



Contents lists available at ScienceDirect

Consciousness and Cognition

journal homepage: www.elsevier.com/locate/concog

Blindness and social trust: The effect of early visual deprivation on judgments of trustworthiness

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ARTICLE INFO

Keywords:

Visual deprivation
 Early blindness
 Social trust
 Trustworthiness

ABSTRACT

Investigating the impact of early visual deprivation on evaluations related to social trust has received little attention to date. This is despite consistent evidence suggesting that early onset blindness may interfere with the normal development of social skills. In this study, we investigated whether early blindness affects judgments of trustworthiness regarding the actions of an agent, with trustworthiness representing the fundamental dimension in the social evaluation. Specifically, we compared performance between a group of early blind individuals with that of sighted controls in their evaluation of trustworthiness of an agent after hearing a pair of two positive or two negative social behaviors (impression formation). Participants then repeated the same evaluation following the presentation of a third (consistent or inconsistent) behavior regarding the same agent (impression updating). Overall, blind individuals tended to give similar evaluations compared to their sighted counterparts. However, they also valued positive behaviors significantly more than sighted controls when forming their impression of an agent's trustworthiness. Moreover, when inconsistent information was provided, blind individuals were more prone to revise their initial evaluation compared to controls. These results suggest that early visual deprivation may have a dramatic effect on the evaluation of social factors such as trustworthiness.

1. Introduction

Developmental studies have reported that in children who are born blind or with severe visual impairment, the lack of early visual experience is likely to interfere with the normal development of social skills, such as perspective-taking ability and understanding others' mental states and emotions (e.g., Brambring & Asbrock, 2010; Dyck, Farrugia, Shochet, & Holmes-Brown, 2004; Green, Pring, & Swettenham, 2004; but see Pijnacker, Vervloed, & Steenbergen, 2012). There is considerable qualitative evidence that blind children are likely to manifest more difficulties than their sighted peers with regards to social interactions (e.g., Preisler, 1991; Tadić, Pring, & Dale, 2010; for a review, see Pérez-Pereira & Conti-Ramsden, 2013). However, evidence also suggests that the acquisition and development of verbal skills tends to reduce the impact of early visual deprivation on abilities such as perceiving the mental states of others (for a review see Bedny & Saxe, 2012; Pérez-Pereira & Conti-Ramsden, 2013; Pérez-Pereira & Castro, 1997; Ricciardi et al., 2009). Congenitally blind adults seem to have a complete understanding of the experiences of others (including the perceptual

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experience of seeing, [Koster-Hale, Bedny, & Saxe, 2014](#)), beliefs and thoughts ([Bedny, Pascual-Leone, & Saxe, 2009](#)). Moreover, blind adults also seem to rely on similar strategies in making inferences regarding the personality traits of other agents. For example, in a study by [Ma and Han \(2011\)](#), participants were asked to indicate whether a personality trait was representative or not of a popular national athlete (e.g., ‘Liu Xiang is lazy’). The authors found no group differences in attributing (and remembering) the personality traits of others, nor in the neural correlates associated with this task (as assessed by functional neuroimaging). In another study, [Oleszkiewicz, Pisanski, and Sorokowska \(2017\)](#) reported that early and late blind individuals responded in a similar fashion compared to sighted peers on a task requiring participants to evaluate a series of sentences designed to measure one’s own level of social trust. The authors found that all participants exhibited evidence of the belief that, overall, people tend to be more exploitative in nature rather than dishonest ([Oleszkiewicz et al., 2017](#)).

Although information acquired through language certainly appears critical in understanding and inferring the internal mental states of others, a large part of socially relevant information is also conveyed by non-verbal cues. Indeed, when assessing the emotional state of other agents (in the absence of any verbal cues), sighted individuals mainly rely on facial expressions and body gestures (for reviews, see [de Gelder, van Honk, & Tamietto, 2011](#); [de Gelder et al., 2010](#)). Similarly, eye gaze provides critical information about other people’s intentions and their goals (e.g., [Soria Bauser, Thoma, & Suchan, 2012](#); for a review, see [Emery, 2000](#)). Furthermore, specific facial configurations seem to be indicative of social traits, such as trustworthiness or competence (for a review, see [Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015](#)). Along these lines, even though blind individuals can make inferences about the mental states of other people, the lack of visual cues garnered from facial expressions or bodily gestures are likely to have an impact on the interpretation of an individual’s intentions, beliefs, and feelings ([Sak-Wernicka, 2016](#)). Interestingly, in the case of blindness, the lack of early visual experience also seems to shift the focus of attention on semantic information (see also [Occelli, Lacey, Stephens, Merabet, & Sathian, 2017](#), for evidence of greater reliance on verbal information in the blind), possibly reducing the influence of other features (such as the pitch of a speaker’s voice) in conveying information about an agent or the surrounding context. In this direction, [Oleszkiewicz, Pisanski, Lachowicz-Tabaczek, and Sorokowska \(2016\)](#) found that lower pitch voices (compared to higher pitch voices) were associated with higher ratings of trustworthiness in both blind and sighted individuals (in agreement with previous evidence, e.g., [Tsantani, Belin, Paterson, & McAleer, 2016](#)), but this effect was significantly larger in sighted compared to blind participants ([Oleszkiewicz et al., 2016](#)).

Whereas changes in neurofunctional mechanisms induced by visual deprivation have been extensively studied (e.g., [Cattaneo et al., 2008](#); [Ricciardi, Bonino, Pellegrini, & Pietrini, 2014](#); [Struiksma, Noordzij, & Postma, 2009](#)), the impact of visual impairment on aspects of social cognition has largely been limited to qualitative observation. Researchers have only recently started to more systematically investigate processes related to social cognition (e.g., theory of mind, emotion recognition, mirror neurons, and trait attribution) in visually deprived individuals (e.g., [Bedny et al., 2009](#); [Gamond, Vecchi, Ferrari, Merabet, & Cattaneo, 2017](#); [Ma & Han, 2011](#); [Oleszkiewicz et al., 2016, 2017](#); [Ricciardi et al., 2009](#)). Here, we aimed to shed light on whether, and how, early visual deprivation affects social evaluations with a specific focus on decisions related to the predominant dimension of trustworthiness ([Goodwin, Piazza, & Rozin, 2014](#); [Uhlmann, Pizarro, & Diermeier, 2015](#)). Given the importance of visual experience in forming social judgments, we hypothesized that early and profoundly blind individuals would show specific differences compared to sighted controls in their decisions related to trustworthiness. Furthermore, when given the opportunity to revise their decisions based on further information, these differences in judgments between the two groups would also remain evident.

2. Methods

2.1. Participants

Nineteen native Italian speaking early-blind participants (8 males; mean age = 42.2 years, SD = 12.1; mean education: 13.6 years, SD = 3.6) and nineteen native Italian speaking matched sighted control participants (8 males; mean age = 42.2 years, SD = 12.4, mean education: 13.6 years, SD = 3.4) took part in the experiment. All participants were right handed (based on self-report) and had no history of neurological or psychiatric disorders. For all the blind participants, documented blindness occurred prior to the age of 24 months and was due to ocular (or pre-chiasmal) pathology or damage (for further details regarding the blind participants, see [Table 1](#)).

2.2. Stimuli

Stimuli used in the experiment consisted of a set of 72 unique sentences describing the behavior of a male individual (i.e. agent) in a particular social situation. The subject of the sentences was always a male (i.e. “he”), followed by a predicate and by other attributes that defined the action. Sentences were adapted from a larger set used in prior studies by [Todorov and colleagues \(Mende-Siedlecki, Baron, & Todorov, 2013; Mende-Siedlecki, Cai, & Todorov, 2013\)](#) and translated into Italian (as in [Ferrari, Vecchi, Todorov, & Cattaneo, 2016; Ferrari et al., 2016](#)). The complete list of sentences is reported in the Appendix. Half of the sentences described a good/socially valuable behavior (e.g., “*He gave out toys to the Children’s Hospital at Christmas*”) and half described a bad/socially questionable behavior (e.g., “*He told a colleague in public that she should lose weight*”). Sentences referred to “ordinary” positive or negative behaviors, with no reference to extremely bad acts (such as murders) or heroic gestures (such as saving a life). Positively and negatively valenced Italian sentences were balanced for length (mean number of letters = 54.4, SD = 9.8 for positive sentences and mean number of letters = 52.6, SD = 13.0 for negative sentences, $t(70) < 1$, $p = 0.50$). In a pilot study (16 sighted participants, 10 males, mean age = 21.2, SD = 2.1; none of whom participated in the main experiment) we pre-rated sentences (randomly presented in written form and at self-paced reading speed) using a 1–9 point Likert scale (1 = socially very negative; 9 = socially

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