

Seeing Social Relationships

Towards a two-pathway model of human perceptual processing of social information

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Background

It is widely accepted that the most important human adaptation to the complexities of social living is the cognitive ability to represent the mental states of conspecifics to understand and predict their behavior — the so-called Theory of Mind. And yet, other social species — which can, at best, be credited with a partial, shaky Theory of Mind — are very good at monitoring complex social relationships, notably dominance. Instead of reducing the perceptual and inferential capacities allowing such monitoring to a rudimentary knowledge of others' mental states, it seems more accurate, from a phylogenetic perspective, to postulate the existence of another cognitive strategy, involving a social and yet non psychological relationships processing. This cognitive strategy, molded by selection pressures proper to social living, would be more parsimonious and less costly in time and energy than psychological processing that is metarepresentational in nature and whose fully-fledged mastery is incontestably human-specific.

Hypothesis

Our hypothesis is therefore that humans have at their disposal two adaptative cognitive heuristics to construe the behavior of others: apart from the well-known psychological heuristic, dedicated to the representation and attribution of mental states, humans might also activate a social heuristic, shared with other evolved social species, which enables them to identify and track social relationships.

Results

Eye-tracking analyses highlight two different scan patterns, lending support to our two-pathway hypothesis: a social heuristic, fundamentally relational, which enables the quick and accurate identification of perceptible patterned relationships (such as dominance), and a psychological heuristic, which allows the representation of mostly opaque, concealable individual attributes (such as lying).

We computed the global/local (g/l) ratio as a measure of scanpath strategy. Saccadic amplitude was analyzed with a cut-off of 1.6° to distinguish between local and global saccades. Participants showed higher global/local ratio (Figure 3), and thus a more global scanpath, in the Hierarchy (i.e. social) condition ($M = 3.28$; $SD = .21$) compared to the Lie (i.e. psychological) condition ($M = 2.43$; $SD = .14$), $F(1,28) = 19.81$, $MSE = .54$, $p < .001$, $\eta_p^2 = .41$.

Moreover, participants could accurately indicate the hierarchic relations between the characters in the pictures, as accuracy ($M = .53$; $SD = .21$) was above chance level, $t(18) = 4.20$, $p < .01$.

Method

To start testing this twofold hypothesis, this study dwells on the first step of social information processing, namely, perception. We used an eye-tracking system that reveals the specific patterns of eye movements that differential social information seeking is capable of eliciting. 40 photographs of actual conversations between two individuals within a hierarchical relationship (Mast & Hall 2004) have been presented for 3500 milliseconds each to 30 adult participants under two conditions. In the "psychological" condition, participants were asked to determine, for each photograph, who was hiding something from the other — "who is lying?". In the "social" condition, participants had to assess if one of the protagonists was superior or equal to the other — "who is the boss?".

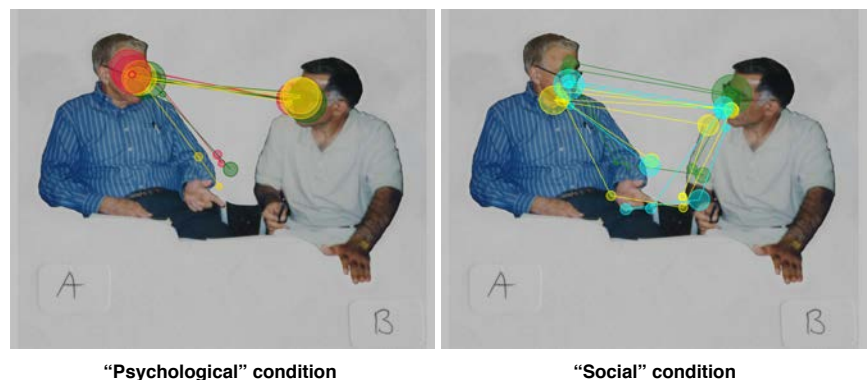


Figure 1 – Examples of typical scanpath strategy in the psychological condition and in the social condition. Each color refers to the performance of a particular subject.

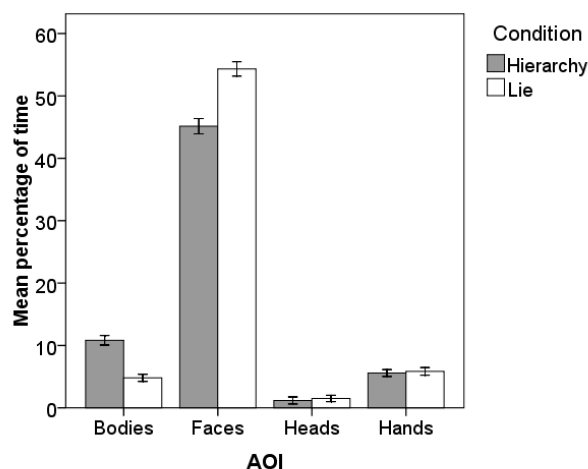


Figure 2 – Bonferroni corrected post-hoc comparisons revealed that participants spent more time looking at the faces of the characters in the Lie (i.e. psychological) condition than in the Hierarchy (i.e. social) condition ($p < .001$).

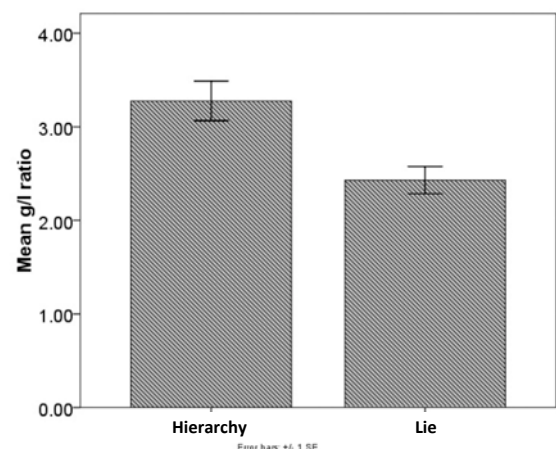


Figure 3 – Mean global/local ratio for the Hierarchy (i.e. social) condition and the Lie (i.e. psychological) condition. Error bars represent SEM.