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Attractiveness judgments and discrimination of mommies and grandmas: Perceptual tuning for young adult faces

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ABSTRACT

Adults are more accurate in detecting deviations from normality in young adult faces than in older adult faces despite exhibiting comparable accuracy in discriminating both face ages. This deficit in judging the normality of older faces may be due to reliance on a face space optimized for the dimensions of young adult faces, perhaps because of early and continuous experience with young adult faces. Here we examined the emergence of this young adult face bias by testing 3- and 7-year-old children on a child-friendly version of the task used to test adults. In an attractiveness judgment task, children viewed young and older adult face pairs; each pair consisted of an unaltered face and a distorted face of the same identity. Children pointed to the prettiest face, which served as a measure of their sensitivity to the dimensions on which faces vary relative to a norm. To examine whether biases in the attractiveness task were specific to deficits in referencing a norm or extended to impaired discrimination, we tested children on a simultaneous match-to-sample task with the same stimuli. Both age groups were more accurate in judging the attractiveness of young faces relative to older faces; however, unlike adults, the young adult face bias extended to the match-to-sample task. These results suggest that by 3 years of age, children's perceptual system is more finely tuned for young adult faces than for older adult faces, which may support past findings of superior recognition for young adult faces.

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Introduction

Adults' ability to recognize faces is limited by experience. For example, they recognize own-race faces more accurately than other-race faces, presumably because they have more experience with own-race than other-race faces (for a review, see Meissner & Brigham, 2001). The advantage for own-race faces emerges during infancy (Kelly et al., 2007), has been found in children as young as 3 years (Macchi Cassia, Luo, Pisacane, Li, & Lee, 2014; Sangrigoli & de Schonen, 2004), and is thought to reflect a process of perceptual tuning (e.g., Kelly et al., 2005, 2007; Scott, Pascalis, & Nelson, 2007) similar to that observed in music (Hannon & Trehub, 2005) and speech perception (Kuhl, Tsao, & Liu, 2003; Kuhl, Williams, Lacerda, Stevens, & Lindblom, 1992; Maurer & Werker, 2014; Werker & Tees, 1984).

Face age also influences recognition accuracy; however, the developmental pattern is more complex, perhaps because one's own age (unlike race) continuously changes, as does the age of faces to which one is primarily exposed. Some studies report enhanced recognition for own-age faces relative to other-age faces across all participant ages (e.g., Anastasi & Rhodes, 2005; Perfect & Harris, 2003; Rhodes & Anastasi, 2012), a pattern of results suggesting that recent life experience exerts significant influence on recognition abilities (see Wiese, Komes, & Schweinberger, 2012, for a demonstration of an own-age bias among older adults with high experience with other older adults but not among older adults with low experience with other older adults). In contrast, other studies report comparable, or even superior, recognition for young adult faces relative to own-age faces even in children and older adults (e.g., Fulton & Bartlett, 1991; Macchi Cassia, Pisacane, & Gava, 2012; Wallis, Lipp, & Vanman, 2012; Wiese, Schweinberger, & Hansen, 2008; Wolff, Wiese, & Schweinberger, 2012); this pattern of results is consistent with the view that young adult faces are the most frequently encountered (Rennels & Davis, 2008) and socially relevant (Scherf & Scott, 2012) face age category early in life, which sets up a lifelong perceptual bias for young adult faces (Macchi Cassia, 2011). Consistent with this argument, Macchi Cassia, Bulf, Quadrelli, and Proietti (2014) recently reported evidence of a perceptual processing advantage for young adult faces relative to infant faces in 9-month-olds but not 3-month-olds. Here we investigated the development of a perceptual bias during childhood for young adult faces compared with older adult faces, a bias that may underlie superior recognition of young faces among young adults and, in many cases, older adults.

One explanation for superior recognition for faces from highly familiar categories (including own-age and young adult faces) is norm-based coding, a process by which individual faces are coded relative to a face prototype that represents the average of all faces previously encountered (Valentine, 1991). Within this multidimensional face space, individual faces are represented as distinct points; the farther a face is from the prototype, the less attractive and more distinctive it appears (Rhodes & Tremewan, 1996; Valentine, Darling, & Donnelly, 2004). Norm-based coding is thought to facilitate discrimination around the norm (Armann, Jeffery, Calder, & Rhodes, 2010; Wilson, Loffler, & Wilkinson, 2002). Because face space is optimized for differentiating individual faces within frequently encountered categories, faces from other categories are recognized less accurately (Valentine & Endo, 1992). Differences in how faces from various age categories (e.g., own age, young adult) are represented in face space may account for how well individual faces from those categories are differentiated and recognized.

Short and Mondloch (2013) recently reported that both young and older adults are more sensitive to how young adult faces, compared with older adult faces, deviate from an undistorted face. Parallel results for both age groups (i.e., the lack of a reversal in older adults) suggest that early and continuous experience with young adult faces tunes the perceptual system to the dimensions of young adult faces, with later experience having less impact. In the current study, we tested the hypothesis that children as young as 3 years would show a similar advantage for young adult faces compared with older adult faces, as would be expected if early experience tunes the perceptual system.

Short and Mondloch (2013) showed participants young and older adult face pairs in which one member of each pair was undistorted and the other had compressed (−10%, −20%, or −30%) or expanded (+10%, +20%, or +30%) features. In the normality task participants indicated which member of each pair was more normal, and in the discrimination task participants indicated which member of