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Research Article

Perceiving Dynamic Emotions Expressed Simultaneously in the Face and Body Minimizes Perceptual Differences Between Young and Older Adults

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Abstract

Objectives: It is commonly argued that older adults show difficulties in standardized tasks of emotional expression perception, yet most previous works relied on classic sets of static, decontextualized, and stereotypical facial expressions. In real life, facial expressions are dynamic and embedded in a rich context, 2 key factors that may aid emotion perception. Specifically, body language provides important affective cues that may disambiguate facial movements.

Method: We compared emotion perception of dynamic faces, bodies, and their combination in a sample of older (age 60–83, n = 126) and young (age 18–30, n = 124) adults. We used the Geneva Multimodal Emotion Portrayals set, which includes a full view of expressers' faces and bodies, displaying a diverse range of positive and negative emotions, portrayed dynamically and holistically in a nonstereotypical, unconstrained manner. Critically, we digitally manipulated the dynamic cue such that perceivers viewed isolated faces (without bodies), isolated bodies (without faces), or faces with bodies.

Results: Older adults showed better perception of positive and negative dynamic facial expressions, while young adults showed better perception of positive isolated dynamic bodily expressions. Importantly, emotion perception of faces with bodies was comparable across ages.

Discussion: Dynamic emotion perception in young and older adults may be more similar than previously assumed, especially when the task is more realistic and ecological. Our results emphasize the importance of contextualized and ecological tasks in emotion perception across ages.

Keywords: Context, Ecological expressions, Emotional integration

Normal aging is traditionally associated with decreased emotion perception abilities in standardized tasks (Ruffman et al., 2008, 2009). Classic findings indicate that older adults have worsened perception of negative emotions (i.e., anger, sadness, and fear) while only minor difficulties, if any, are noted with positive emotions (i.e., happiness; for a meta-analysis, see Calder et al., 2003; Ebner et al., 2011; Gonçalves et al., 2018; Hayes et al., 2020; Isaacowitz

et al., 2009; Murphy et al., 2010; Ruffman et al., 2008; Wong et al., 2005).

Two main approaches have attempted to explain this pattern: (a) motivational models and (b) neurobiological models. According to motivational models, older adults prefer to attend to positive information and ignore negative information leading to an attentional-motivational bias termed the *positivity effect* (Kennedy et al., 2004). Alternatively, biological models attribute age-related differences to a host of potential neurobiological factors, including changes in brain activation, different gaze patterns, disturbed visuospatial abilities, and cognitive decline (for a review, see Ebner et al., 2011; Horning et al., 2012; Mather, 2016).

Yet, most evidence suggesting differences between older and young adults in emotion perception is based on methods that do not necessarily reflect real-life phenomena (Isaacowitz & Stanley, 2011). Methodological problems include: (a) using stereotypical and posed facial expressions, (b) absence of dynamic information, (c) biased classification tasks favoring the ease of positive emotion perception, and (d) absence of context in the face perception task.

Understandably, limitations of prior studies on emotion perception in older adults are dictated by the stimuli available in most sets of facial expressions (e.g., FEEST based on Ekman & Friesen, 1976; ADFES: Van der Schalk et al., 2011). Specifically, such sets included stereotypical and static displays that are posed in a constrained manner. A recent meta-analysis (Hayes et al., 2020) examined age-related emotion perception difficulties under different stimuli formats, image sets, and number of response options. Results showed that older adults had more difficulty recognizing static facial expressions than facial expressions in dynamic videos. This meta-analysis indicates that different age patterns of emotion perception are strongly influenced by the study methodology such as stimulus format and task design. Other recent studies also suggested that dynamics may have a critical role in the expression and perception of emotions (Dukes et al., 2017; Mortillaro & Dukes, 2018).

Additionally, most studies (see Supplementary Table S1) included only one unambiguously positive emotional category (i.e., happy faces) alongside several negative categories, resulting in inherently unbalanced experimental designs. With only one positive expression category, the challenge of perceptual differentiation between confusable alternatives is reduced to a minimum. Therefore, preserved perception of happy faces in older adults may merely reflect an inflated perception of the only positive category (Isaacowitz & Stanley, 2011).

Finally, previous work assessing age-related differences had primarily focused on categorizing facial expressions void of any context (e.g., see Grainger et al., 2015; Suzuki et al., 2007). In real life, faces are typically perceived in the context of an expressive body. Studies in young adults have shown that contextual bodies may significantly impact the processing of the face, either by facilitating or impairing face perception as a function of face–body congruency (Aviezer et al., 2008; Meeren et al., 2005). Supportive evidence for the importance of contextual cues in the perception of emotion by older adults has started to emerge in several studies. Richter and colleagues (2011) reported that an enrichment of context by adding sound to videos increased positive emotion perception in older adults. Wieck and Kunzmann (2017) reported that older adults can benefit from multimodal emotional stimuli, that is, adding facial, lexical, or prosodic cues. Additionally, we have recently reported (Abo Foul et al., 2018) that older adults are more influenced than young adults by incongruent bodily cues. Thus, contextual body effects may be accentuated in older adults, further highlighting the importance of investigating emotion perception beyond the isolated face (Abo Foul et al., 2018; Noh & Isaacowitz, 2013).

As noted, most studies on emotional expressions suffer from several of the aforementioned stimuli concerns, that is, they are static, stereotypical, decontextualized (showing only isolated faces), and they are unbalanced (typically including only one positive expression). To counter these limitations and better understand emotion perception across ages, we used the Geneva Multimodal Emotion Portrayals (GEMEP) database (Bänziger et al., 2012), which has several unique advantages. First, it is one of the few sets that portray emotional expressions in a full-body holistic view, in which the face appears naturally with the context of the body. This critical factor allowed us to manipulate the cue digitally and examine the perception of faces, bodies, and their holistic combination. Second, the set is dynamic, a potentially important factor in emotion perception studies, and in particular, in studies of older adults (e.g., Grainger et al., 2017; Krendl & Ambady, 2010; Murphy et al., 2010; Sze et al., 2012). Third, the expressions are portrayed in a diverse nonstereotypical manner, which is more akin to realistic portrayals. Finally, the set includes a wide variety of positive and negative emotions, allowing us to directly examine the role of design balance (i.e., having an equal or unequal number of positive and negative emotional categories) across independent groups within a single study.

Few studies used GEMEP stimuli for investigating age-related differences. Schlegel and colleagues (2014) examined age-related differences using several tests assessing interpersonal accuracy. These authors found that older adults showed impaired perception of amusement, anger, disgust, pride, anxiety, irritation, joy, fear, and surprise and an overall advantage for women compared to men. Notably, older adult females performed worse than young adult females in recognizing dynamic emotional multimodal clips. Yet, older adult and young adult females showed comparable performance in judging an interaction partner's personality traits or rating of rapport. These studies provided initial evidence that dynamic multimodal clips could shed new light on age-related differences. However, our approach

differs in important ways. For example, previous work included a very high number of emotional categories (14 vs 6 in our design) that may potentially increase the cognitive load of the task (Schlegel et al., 2014, 2020). Furthermore, prior studies included vocal stimuli, which make it difficult to reach conclusions concerning the visual modality.

Our primary goal was to compare older (age 60+) and younger adults' (age: 18–30) dynamic emotion perception from isolated faces, isolated bodies, and combined faces with bodies. We further examined the role of design balance by replicating our study with different samples, once with a balanced-valence design (equal number of positive and negative emotions) and once with an unbalanced-valence design (unequal number of positive and negative emotions). Cognitive abilities were also assessed to examine their potential effect on emotion perception patterns in older and younger adults.

Based on Hayes and colleagues' (2020) recent meta-analysis, one would predict that older adults would show poor emotion perception from static, stereotypical, and decontextualized faces with the possible exclusion of a positivity effect for happy faces (Hayes et al., 2020). However, with regard to dynamic stimuli, which consisted of less than 10% of the studies reviewed, the evidence is less consistent as no positivity effect was found (Hayes et al., 2020). Following the previously reviewed studies, we expected age differences to be minimized when viewing facial expressions with a contextualizing body. Finally, we predicted that a valence-balanced design with an equal number of positive and negative emotional categories would reduce positivity bias (Mortillaro & Dukes, 2018).

Method

Participants

Two hundred eighty-nine participants recruited from Panel4All, an online internet Israeli participants' pool (https://www.panel4all.co.il/pages/home.html), took part in this study. Registered participants to Panel4All received an invitation to participate in this study, consented, and received payment for their participation. The study was approved by the ethics committee of the Hebrew University of Jerusalem.

A statistical power analysis was performed, using G*Power3 (Faul et al., 2007), for sample size estimation, using effect sizes from a related study (Abo Foul et al., 2018). With an alpha = .05 and power = .95, the projected sample size needed with this effect size is approximately 76 for this 2 × 2 × 3 design with two groups.

Nineteen participants failed to complete the task, and 14 participants were erroneously recruited out of the desired age range (i.e., 30–59) due to computer coding error. Additionally, six participants reported untreated vision problems. Thus, 250 participants were included in the study analysis (125 participants in the unbalanced-valence design and 125 participants in the balanced design). These 250 participants qualified for a data quality analysis, as described in the Results section. Sample characteristics are reported in Table 1. (Sample characteristics by the experiment designs are depicted in Supplementary Table S2.)

Stimuli

Emotional Expressions

The original GEMEP set contains full-body videos of actors portraying a wide variety of positive and negative dynamic emotional expressions using facial expressions and body gestures while uttering pseudo-words with affective intonation (Bänziger et al., 2012).

We selected our stimuli from the GEMEP Core Set (consisting of a total of 154 dynamic emotional expressions), which includes validated emotional clips for 17 emotions expressed by 10 actors (for the exact validation procedure, which considers recognizability and believability, please refer to Bänziger et al., 2012). For our study, we chose the four best-recognized stimuli (clips) for joy, pride, pleasure, fear, sadness, and anger—out of the 10 clips per emotion included in the Core Set, each from a different actor—with the requirement of being two from male actors and two from female actors. The best four stimuli were selected based on data collected using the same procedure by Bänziger and colleagues (2012) but with stimuli presented with only the face being visible, only the body, or both face and body (Mortillaro, 2017; Mortillaro, 2021). The best stimuli were those that had the highest recognition accuracy averaging the three perceptual conditions. Overall, 10 Caucasian actors expressed the six target emotions, five male and five female, and the age ranged from 25 to 57.

Based on the original videos, two additional stimuli formats were produced with video editing using Adobe Premiere: (a) *Face only*—in which the actor's body was edited out, and (b) *Body only*—in which the actor's face was edited out. This resulted in a total of three types of stimuli

Table 1. Sample Size, Age Range, Mean Age, Gender Distribution, Education Years Average, and the Predicted RPSM by Age Group

	Older adults	Young adults
N	122	116
Age range	60–83	18–30
Mean age (*SD*)	66.92 (±5.65)	25.22 (±3.41)
Gender		
Female	64	56
Male	58	60
Education years average (*SD*)	15.45 (±2.64)	13.59 (±2.25)
RPSM	39.97 (±10.86)	40.35 (±11.91)

Note: RPSM = Raven's Standard Progressive Matrices.

(a) *Face only*, (b) *Body only*, and (c) *Face with body* (see Figure 1).

Isolated faces were enlarged and equated to the size of the bodies. Note that the faces with bodies were always emotionally congruent. Video durations ranged from 2 to 3 s. As the current study focused on the visual modality, we muted the videos. The stimuli displayed good reliability, and Cronbach's alpha was .80 in the balanced-valence design and .70 in the unbalanced-valence design.

Cognitive Assessment

Raven's Standard Progressive Matrices (RSPM) is a nonverbal, multiple-choice test aimed to assess abstract reasoning and fluid intelligence. Each item comprises 2 × 2 or 3 × 3 cells, when all but the right corner cell contain an abstract pattern. Participants were asked to complete the abstract pattern by choosing the missing shape from a list. An abbreviated shortened nine-item version of the Raven test (version A: Bilker et al., 2012) was used. This short version is highly correlated with the full-length version of the RSPM (r = .984) and, due to its brevity, is ideal for online administration. For each participant, we calculated the total predicted score as detailed in Bilker and colleagues (2012). Cronbach's alpha was .5 for older adults and was .65 for younger adults.

Design

The study included *Age Group* (older adults and young adults) as a between-subject variable and *Cue* (face, body, face and body) as a within-subject variable. Similarly, *Emotion Valence* (positive and negative emotions) was included as a within-subject factor. *Experimental Design* (unbalanced-valence and balanced-valence) was included as a between-subject variable. The unbalanced-valence design included three negative emotion categories (fear, sadness, and anger) and one positive category (joy). The balanced-valence design included the same negative emotions categories as in the unbalanced design, but included two additional positive categories (pleasure and pride) to create a symmetrical balanced-valence design with three positive and three negative emotions. Thus, in effect, the same experiment was replicated across independent groups with slightly different designs.

Procedure

Participants reported their age, gender, years of education, vision status, as well as psychiatric and physical status. Then, they performed the nine-item version of the RSPM test.

Subsequently, they were randomly assigned to either the balanced-valence or the unbalanced-valence emotional perception tasks. Faces, bodies, and face–body composites were presented in three separate blocks. Blocks and stimuli within each block were randomly ordered. In each trial, participants viewed the video and were asked to choose the label that best described the emotion expressed by the person. No time limit was imposed for responses. As the online study was not optimized to record reaction time in a reliable manner, reaction times were not analyzed.

Analysis strategy

Our main dependent variable was mean affective perception accuracy across emotions (mean accuracy of positive emotions vs mean accuracy of negative emotions).

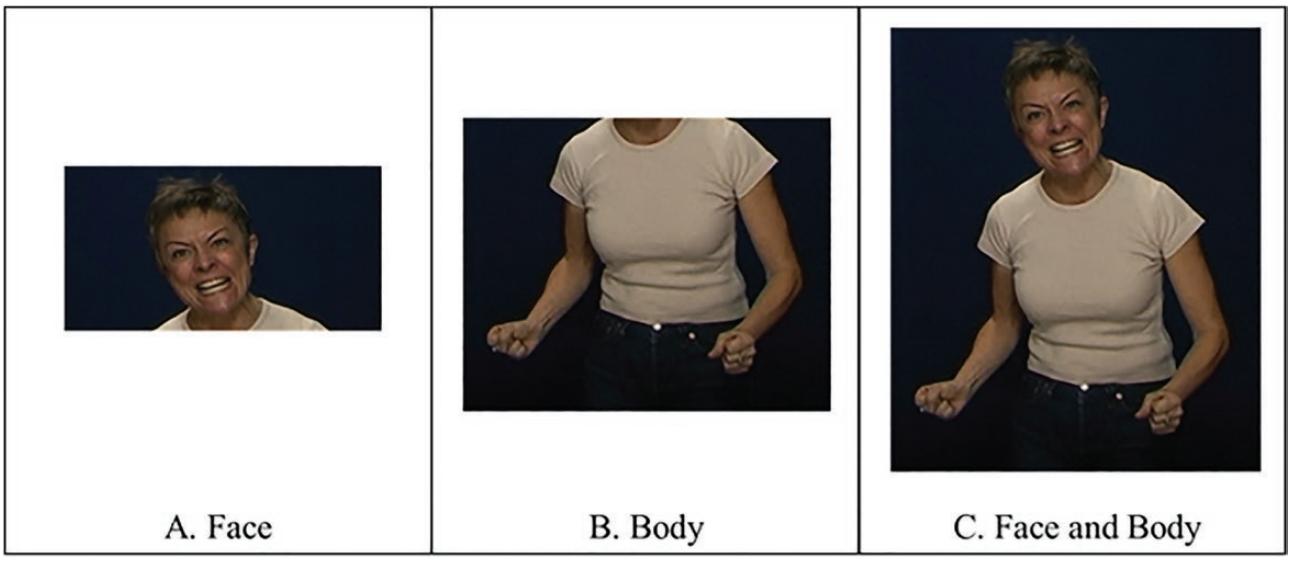

Figure 1. Stimuli examples from Geneva Multimodal Emotion Portrayals used in the study: (**A**) angry isolated facial expression, (**B**) angry isolated bodily expression, and (**C**) angry person (combined face with body).

While no exact a-priori predictions were raised for specific emotions, a detailed exploratory analysis is provided in Supplementary Material.

To test the differences in the perception of negative and positive emotions, we calculated, for each participant, the averaged accuracy proportion for the negative and the positive emotions. The negative emotion score was calculated as the average perception accuracy of anger, fear, and sadness in both experimental designs, while the positive emotions score was the averaged perception accuracy of joy in the unbalanced-valence design and the averaged perception accuracy of pride, joy, and pleasure in the balanced-valence design. The accuracy data rates of each valence category were subjected to a 2 (age group: older adults and young adults) × 2 (emotion valence: positive and negative) × 3 (cue: face, body, face, and body) × 2 (design: unbalanced-valence and balanced-valence) mixed analysis of variance (ANOVA). Additionally, we examined the correlation between the RSPM scores and the mean accuracy perception of isolated faces, isolated bodies, and combined faces and bodies' stimuli (reported in Supplementary Material). When required, p values were adjusted using Greenhouse–Geisser correction and Bonferroni corrections were applied for follow-up t tests.

Results

Data Quality Assessment

As online studies offer less control over participant behavior, we carefully examined our data for any obvious outliers with performance suggesting poor attentiveness and/or compliance with the task. To this end, we combined two poor-performance markers, which would be highly atypical irrespective of age. These included (a) below chance perception of joy expressed in the combined face and body, and (b) the aforementioned perception errors resulted from valence miscategorizations (i.e., misrecognizing the joy stimuli as anger, fear, or sadness). This exclusion criterion resulted in the removal of 12 participants, hence 238 participants were included in the final analysis (117 in the unbalanced-valence group and 121 in the balanced-valence group). Notably, an analysis confirmed that all our reported results held strong when no exclusions were conducted.

Main analysis: A 2 (age group: older and young adults) × 2 (emotion valence: positive and negative) × 3 (cue: face, body, and face and body) × 2 (design: unbalanced-valence and balanced-valence) mixed ANOVA was run on the mean accuracy of each valence category.

A significant effect of the cue was found, indicating that combined face and body expressions were best recognized (M = 0.81, SD = 0.13), followed by the face expressions (M = 0.64, SD = 0.22), while bodily expressions (M = 0.54, SD = 0.20) were most poorly recognized, $F(2, 468) = 249.43$, $p < .001$, $\eta^2_p = .52$ (all t contrasts, $ps < .001$).

A significant main effect for emotion valence was found, showing better perception of negative emotions (M = 0.70, SD = 0.30), than positive emotions (M = 0.62, SD = 0.31), $F(1, 234) = 65.92$, $p < .001$, $\eta^2_p = .22$. Additionally, there was a significant effect for the design, indicating that the mean accuracy in the unbalanced design (M = 0.72, SD = 0.28) was higher compared to the balanced design (M = 0.62, SD = 0.10), $F(1, 234) = 27.25$, $p < .001$, $\eta^2_p = .10$. No significant main effect was found for the difference between older and young adults, $F(1, 234) = 0.85$, $p = .36$.

Significant interactions were found for Cue × Design, $F(2, 468) = 9.08$, $p < .001$, $\eta^2_p = .04$; Cue × Age group, $F(2, 468) = 7.39$, $p = .002$, $\eta^2_p = .03$; Emotion valence × Design $F(1, 234) = 76.76$, $p < .001$, $\eta^2_p = .25$; Emotion valence × Age group $F(1, 234) = 4.84$, $p = .03$, $\eta^2_p = .02$; and for Emotion valence × Cue, $F(2, 468) = 87.14$, $p < .001$, $\eta^2_p = .27$. Importantly, the three-way interaction of Cue × Emotion valence × Age group was significant, $F(2, 468) = 6.93$, $p = .002$, $\eta^2_p = .03$. The four-way interaction Cue × Emotion valence × Age group × Design was not significant, $F(2,468) = .20$, $p = .82$.

As the unbalanced and balanced designs differed in the number of trials averaged to determine accuracy, a factor which may influence measurement reliability, we also analyzed our data using unbiased hit rates (Wagner, 1993). The results of this analysis (reported in Supplementary Material) replicated the current pattern.

Age-Related Differences: Perception of Positive versus Negative Emotions

Following our omnibus analysis, we continued to examine the three-way Cue × Emotion valence × Age group interaction pooled across the balanced and unbalanced experimental designs. In order to break down the three-way interaction, we conducted two separate 2 (age group: older adults and young adults) × 3 (cue: face, body, and face and body) mixed ANOVAs, for positive and negative emotions, respectively (see Figure 2).

A significant main effect of cue was found for both positive, $F(2, 472) = 249.96$, $p < .001$, $\eta^2_p = .51$, and negative

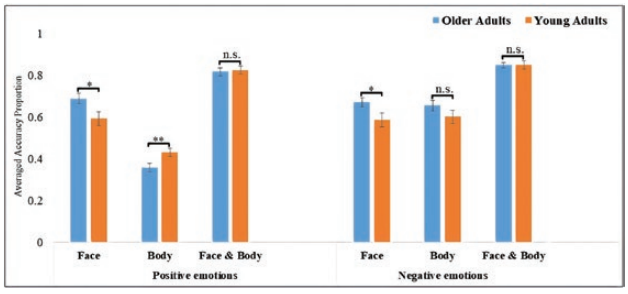

Figure 2. Mean perception accuracy of positive and negative emotions in each cue (i.e., isolated faces, isolated bodies, and combined faces and bodies) in older and young adults. Results are pooled across designs. Error bars represent standard errors. *$p < .05$, **$p < .01$.

emotions, $F(2, 472) = 115.55$, $p < .001$, $\eta^2_p = .33$. Follow-up comparisons confirmed the advantageous perception of the face–body composites irrespective of valence (positive: $M = 0.82$, $SD = 0.22$; negative: $M = 0.85$, $SD = 0.19$). In the positive emotions, this was followed by the isolated faces ($M = 0.64$, $SD = 0.33$), while the perception of isolated bodies showed the lowest accuracy ($M = 0.39$, $SD = 0.23$). In the negative emotions, no differences were found in the perception of isolated faces and isolated bodies (faces: $M = 0.63$, $SD = 0.31$, bodies: $M = 0.63$, $SD = 0.32$).

Importantly, a significant Cue × Age group interaction was found for the positive emotions, $F(2, 472) = 9.92$, $p < .001$, $\eta^2_p = .04$. Older adults showed better perception of positive facial expressions than young adults, $t(236) = 2.25$, $p = .03$, $d = .29$, while young adults showed better perception of positive bodily expressions than older adults, $t(236) = 2.54$, $p = .01$, $d = .33$. However, the age groups did not differ in their perception of combined positive faces and bodies, $t(236) = .31$, $p = .76$.

A significant Cue × Age group interaction was also found for the negative emotions, $F(2, 472) = 3.37$, $p = .04$, $\eta^2_p = .01$. Older adults showed better perception of negative facial expressions than young adults, $t(236) = 2.08$, $p = .04$, $d = .27$. However, no differences were found for recognizing bodies alone, $t(236) = 1.28$, $p = .20$, or for recognizing combined faces and bodies, $t(236) = .06$, $p = .95$. Thus, the results yielded no differences between older and younger adults in their perception of combined faces with bodies, and this was true for both positive and negative stimuli. In order to strengthen our inferences concerning the lack of difference in these conditions, we conducted Bayesian t tests for examining the performance of older and younger adults with combined faces and bodies. The corresponding Bayes factors (BFs) suggested moderate-to-strong evidence for the null hypothesis relative to the alternative hypothesis, positive face with bodies: $BF_{01} = 6.74$, negative faces with bodies: $BF_{01} = 7.04$.

Beyond Age Differences: The Design × Cue Effect of Positive versus Negative Emotions

As noted, the full ANOVA also revealed a significant three-way interaction of Cue × Valence × Design, $F(2, 468) = 87.14$, $p < .001$, $\eta^2_p = .27$. We examined this interaction by running two separate two (valence: positive and negative) × three (cue: face, body, and face and body) repeated measures ANOVAs, for the unbalanced-valence and the balanced-valence designs, respectively (see Table 2 and Figure 3).

In the unbalanced design, post-hoc comparisons revealed that the mean perception accuracy of the positive emotion (i.e., joy) was higher than the averaged perception of negative emotions for both faces, $t(116) = 5.77$, $p < .001$, $d = .33$, and face and body composites, $t(116) = 57.04$, $p < .001$, $d = .75$. However, perception accuracy of negative body emotions was better than that of positive body emotions, $t(116) = 5.53$, $p < .001$, $d = .63$.

In the balanced-valence design, follow-up comparisons revealed that the averaged perception accuracy of positive emotions was lower than negative emotions in all of the cues (face: $t(120)$ 4.18, $p < .001$, $d = .28$, body: $t(120) = 11.07$, $p < .001$, $d = 1.09$, face and body: $t(120) = 8.83$, $p < .001$, $d = .70$).

Because the balanced design included more emotion categories, deeming the task more challenging, we computed and analyzed unbiased hit rates, which confirmed our results even when the different chance rates in each design are considered (see Supplementary Analysis). Additionally, we further examined gender effects, given the potential effect of gender on emotion perception (Thompson & Voyer, 2014; see Supplementary Analysis). Finally, while our results showed the four-way interaction was not significant, the full breakdown of the data for positive and negative emotion perception, across age groups, in each cue by experiment design is reported in Supplementary Table S3.

Discussion

This study investigated age-related differences in emotion perception while addressing several limitations of previous studies in the field. Central to our examination was the use of dynamic, nonstereotypical stimuli (GEMEP; Bänziger et al., 2012) presented as isolated faces, isolated bodies, or combined faces and bodies. The experiment was essentially replicated across separate groups by means of two experimental designs, an unbalanced-valence task (with only one positive vs multiple negative categories) and a

Table 2. Summary of Mixed Analysis of Variance for 2 (Valence: Positive and Negative) × 3 (Cue: Face, Body, and Face and Body) for Each Experiment Design

q	Effect	df	F	p	η^2_p
Unbalanced-valence design	Cue	(2, 232)	136.03	<.001	.54
	Emotion valence	(1, 116)	0.20	.66	—
	Cue × Emotion valence	(2, 232)	50.23	<.001	.30
Balanced-valence design	Cue	(2, 240)	106.65	<.001	.47
	Emotion valence	(1, 120)	126.43	<.001	.51
	Cue × Emotion valence	(2, 240)	37.32	<.001	.24

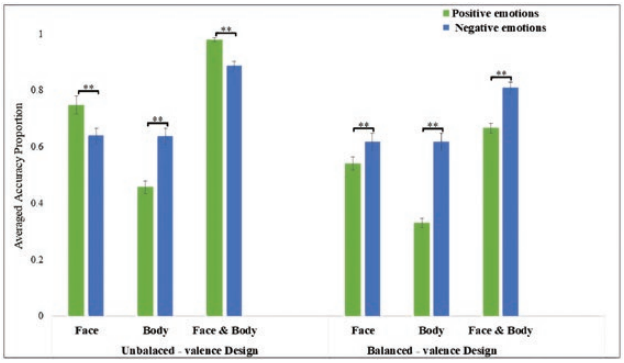

Figure 3. Mean accuracy of positive and negative emotions by cue (i.e., faces, bodies, and faces with bodies) in the unbalanced-valence and balanced-valence designs. Results are pooled across ages. Error bars represent standard errors. $^{**}p < .01$.

balanced-valence task (with an equal number of positive and negative categories).

Using these nonstereotypical dynamic stimuli, no simple effects of age-related differences in emotion perception were detected. However, when separately examining positive and negative emotions, important differences were revealed between young and older adults as a function of the perceived cue. While young adults showed better perception of positive isolated bodily expressions, older adults showed better perception of positive and negative facial expressions. More importantly, when perceiving holistic videos of faces with bodies, these age differences were eliminated, and performance was comparable across ages, in both negative and positive stimuli.

These findings are intriguing because they fail to support two common assumptions in the literature. First, we found no evidence for a global deterioration in emotion perception abilities for older adults, and second, we found no consistent evidence for a positivity effect in older adults. Rather, the results reveal a nuanced picture showing that differences between older and young adults in emotion perception differ as a function of the expressive cue available. Especially interesting is the finding that no emotion perception differences were found when perceiving faces with bodies, a more ecological condition resembling real-life circumstances.

Previous work showed a consistent positivity bias in older adults during attention and memory tasks as well as in emotion perception tests (reviewed in Carstensen & DeLiema, 2018; Reed et al., 2014; Ruffman et al., 2008). Theoretically, the positivity effect may be detected regardless of the specific task characteristics (balanced or unbalanced designs). Yet, the current study found no evidence for such a bias across dynamic faces, bodies, or their combination. These results may hint at a distinction between emotion perception and the processes involved in attention and memory tasks in which the positivity bias is well established. Alternatively, it is possible that the GEMEP dynamic stimuli, which are inherently more engaging, may invoke enhanced motivation and heightened involvement from perceivers, thereby masking any subtle positivity effects. If this assumption is correct, it may have implications for real-life interactions in which increased motivation and relevance may mask perceptual positivity effects. Unfortunately, it is very challenging to directly compare our results to previous research because researchers have almost always used static, isolated, and stereotypical facial expressions, and studies that used GEMEP stimuli were fairly different compared to our study (Schlegel et al., 2014, 2020).

Adapting a more ecological approach suggests that despite differences with isolated cues, older adults successfully incorporate facial and bodily cues at least as well as their younger counterparts. These findings are in good accordance with the social expertise notion (Hess, 2006). According to this hypothesis, older adults may become more sensitive to external cues facilitating adaptive social function, and hence, they perform well with dynamic holistic face–body stimuli. Considering the fact that older adults have good social relationships, which require accurate perception of others' emotions (e.g., Birditt et al., 2005; Engelberg & Sjöberg, 2004; Isaacowitz & Stanley, 2011), our findings seem to resonate with real-life performance rather than the deteriorated emotion perception often reported. These findings are not surprising given the host of studies showing that facial expressions in congruent context offer an advantage over isolated stimuli, in both young (Aviezer et al., 2008; Israelashvili et al., 2019; Lecker et al., 2019; Meeren et al., 2005) and older adults (Abo Foul et al., 2018; Sze et al., 2012).

While the experimental design (balanced- or unbalanced-valence) did not interact with the age group, it had a notable effect on emotion perception. Irrespective of age and cue, in the balanced-valence design, positive emotions were *harder* to recognize. However, in the unbalanced design, which resembles the majority of the experimental designs to date, positive expressions were better recognized from the face and face–body composites. We further analyzed the differences between the experimental designs using unbiased hit rates to control for differences in difficulty (Wagner, 1993), showing similar results (reported in Supplementary Material). Overall, these findings demonstrate how experimental designs may have an influential role in determining the outcomes of emotion perception tests and raise a cautionary note for future work.

The results are in line with work calling researchers to expand and broaden methods and approaches when studying age-related differences in emotion perception (e.g., Isaacowitz & Stanley, 2011; Schlegel et al., 2020). Similarly, they are in line with Freund and Isaacowitz (2014), who claimed that older and young adults may have more similarities in emotion processing abilities than previously assumed. Our results may also have practical implications in terms of training emotion perception abilities. Schlegel and colleagues (2017) found that older adults could not improve their emotional perception abilities with training programs based on multimodal emotional portrays. Yet, the current investigation suggests that older adults may benefit from emotional training programs containing dynamic context-rich stimuli in which the face is presented

with the body. Future intervention studies should explore this possibility further.

One limitation of the current study is that it examined a relatively narrow aspect of interpersonal social perception, namely, that of emotional perception of acted stimuli. Nevertheless, our main results support the notion of Castro and Isaacowitz (2019) that while older adults may be deficient in emotion perception tasks, their performance in a host of other interpersonal social tasks of emotion regulation is intact (Castro & Isaacowitz, 2019; Schlegel et al., 2020), and further, that previous arguments concerning poor emotion perception in older adults may have been overstated. A second limitation of this study concerns the representativeness of the participants in the different age groups. While our study included a relatively large sample of older and young adults from an online pool, this method may favor older adults who are more educated than young online adults, a concern echoed by the comparable performance in the cognitive testing across age groups. Additionally, the older adults in this study were familiar with online experiments and were technologically savvy. Therefore, they may demonstrate higher functioning compared to older adults in the general population. Replications across different age groups in broader, more representative samples are warranted. A third limitation of this study is in our comparison between the balanced and unbalanced designs. Specifically, the balanced design task may have been more difficult as a consequence of (a) the difference between the number of emotion choices in experimental designs (four in the unbalanced-valence and six in the balance-valence design). And (b) specific positive emotion category effects in the balanced design may have deemed the balanced design task more difficult. However, an additional high-resolution look at our results suggests this does not provide a satisfactory explanation. Specifically, a fine grain examination of the specific emotional categories (see Supplementary Figure S1) shows that in the most difficult emotional categories (e.g., pleasure bodily expressions, pride facial expressions), we found no significant differences between older and younger adults. Indeed, a generalized difficulty effect would likely result in a main effect impacting both young and older adults, with the latter showing greater decline due to their greater sensitivity to task difficulty, a finding not evident in our data. Future studies may take these concerns into account by manipulating emotional task difficulties and the number of emotional labels while better controlling for the difficulty level of different emotional categories.

Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of the article.

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The data, analytic methods, and study materials will be made available to other researchers. The study was not preregistered.

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