relevant contexts?). In addition, to the extent to which emotion perception unfolds in a personally meaningful and consequential encounter, older adults’ emotional involvement (e.g., level of personal distress) as well as their ability to share another person’s emotions and feel sympathy for him or her may serve as factors that can enhance or limit emotion perception accuracy (e.g., Richter & Kunzmann, 2011; Sze, Goodkind, Gyurak, & Levenson, 2012b; Wieck & Kunzmann, 2015).

Considering Research on Age Differences in Emotion Perception from an Ecological Validity Perspective

In many ways, the work reviewed above is highly ecologically valid as it employed dynamic and context-rich stimuli of relevance to the participants. Nevertheless, a closer look reveals aspects that may arguably limit the ecological validity of the work. For example, given that many aging researchers, including ourselves, have claimed that the evidence for an age-related deficit in emotion perception is alarming because if such a deficit is an important factor in poor
communication, one wonders why the majority of laboratory research has not studied emotion perception during actual interactions. To the best of our knowledge, there is only one such age-comparative laboratory study (Blanke, Rauers, & Riediger, 2015). In this study, younger and older women who did not know each other were paired and invited to a laboratory session. The members of each dyad were first asked to introduce themselves to each other and to then think of a personal event during which they had felt particularly bad and another event during which they had felt particularly good. They were then asked to have a conversation about these events with the goal of getting to know each other. The conversation started with the negative events and the members of each dyad had 3 minutes for each event (the total conversation lasted 12 minutes). Subsequent to the conversations, the participants watched their tape twice and, at predefined tape stops, reported their own thoughts and feelings (first time) as well as what they thought their interaction partner was thinking and feeling (second time). Given the comparatively high ecological validity of this paradigm, one might have expected fewer age deficits in emotion perception than typically reported in studies using paradigms that are more stripped down in terms of meaningfulness. However, the authors reported significant age deficits in negative emotion perception. Several decisions in terms of the research setting may be responsible for this finding.

A first aspect refers to the type of interaction: It was an interaction between strangers rather than between individuals who knew each other. Given the evidence for an age-related decline in the size of social networks and particularly the frequency of social interactions with individuals one does not know well, it is an open question as to whether this particular type of interaction held a substantial disadvantage for the older participants. In addition, viewed from an ecological validity perspective, one wonders how often individuals of any age actually talk about personal events, let alone events during which they had felt bad, when they first meet a stranger. Such interactions may be rare so that older adults most likely do not have accumulated experience to fall back on when judging the interaction partner’s thoughts and feelings. Thus, one exciting avenue for future research is to begin to realize different types of actual interactions in the laboratory and to test theoretically derived predictions regarding contextual features that operate as moderators of age differences in emotion perception.

A second question refers to the predefined and fast-paced nature of the conversation. Although many everyday conversations take place under time constraints, it is again one type of situation that may put older individuals at a particular disadvantage, given the well-documented age-related deficits in speed of information processing and other related cognitive abilities (e.g., Baltes, Lindenberger, & Staudinger, 2006). In addition, although we fully understand the authors’ need for high internal validity, from an ecological validity perspective, it is unfortunate that the conversations were not experienced naturally but segmented into four periods of 3 minutes each. It may also be unusual to first systematically think about one’s own feelings and thoughts after a conversation and to only then judge the interaction partner’s feelings and thoughts.

Despite these potential concerns, we consider this study by Blanke et al. (2015) as one of the best starting points for future ecologically valid laboratory research interested in age differences in emotion perception. Blanke and colleagues were the first to conduct an age-comparative laboratory study during which participants had an actual interaction and judged their partners’ thoughts and feelings. The majority of past studies, including our own, are much more limited in terms of ecological validity.
GENERAL DISCUSSION AND CONCLUSIONS

Our goal in this article was to increase awareness that the immediate situation can strongly influence younger and older adults’ emotional reactions and skills. In laboratory studies on emotional aging, the immediate situation involves the stimuli used and the settings in which participants are tested. To the extent to which the effects of the immediate situation are age differential, they can moderate age differences (and similarities) in emotional outcomes measures. In fact, on the basis of a prominent metatheoretical model of successful aging, the model of selection, optimization, and compensation introduced by Baltes and colleagues (SOC, e.g., Baltes & Baltes, 1990; Freund, 2008), one could make the argument that features of the immediate situation will especially influence older adults’ reactions and performance levels.

According to this model, successful aging in the face of an increasing number of limited resources can be achieved only if individuals invest their remaining resources selectively. However, selectivity is not likely to be a random process; rather, older adults seem to invest their resources into those tasks that are most meaningful and important to them and enact resource saving in contexts of less relevance. In contrast, younger adults may be less selective and their reactions and performance levels may thus be less dependent on the characteristic of the immediate situation, given that they reach their limits less often and have greater resources, for example, in terms of cognitive functioning or physical fitness. Hess (2014) has similarly argued in his selective engagement theory that aging is associated with increased selectivity in cognitive resource engagement. He hypothesized that this aging-related resource conservation should be least apparent in situations of high personal relevance or meaningfulness to the individual, with age differences in cognitive performance decreasing as these factors increase.

When viewed from this perspective, we consider it absolutely critical for researchers interested in old age and aging to be particularly sensitive to the issue of ecological validity and, thus, the choices that they make in terms of research settings and stimuli. If findings of age differences are true only for a relatively narrow set of stimuli and settings, then those differences should be considered circumscribed rather than general. If findings of age differences are true for stimuli and settings that seem to rarely occur in real life, then those differences should be considered with caution and conclusions about a given phenomenon as it occurs in the real world may not be warranted.

Of course, and as Brunswik (1955) once wrote, it is difficult to determine “whether a given experiment is an ecological normal, located in the midst of a crowd of natural instances, or whether it is more like a bearded lady at the fringes of reality, or perhaps like a mere homunculus of the laboratory out in the blank” (p. 204). It is also difficult, if not impossible, to conceptualize and conduct laboratory research that fulfils all requirements of ecological validity (e.g., select and present a fully representative sample of stimuli). As discussed earlier, such an aspiration encounters tremendous practical and theoretical problems. Nevertheless, we do believe that it is very desirable that we are more explicit about our choices and decisions in terms of the settings and stimuli that we employ in our studies. Are the settings and the stimuli of a particular study relevant to the phenomenon one is interested in? Does the laboratory context correspond to situations as they occur in everyday life? Can one reproduce a certain phenomenon as it occurs in the world outside the laboratory? What are the critical contextual factors that enhance or limit emotional functioning at particular periods in the adult life-span? Recently-developed taxonomies of situations provided in the personality psychology literature (e.g., DIAMONDS;
Rauthmann et al., 2014) may also prove useful in helping to connect lab studies to everyday experiences of different age groups.

Given that ecological validity is an ideal rather than an achievable goal, it will always be necessary to make choices as to which aspects of a context are sampled and systematically tested. We believe that these choices can only be made on the basis of theoretical considerations. Seen in this light, it would be desirable if the two most prominent theories in the field of emotional aging, SST and DIT, are further developed so as to include more recent theoretical work specifically concerned with the age-differential effects of the immediate situation on emotional reactions and emotion-related skills. Put differently, in our opinion, the theories in our field should guide the selection of particular stimuli and settings, and, thus, could provide strong frameworks for our attempts to increase ecological validity in the field.

Although we have focused our review on the ways in which past work has often neglected aspects of ecological validity, and how conclusions need to be tempered until studies are conducted that sample a greater ecological space of stimuli and contexts, we believe there are promising areas for future work. In particular, arousal, personal relevance, and familiarity of the immediate situation are important aspects to be considered in future theoretical and empirical emotion research. There certainly are additional and similarly important characteristics to be considered, including the social embeddedness and the potential for personal control in a given situation. Only when this kind of work has been successfully conducted will we truly understand emotional aging in context and be able to give an accurate answer to the question in what ways emotional aging is a theme of gain, loss, or continuity.

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