



ORIGINAL ARTICLE

A comparison between preterm and full-term infants' preference for faces[☆]

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KEYWORDS

Model of visual recognition;
Visual perception;
Newborn;
Preterm infant;
Full-term infant

Abstract

Objective: Visual preference for faces at birth is the product of a multimodal sensory experience experienced by the fetus even during the gestational period. The ability to recognize faces allows an ecologically advantageous interaction with the social environment. However, perinatal events such as premature birth, may adversely affect the adequate development of this capacity. In this study, we evaluated the preference for facial stimuli in preterm infants within the first few hours after birth.

Methods: This is a cross-sectional observational study of 59 newborns, 28 preterm and 31 full-term infants. The babies were assessed in the first hours of life, with two white boards in the shape of a head and neck: one with the drawing of a face similar to the human face (natural face), and one with the drawing of misaligned eyes, mouth and nose (distorted face). After the newborn fixated the eyes on the presented stimulus, it was slowly moved along the visual field. The recognition of the stimulus was considered present when the baby had eye or head movements toward the stimulus.

Results: The preterm infants, in addition to showing a lower occurrence of orientation movements for both stimuli, on average (1.8 ± 1.1 to natural faces and 2.0 ± 1.2 for distorted ones) also showed no preference for any of them ($p = 0.35$). Full-term newborns showed a different behavior, in which they showed a preference for natural faces ($p = 0.002$) and a higher number of orientations for the stimulus, for both natural (3.2 ± 0.8) and distorted faces (2.5 ± 0.9).

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PALAVRAS-CHAVE

Reconhecimento Visual de Modelos; Percepção Visual; Recém-Nascido; Prematuro; Nascimento a Termo

Conclusion: Preterm newborns recognize facial stimuli and disclose no preference for natural faces, different from full-term newborns.

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Uma comparação entre recém-nascidos prematuros e a termo na preferência por faces

Resumo

Objetivo: A preferência visual por faces ao nascimento é produto de uma experiência sensorial multimodal vivenciada pelo feto ainda no período gestacional. A habilidade de reconhecer faces possibilita uma interação ecologicamente vantajosa com o ambiente social. Entretanto, eventos perinatais, como o nascimento prematuro, podem prejudicar o desenvolvimento adequado dessa habilidade. Nesse trabalho, avaliamos a preferência por estímulos faciais de recém-nascidos prematuros nas primeiras horas após o nascimento.

Métodos: Trata-se de um estudo observacional transversal realizado com 59 recém-nascidos, 28 prematuros e 31 nascidos termos. Os bebês foram avaliados, nas primeiras horas de vida, com duas pranchas brancas em formato de cabeça e pescoço: uma com o desenho de uma face similar ao rosto humano (face natural), e outra com o desenho de olhos, boca e nariz desalinhados (face distorcida). Após o recém-nascido fixar o olhar no estímulo apresentado o mesmo era lentamente movimentado ao longo do campo visual. O reconhecimento do estímulo foi considerado presente quando o bebê apresentou movimentos dos olhos ou cabeça em direção ao estímulo.

Resultados: Os recém-nascidos prematuros além de apresentarem menor ocorrência de movimentos de orientação para ambos os estímulos, em média ($1,8 \pm 1,1$ para faces naturais e $2,0 \pm 1,2$ para faces distorcidas), também não apresentaram preferência por qualquer um deles ($p = 0,35$). Diferente foi o comportamento dos recém-nascidos a termo que apresentaram preferência por faces naturais ($p = 0,002$) e um número maior de orientações para o estímulo, tanto para faces naturais ($3,2 \pm 0,8$) quanto para faces distorcidas ($2,5 \pm 0,9$).

Conclusão: Recém-nascidos prematuros reconhecem os estímulos faciais e não apresentam preferência por faces naturais, diferente de recém-nascidos a termos.

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Introduction

Despite the visual cortical area immaturity and the consequent limitation in visual skills, newborns have an innate preference for visual stimuli that resemble faces. This ability is essential to guide the child's interactions in the social environment.¹

Unlike most other objects, faces are processed in a holistic or configural manner in the visual system and are processed in their entirety, while other objects are processed as aggregates of independent elements.² This is probably due to the fact that many socially relevant information sources depend on the integration from several facial regions, such as judgments of facial expressions and intentionality.²

The configural processing of faces depends on a sub-cortical system known as CONSPEC, which operates since birth and is sensitive to basic information on the visual characteristics of faces of the same species.³ This system guides the preference for facial patterns (eyes aligned above the nose and mouth) from high contrasts up to the first months of life,⁴⁻⁶ before a second system, termed CONLERN, completes its maturation.^{3,4} The development of the CONLERN system depends on the visual experience with

human faces.^{3,4,7} These two systems interact during the postnatal development of the visual system.⁸ The CONSPEC guides the development of CONLERN;³ any impairment in its function may affect cortical specialization for faces and, thus, adversely influence the subsequent processing of social stimuli.⁴

Experiments that investigate these two systems in full-term newborns with gestational age >40 weeks are widely found in the literature.^{1,4,5,8-10} However, although preterm infants are capable of completing all elements of a visual assessment protocol, including those with complex answers,^{6,11} no study has assessed the preference for faces in preterm infants in the first few hours of life.

Some studies¹²⁻¹⁴ demonstrated an association between preterm birth and several neurocognitive disorders, associated in one way or another to the processing of facial stimuli, such as autism^{12,13} and prosopagnosia,¹⁴ the inability to recognize faces.

An orientation by social stimuli may be a critical control point for predicting the trajectory of social cognitive development.¹⁵

However, a hypothesis discussed in the present study is that the orientation by social stimuli at birth may be a product of a multimodal sensory experience that the fetus can

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