



Adolescents gradually improve at detecting trustworthiness from the facial features of unknown adults



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ABSTRACT

People can (to some extent) detect trustworthiness from the facial features of social partners, and populations which underperform at this task are at a greater risk of abuse. Here we focus on situations in which adolescents make a decision whether to trust an unknown adult. Adolescents aged 13–18 ($N = 540$) played a trust game, in which they made decisions whether to trust unknown adults based on their picture. We show that trusting decisions become increasingly accurate with age, from a small effect size at age 13 to an effect size 2.5 times larger at age 18. We consider the implications of this result for the development of prosociality and the possible mechanisms underlying the development of trustworthiness detection from faces.

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1. Introduction

The propensity to trust and cooperate is a central component of the human cognitive niche (Pinker, 2010; Whiten & Erdal, 2012). The problem with trusting easily, though, is that it makes one vulnerable to selfish agents willing to abuse trust (Fehr, 2009). Accordingly, people resort to various cognitive and social safeguards, which protect them against trusting the wrong persons. To decide whether to trust a given individual, people may rely on first-hand information about her trustworthiness, based on personal interactions (Chang, Doll, van't Wout, Frank, & Sanfey, 2010). In the absence of past personal interactions, they may rely on gossip and reputation (Laidre, Lamb, Shultz, & Olsen, 2013); and when there is no available record of the trustworthiness of a given individual, people can try to read trustworthiness from facial features.

Indeed, convergent evidence suggests that healthy adults can discriminate, at least to some extent, between faces of cooperators and faces of abusers (Bonnefon, Hopfensitz, & De Neys, 2013; De Neys, Hopfensitz, & Bonnefon, 2013; Little & Jones, 2013; Stirrat & Perrett, 2010; Tognetti, Berticat, Raymond, & Faurie, 2013; Yamagishi, Tanida, Mashima, Shimoma, & Kanazawa, 2003). Without this capacity to read trustworthiness from faces, people would be at a greater risk of abuse. And indeed, recent research linked older adults' greater vulnerability to fraud, to a diminished capacity to read trustworthiness

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from faces (Castle et al., 2012). This diminished capacity was correlated with a muted response of the anterior insula, suggesting that older adults lacked a proper “gut response” to untrustworthy faces.

In this article, we focus on another period of heightened vulnerability to abuse, adolescence. During their transition to autonomous decision-making, teenagers have many opportunities to interact with unknown adults in novel contexts, and these interactions may involve decisions to trust or not to trust unknown adults. We already know from behavioral economic experiments that adolescents become increasingly trusting (Sutter & Kocher, 2007; Van den Bos, van Dijk, & Crone, 2012; Van den Bos, Westenberg, van Dijk, & Crone, 2010). However, as emphasized by Evans, Athenstaedt, and Krueger (2013), we do not know whether this growing propensity to trust goes together with an increased performance at trusting the right person. In parallel, we already know that young children can show adult-like levels of consistency in their judgments of facial trustworthiness (Cogsdill, Todorov, Spelke, & Banaji, 2014), but we do not know whether these judgments, consistent as they are, are also accurate.

In sum, it is an important, unanswered question whether or when adolescents can reliably detect trustworthiness from adult faces. To answer this question, we conducted a study where 540 participants aged 13 to 18 played a classic trust game, in which they made decisions whether to trust adults based on their facial features. We recorded the accuracy of these decisions in order to track the developmental trajectory of trustworthiness detection from adult faces.

2. Disclosure statement

We report all measures, conditions, and data exclusions. The sample size for the study was exogenously determined as the highest possible number of volunteers in the two schools we contacted.

3. Method

3.1. Participants

The study took place in two suburban secondary schools in Belgium. After excluding 15 participants for not reporting their age or for being outside of our target age range (13–18), the data for 540 participants were retained for analysis. Table 1 shows the breakdown of these participants, by gender and age.

3.2. Procedure

The study was conducted on the school premises. Participants sat in front of individual computers, and were told about the rules of the 14-round trust game they were about to play, in the role of Investor, with 14 different adult Trustees. Note that while the words ‘Investor’ and ‘Trustee’ are used for clarity here, they were never actually used in the experiment. The Trustee was simply called ‘the other player’.

Each round had the same structure: Participants were endowed with an hypothetical sum of 4 euros (all payoffs were hypothetical, as requested by the school boards) and had to decide whether to keep the endowment, or to transfer that endowment to a Trustee, whose picture appeared on the screen. In case the endowment was transferred, it was multiplied by three, and the Trustee had to decide whether to keep the whole 12 euros, to return 6 euros to the Investor, or to return 4 euros to the Investor. We refer to these strategies as the Abuser, Cooperator, and Neutral strategies, respectively. These terms were not mentioned to the participants. The participants were informed that each Trustee had already recorded his or her strategy. Because the school boards were opposed to incentivizing the students, the payoffs were only hypothetical.

Each round started with a fixation cross (1000 ms), followed by the picture of the Trustee (5500 ms). Pictures were presented in randomized order for each participant. Participants indicated whether they wanted to transfer money to the Trustee by pressing one of two keys, after which they moved on to the next round, without receiving feedback about the strategy of the Trustee.

After having played the 14 rounds, participants were asked for an estimate of the overall proportion of Trustees that they believed would return nothing (the Abuser strategy). This question was meant to capture their explicit beliefs about trustworthiness, as compared to the implicit judgments captured by their decisions during the game. Finally, participants indicated what would have been their own strategy had they played Trustee: keep 12 (Abuser), keep 8 (Neutral), or keep 6 (Cooperator). Eight participants did not record their responses to either or both of these questions. A subset of participants also recorded their birth order among their siblings, but this measure was not used in any analysis.

3.3. Materials

Most importantly, the Trustees shown to the participants had recorded their strategy in the context of a previous study (Centorrino, Djemai, Hopfensitz, Milinski, & Seabright, *in press*). In this initial study, 84 young adults played the role of Trustee, and recorded a movie introducing themselves. From each of these movies, a research assistant blind to the strategies of the Trustees extracted one frame in which the Trustee had the most neutral expression. Each picture was then cropped (left and right facial boundaries, chin and top of the eyebrows) to minimize display of clothing or hairstyle, and turned to black and white (see Fig. 1). A set of 60 of these pictures was used for the trustworthiness detection studies reported in

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