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FAST-TRACK REPORT

Three-month-olds, but not newborns, prefer own-race faces

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Abstract

Adults are sensitive to the physical differences that define ethnic groups. However, the age at which we become sensitive to ethnic differences is currently unclear. Our study aimed to clarify this by testing newborns and young infants for sensitivity to ethnicity using a visual preference (VP) paradigm. While newborn infants demonstrated no spontaneous preference for faces from either their own- or other-ethnic groups, suggesting insensitivity to ethnicity, 3-month-old infants demonstrated a significant preference for faces from their own-ethnic group. These results suggest that sensitivity to ethnic differences is not present in the first days of life, but is learned within the first 3 months of life. The findings imply that adults' perceptions of ethnic differences are learned and derived from differences in exposure to own- versus other-race faces during early development.

Introduction

Historically, the perception of human races has had major ramifications for the social and economic livelihoods of people throughout the world. Adults very rapidly make judgements and categorize people according to ethnicity (Levin, 2000; Valentine & Endo, 1992). It is likely that both skin color and physiognomic differences are used to make such judgements. Hirschfeld suggests that sensitivity to ethnicity is more than knowledge concerning observable, physical differences and instead is a specialized cognitive strategy for reasoning about human collectives (Hirschfeld, 1998). However, while the origins of ethnic categorization must originate from some form of sensitivity to ethnic differences, exactly when and how such knowledge develops is unclear.

In the first few days of life, newborn infants demonstrate a visual preference for faces (Fantz, 1963; Goren, Sarty & Wu, 1975; Johnson, Dziurawiec, Ellis & Morton, 1991; Maurer & Young, 1983; Valenza, Simion, Macchi Cassia & Umiltà, 1996; but see Easterbrook, Kisilevsky, Hains & Muir, 1996), a preference for their mother's face over a stranger's face (Bushnell, Sai & Mullin, 1989; Field, Cohen, Garcia & Greenburg, 1984; Pascalis, de Schonen, Morton, Deruelle & Fabre-Grenet, 1995) and the ability to discriminate between faces from their own-ethnic group (Pascalis & de Schonen, 1994). Also, newborns demonstrate a preference for attractive over unattractive faces (Slater, von der Schulenburg, Brown, Badenoch, Butterworth, Parsons & Samuels, 1998) and use information from internal facial features when making this preference (Slater, Bremner, Johnson, Sherwood, Hayes & Brown, 2000). Furthermore, newborns will imitate an array of facial gestures performed by an adult (Meltzoff & Moore, 1977). Collectively, these findings suggest that newborns very rapidly form a face representation, are sensitive to subtle physiognomic variations, attend to internal facial features and learn from faces in their visual environment.

There is mounting evidence in support of the proposal that the face processing system is shaped by the faces seen in the visual environment (de Schonen & Mathivet, 1989; Morton & Johnson, 1991; Nelson, 2001). Experiential effects on face processing have thus far been reported for the attributes of gender, race and species. With respect to gender, at 3 months of age, infants raised primarily by a female caregiver demonstrate a preference for female faces over male faces and are better able to

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discriminate among female faces than among male faces. Conversely, infants raised primarily by a male caregiver demonstrate a preference for male faces over female faces (Quinn, Yahr, Kuhn, Slater & Pascalis, 2002).

For the attribute of race, Sangrigoli and de Schonen (2004) have recently demonstrated that at 3 months of age Caucasian infants are able to discriminate between own-race faces, but not other-race faces. This discrimination bias may represent an early manifestation of a similar deficit seen in adults, which is typically called the other-race effect (ORE; Meissner & Brigham, 2001). However, the effect present in infants appears to have greater plasticity than the effect reported in adults. In a follow-up experiment, when infants were familiarized with three individual faces, as opposed to one in the first experiment, they were able to demonstrate recognition with both own- and other-race faces. This latter result suggests that with only limited experiences with faces from another race, abilities to discriminate within own- and other-race face categories can be rendered equivalent.

With regard to the processing of species information from faces, at 6 months of age, infants are able to discriminate both human and monkey faces, whereas 9-month-olds and adults can only discriminate human faces (Pascalis, de Haan & Nelson, 2002). However, exposure to monkey faces between 6 and 9 months of age allows the infant to maintain the ability to discriminate monkey faces (Pascalis, Scott, Kelly, Shannon, Nicholson, Coleman & Nelson, 2005). The combined results from the studies of gender, race and species processing of faces by infants illustrate that facial input received early in life influences the development of the infant face representation and subsequent face processing abilities.

The notion of a face representation is best understood within the framework of the multidimensional face space model described by Valentine (1991). Valentine proposes a norm-based coding model in which faces are encoded as vectors according to their deviation from a prototypical average. At birth, the dimensions of the prototype are likely to be broad and largely unspecified (Nelson, 2001) with the development of the prototype being dependent on facial input. The resulting dimensions will differ according to the input received with certain salient, individuating dimensions carrying more 'weight' than others. Predominant exposure to faces of a specific gender, ethnicity or species early in life may result in both the physiognomic and skin color dimensions of one's prototype becoming 'tuned' towards such faces.

The aim of the current study was to further investigate the emergence of sensitivity to ethnicity and how it is shaped by the infant's visual environment. It also sought to investigate a possible mechanism by which differential experience with same- versus other-race faces might lead to superior recognition of same-race faces (i.e. the ORE). Specifically, we examined whether early differential experience with same- versus other-race might lead to an acquired preference for same- versus other-race faces.

To assess spontaneous preference for same- versus other-race faces, Caucasian newborn and 3-month-old infants were exposed to faces from a range of ethnic groups using a Visual-Preference (VP) task. The VP task has been successfully used in previous studies to assess both newborns' (e.g. Pascalis *et al.*, 1995; Slater *et al.*, 1998, 2000) and 3-month olds' (e.g. Quinn *et al.*, 2002) spontaneous preference for stimuli. Our expectation is that, due to a lack of exposure to faces in general, newborns will not display a preference for faces from any ethnic group. However, an alternative possibility is that newborns will have already encoded the skin color and physiognomic information from their mother's face and subsequently prefer faces which most closely match that color and physiognomy (i.e. Caucasian). Therefore, it remains unclear whether newborns will demonstrate spontaneous preferences for faces from own- or other-ethnic groups. Following from the results on gender preference (Quinn *et al.*, 2002), we hypothesized that 3-month-olds would demonstrate a preference for faces from their own ethnic group based on predominant exposure to same-race faces from birth.

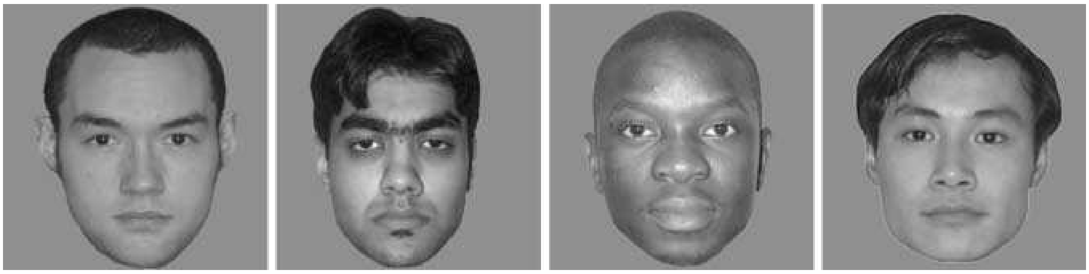
Experiment 1

Participants

In Experiment 1, Caucasian newborn infants viewed pairs of faces from a range of ethnic groups using a VP task. Newborn infants were recruited and tested in the Royal Hallamshire Hospital, Sheffield, UK. In total, 64 full-term healthy newborns (36 females) aged 16–120 hours ($M = 69$ hours, SD = 29.78) were included in the final sample. A further 26 newborns were excluded from the final sample due to side bias ($n = 4$), fussiness ($n = 8$) or falling asleep ($n = 14$). All newborns were randomly assigned to one of the four ethnic pairing conditions, with 16 in each condition. Because infants participated in only one condition, they were exposed to the same number of own- and other-race faces. This feature of the experimental design prevented a potential within-experiment familiarity preference from developing across trials.

Stimuli

The stimuli were 32 color images (Fig. 1) of male and female adult faces (age range 25–29) from four distinct ethnic groups (Caucasian, Middle Eastern, Asian and African) which were paired as follows: African/Caucasian; Middle Eastern/



Caucasian Middle Eastern African Asian

Figure 1 *Sample stimuli.*

Caucasian; Asian/Caucasian; and Caucasian/Caucasian. All pictures were taken with a Canon S50 digital camera. Using Photoshop (Adobe Systems, San Jose, CA), all faces were cropped to remove the neck and background detail from the original image. They were then mounted on a uniform dark grey background. All stimuli were resized identically to ensure uniformity. Faces were rated on a scale of 1–10 for attractiveness and distinctiveness by 16 independent observers and subsequently paired to equate for gender, attractiveness and distinctiveness.

Luminosity was measured with a Sekonic Dualsport F l-778 Lightmeter and contrast differences between faces from different ethnic groups calculated using the Michelson Contrast ($C = (L_{max} - L_{min})/(L_{max} + L_{min})$). Three separate luminosity readings were recorded, averaged for each face and then for each ethnicity. The average luminosity for the respective groups was: African (10.19 cd/m^2), Middle Eastern (14 cd/m^2), Asian (16.92 cd/m^2) and Caucasian (16.81 cd/m^2). The contrast difference between ethnic groups was calculated as: African vs. Caucasian (L = 0.25), Middle Eastern vs. Caucasian (L = 0.09), Asian vs. Caucasian (L = 0.003).

Procedure

Newborns were tested in a quiet room, seated in a semi-upright position in a padded infant car chair which was secured to a table, limiting movement and ensuring safety, approximately 30 cm from a screen measuring (45 cm × 30 cm) onto which the paired images were projected. They were randomly assigned to one of the four ethnic pairing conditions, with 16 in each condition. Each newborn was shown two face pairings, one male and one female. The presentation of slides was counterbalanced for gender and left/right positioning of images across trials. Eye movements were recorded and the film digitized to be analyzed frame by frame by two independent observers on a computer using specialized software. The average level of inter-observer agreement was high (Pearson $r = .87$).

When projected onto the screen all images measured 18 cm × 18 cm (14° visual angle) and were positioned side-by-side separated with a 9-cm gap. Each pair of images was displayed until 10 seconds of fixation time had elapsed. If the newborn spent 10 seconds looking away from the projected images, the trial was terminated. Between each image pairing, a blank screen was presented for 5 seconds or until the newborn moved their eyes from the final point of fixation from the previous trial. A black and white CCD camera (specialized for low light conditions) was used to film the neonate's eye movements. This was displayed to the experimenters, during recording, on an ITC control monitor. Time was recorded and displayed on the control monitor using a Horita II (TG-50) at 25 frames per second.

Results

Preliminary examination of the data revealed no significant effects of gender on looking times, so data were combined for further analysis. A paired samples two-tailed *t*-test conducted on the total time spent looking at Caucasian vs. other-race faces yielded a non-significant result (t = .036, $df = 47$, p = ns). Observation of the overall mean percentage of looking time verifies that newborns attended equally to both the Caucasian (49.73%) and the other-race faces (50.27%). The overall null preference was represented within each of the three ethnicity conditions: African (49.02%) vs. Caucasian (50.98%); Middle Eastern (49.83%) vs. Caucasian (50.17%); Asian (51.66%) vs. Caucasian (48.34%), with no comparison approaching significance. Newborns also displayed a null preference in the Caucasian (49.04%) vs. Caucasian (50.96%) condition.

Discussion

Overall the results obtained in Experiment 1 suggest that at birth, newborns display no spontaneous preferences for faces from own- or other-ethnic groups. Although null results can be difficult to interpret, it is unlikely that these results are due to an inability to differentiate between faces from different ethnic groups, given that newborns discriminate between faces from within their own ethnic-group (Pascalis & de Schonen, 1994). The most likely account is that newborns are able to discriminate between faces from different ethnic groups, but no group elicits a greater attraction.

Experiment 2

In Experiment 2, Caucasian 3-month-old infants were tested in an identical manner to Experiment 1. It was predicted that the infants would demonstrate a familiarity preference for Caucasian faces over other-race faces on the basis of greater experience with same-race faces. Infants should demonstrate a null preference in the Caucasian/Caucasian condition.

Participants

Participants were 3-month-old infants who had been recruited from the Royal Hallamshire Hospital, Sheffield, UK. In total, 64 full-term 3-month-old infants (42 females) of normal birth weight were included in the final sample. A further 18 infants were excluded due to side bias ($n = 16$) or fussiness ($n = 2$). All mothers reported that their baby had received little or no contact with people from non-Caucasian ethnic groups.

Stimuli

The stimuli used were identical to those of Experiment 1.

Procedure

Three-month-old infants were tested in a quiet room in the Department of Psychology at the University of Sheffield, UK. Infants were seated on their mother's lap approximately 60 cm away (due to improved visual acuity compared to newborns, a greater viewing distance is appropriate for 3-month-old infants) from a screen onto which the images were projected. Infants were randomly assigned to one of the same four ethnic pairing conditions that were used in the first experiment, and the procedure for testing was identical to that of Experiment 1. All mothers were instructed to fixate centrally above the screen and to remain quiet during testing. Eye movements were recorded and the film was then digitized to be analyzed frame by frame by two independent observers on a computer using specialized software. The average level of inter-observer agreement was high (Pearson $r = .90$).

Results

Preliminary examination once more revealed no significant gender differences, so the data were combined for further analysis. A paired-samples two-tailed *t*-test conducted on the total time spent looking at Caucasian vs. other-race faces yielded a highly significant result: overall, the infants attended more to Caucasian than other-race faces (58.80% and 41.20%, respectively, $t = 4.179$, $df = 47$, $p < .0001$). To investigate whether the Caucasian preference was represented within each of the three ethnicity conditions, further *t*-tests were conducted. Paired samples two-tailed *t*-tests yielded significant preferences in all conditions: African/Caucasian (39.67% and 60.33%; $t = 2.621$, $df = 15$, $p < .02$), Middle Eastern/Caucasian (41.77% and 58.23%; $t = 2.163$, $df = 15$, $p < .05$), Asian/Caucasian (42.16% and 57.84%; $t = 2.454$, $df = 15$, $p < .03$). In addition, the infants displayed a null preference in the Caucasian vs. Caucasian condition (looking times of 51.46% and 48.54%, respectively, $t = .402$, $df = 15$, $p > .05$).

Discussion

The results from Experiment 2 indicate that the facial input received by infants during the first 3 months of postnatal life is sufficient to induce a visual preference for own-race faces. This preference can be interpreted in terms of the infant face prototype becoming tuned to 'own-race' following principal exposure to own-race faces from the visual environment and is consistent with the finding that 3-month-olds, but not 1-month-olds are able to form a prototype from faces experienced in their visual environment (de Haan, Johnson, Maurer & Perrett, 2001). The effect of differential experience on face-race preference is also consistent with the finding that 3-month-old infants demonstrate a preference for faces matching the gender of their primary caregiver (Quinn *et al.*, 2002).

General discussion

Overall, the results from Experiments 1 and 2 demonstrate that sensitivity to ethnic differences is not present in the first days of life, but is learned within the first 3 months of life. The findings in turn imply that adults' perceptions of ethnic differences are learned and derived from differences in exposure to own- versus other-race faces during early development. Also, in concordance with earlier findings (Quinn *et al.*, 2002; Pascalis *et al.*, 2002; Pascalis *et al.*, 2005), the current data support the notion of a broad and unspecified face processing system at birth that becomes tuned through facial input at a very early stage in life. While it may be correct that in adulthood, ethnicity represents more than just an observation of physical differences (Hirschfeld, 1998), we maintain that a conception of ethnicity is founded in the sensitivity to ethnic physical differences in infancy.

While the preference for own-race faces observed in 3-month-olds may be evident, it is unclear which facial component (i.e. skin color, physiognomy, or both) is responsible for the effect. Although there was a clear contrast difference between the African vs. Caucasian faces (C = 0.25), the difference between the Middle Eastern vs. Caucasian faces (C = 0.09) was minimal, and the Asian vs. Caucasian face difference (C = 0.003) was almost indistinguishable. Despite these differences, the preference observed for own-race faces was similar across conditions. Clearly, in terms of physiognomy, there are marked differences between faces across all different ethnic groups and our findings suggest that 3-month-old infants can discriminate between faces from different ethnic groups on the basis of physiognomic differences alone.

Although our primary objective was to investigate the origins of sensitivity to ethnicity, our secondary objective was to look for a possible mechanism by which the ORE may arise. We propose that the emergence of the ORE is caused by two interrelated mechanisms. First, early predominant exposure to own-race faces tunes one's facial prototype towards own-race dimensions. Second, the tuning of the face prototype to one's own-race actuates a preference to look toward familiar, own-race faces.

It is interesting to consider the relation between the data reported here and the outcomes reported in Sangrigoli and de Schonen (2004). Whereas our findings show that Caucasian 3-month-old infants spontaneously prefer Caucasian over other-race faces, Sangrigoli and de Schonen's (2004) results demonstrate that when familiarized with a single face and tested with the familiar face versus a novel face, same-aged Caucasian infants display a novelty preference, but only when the familiar and novel faces are Caucasian. When the familiar–novel face pairings are from another race, infants divide attention between the faces. It is possible that the outcomes of the two studies bear a complementary relationship to each other if viewed from a perceptual-expertise framework (Gauthier & Nelson, 2001; Quinn *et al.*, 2002). That is, our own findings suggest that greater experience with faces from one's own race leads infants to display greater visual attention to such faces. This greater visual attention may in turn make it more likely that infants will process the exemplar-specific details of faces that define them as individual instances. Processing of the faces as individual exemplars would of course increase the likelihood of successful performance in a recognition memory task of the sort reported by Sangrigoli and de Schonen (2004). The lesser visual attention deployed for faces from other races may make it more likely that these faces would be processed only at the category level (i.e. African, Asian, Middle Eastern), and not at the more specific exemplar level (Levin, 1996, 2000). Processing the faces only in terms of their ethnic category would lead to null outcomes in a recognition memory task as reported by Sangrigoli and de Schonen (2004). By this accounting, the findings reported here may provide a basis for the data reported in Sangrigoli and de Schonen (2004).

One limitation of the current study as well as that of Sangrigoli and de Schonen (2004) is that only Caucasian participants were tested. It will thus be necessary to extend the results of both studies to infants from other ethnic groups to assess whether these findings can be generalized across all ethnic groups.

To summarize, this study has provided the first direct evidence in support of an ethnically unspecified face processing system at birth, which can become tuned to certain facial dimensions that specify race within the first 3 months of life. We believe that preference for own-race faces observed in 3-month-olds represents the perceptual beginnings of sensitivity to ethnic differences and may provide a basis for the 'other-race effect'.

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References

Bushnell, I.W., Sai, F., & Mullin, J.T. (1989). Neonatal recognition of the mother's face. *British Journal of Developmental Psychology*, **7**, 3–15.

de Haan, M., Johnson, M.H., Maurer, D., & Perrett, D.I. (2001). Recognition of individual faces and average face prototypes by 1- and 3-month-old infants. *Cognitive Development*, **16**, 659–678.

de Schonen, S., & Mathivet, H. (1989). First come, first served: a scenario about the development of hemispheric specialisation of face recognition during early infancy. *European Bulletin of Cognitive Psychology*, **9**, 3–44.

Easterbrook, M.A., Kisilevsky, B.S., Hains, S.M.J., & Muir, D.W. (1999). Faceness or complexity: evidence from newborn visual tracking of facelike stimuli. *Infant Behavior and Development*, **22**, 17–35.

Fantz, R.L. (1963). Pattern vision in newborn infants. *Science*, **140**, 296–297.

Field, T.M., Cohen, D., Garcia, R., & Greenburg. (1984). Mother–stranger face discrimination by the newborn. *Infant Behavior and Development*, **7**, 19–25.

Gauthier, I., & Nelson, C.A. (2001). The development of face expertise. *Current Opinion in Neurobiology*, **11**, 219–224.

Goren, C.C., Sarty, M., & Wu, P.Y.K. (1975). Visual following and pattern discrimination of face-like stimuli by newborn infants. *Pediatrics*, **56**, 544–549.

Hirschfeld, L.A. (1998). *Race in the making.* Cambridge, MA: MIT Press.

Johnson, M.H., Dziurawiec, S., Ellis, H., & Morton, J. (1991). Newborns' preferential tracking of face-like stimuli and its subsequent decline. *Cognition*, **40**, 1–19.

Levin, D.T. (1996). Classifying faces by race: the structure of face categories. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **22**, 1364–1382.

Levin, D.T. (2000). Race as a visual feature: using visual search and perceptual discrimination tasks to understand face categories and the cross-race recognition deficit. *Journal of Experimental Psychology: General*, **129**, 559–574.

Maurer, D., & Young, R.E. (1983). Newborns' following of natural and distorted arrangements of facial features. *Infant Behavior and Development*, **6**, 127–131.

Meissner, C.A., & Brigham, J.C. (2001). Thirty years of investigating the own-race bias memory for faces: a meta-analytic review. *Psychology, Public Policy & Law*, **7**, 3–35.

Meltzoff, A.N., & Moore, M.K. (1977). Imitation of facial and manual gestures by human neonates. *Science*, **198**, 75–78.

Morton, J., & Johnson, M.H. (1991). CONSPEC and CONLEARN: a two-process theory of infant face recognition. *Psychological Review*, **98**, 164–181.

Nelson, C.A. (2001). The development and neural bases of face recognition. *Infant and Child Development*, **10**, 3–18.

Pascalis, O., de Haan, M., & Nelson, C.A. (2002). Is face processing species-specific during the first year of life? *Science*, **296**, 1321–1323.

Pascalis, O., & de Schonen, S. (1994). Recognition memory on 3- to 4-day-old human neonates. *NeuroReport*, **5**, 1721–1724.

Pascalis, O., de Schonen, S., Morton, J., Deruelle, C., & Fabre-Grenet, M. (1995). Mother's face recognition in neonates: a replication and an extension. *Infant Behavior and Development*, **17**, 79–85.

Pascalis, O., Scott, L.S., Kelly, D.J., Shannon, R.W., Nicholson, E., Coleman, M., & Nelson, C.A. (2005). Plasticity of face processing in infancy. *Proceedings of the National Academy of Science of the USA*, **102**, 5297–5300.

Quinn, P.C., Yahr, J., Kuhn, A., Slater, A.M., & Pascalis, O. (2002). Representation of the gender of human faces by infants: a preference for female. *Perception*, **31**, 1109–1121.

Sangrigoli, S., & de Schonen, S. (2004). Recognition of own-race and other-race faces by three-month old infants. *Journal of Child Psychology and Psychiatry*, **45**, 1–9.

Slater, A.M., Bremner, G., Johnson, S.P., Sherwood, P., Hayes, R., & Brown, E. (2000). Newborn infants' preference for attractive faces: the role of internal and external facial features. *Infancy*, **1**, 265–274.

Slater, A.M., von der Schulenburg, C., Brown, E., Badenoch, M., Butterworth, G., Parsons, S., & Samuels, C. (1998). Newborn infants prefer attractive faces. *Infant Behavior and Development*, **21**, 345–354.

Valentine, T. (1991). A unified account of the effects of distinctiveness, inversion, and race in face recognition. *The Quarterly Journal of Experimental Psychology*, **43A**, 161–204.

Valentine, T., & Endo, M. (1992). Towards an exemplar model of face processing: the effects of race and distinctiveness. *The Quarterly Journal of Experimental Psychology*, **44A**, 671–703.

Valenza, E., Simion, F., Macchi Cassia, V., & Umiltà, C. (1996). Face preference at birth. *Journal of Experimental Psychology: Human Perception and Performance*, **22**, 892–903.

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