

Interoceptive accuracy modulates the effect of social reputation on deceptive behaviour

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Introduction

Corporeal awareness arises from the integration of exteroceptive (e.g. visual, tactile) and interoceptive signals (e.g. cardiac, respiratory, gastric) originating outside and inside the body, respectively^{1,2}. Various studies within the framework of *embodied cognition* have demonstrated that bodily signals not only build corporeal awareness but can influence high-order cognitive and emotional processes.^{3,4} Even social and moral behaviour can be modulated by the increased presence –or attention towards– bodily signals.^{5,6} However, the role of corporeal awareness in honesty-related behaviour remains largely unexplored. As interoceptive and exteroceptive accuracy have been linked to private and public self-consciousness^{7,8}, these components of corporeal awareness may differentially influence *internalized morality*, the intrinsic importance given to moral conduct, and *symbolized morality*, the importance given to appearing moral to others.⁹

Aims

The aim of the present study was to test whether individual differences in the capacity to accurately detect interoceptive (cardiac) and exteroceptive (visual) bodily signals differentially predicted participants' deceptive behaviour in a card game, when their reputation was at risk or not.

Methods

Participants A sample of 71 healthy participants (33 males, age [$M = 24.69$, $SD = 4.57$]) volunteered the study. **Duration** approximately 1 hour.

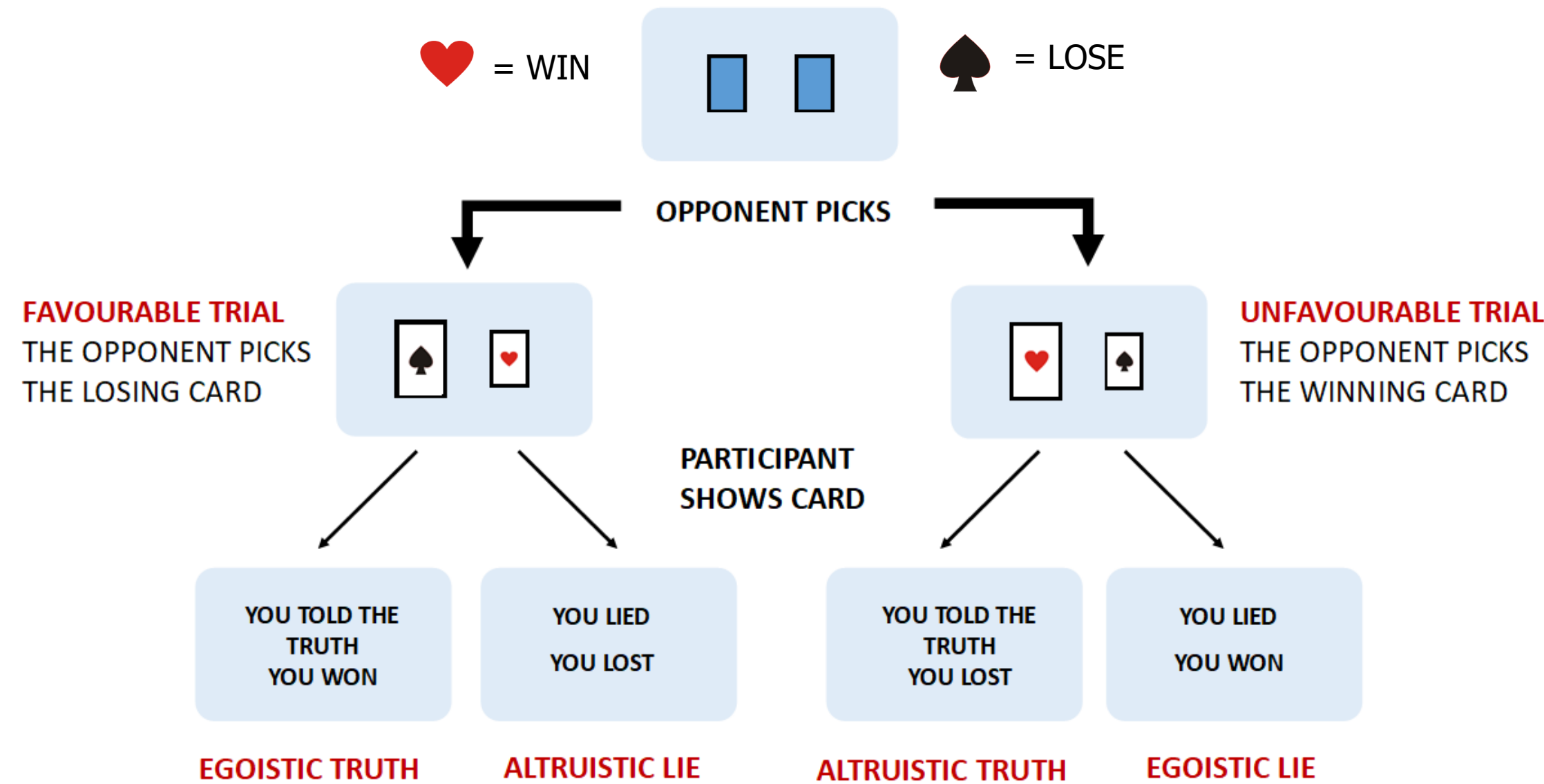
Step 1—MEASURING DECEPTIVE BEHAVIOUR

The Temptation to Lie Card Game

Two-person computer card game. In 64 trials the *opponent* picks one of two covered cards (ace of hearts is winning card) and the *participant* must show the *opponent* the card they picked (the remaining card goes to the *participant*) and can also lie to change the game outcome. Game played in two conditions:

HIGH REPUTATION RISK = high probability opponent will know if you lie

LOW REPUTATION RISK = low probability opponent will know if you lie



Step 2—MEASURING BODY AWARENESS

Heartbeat counting task

Participants mentally counted their felt heartbeats in 4 randomized trials of different length, without taking their pulse.

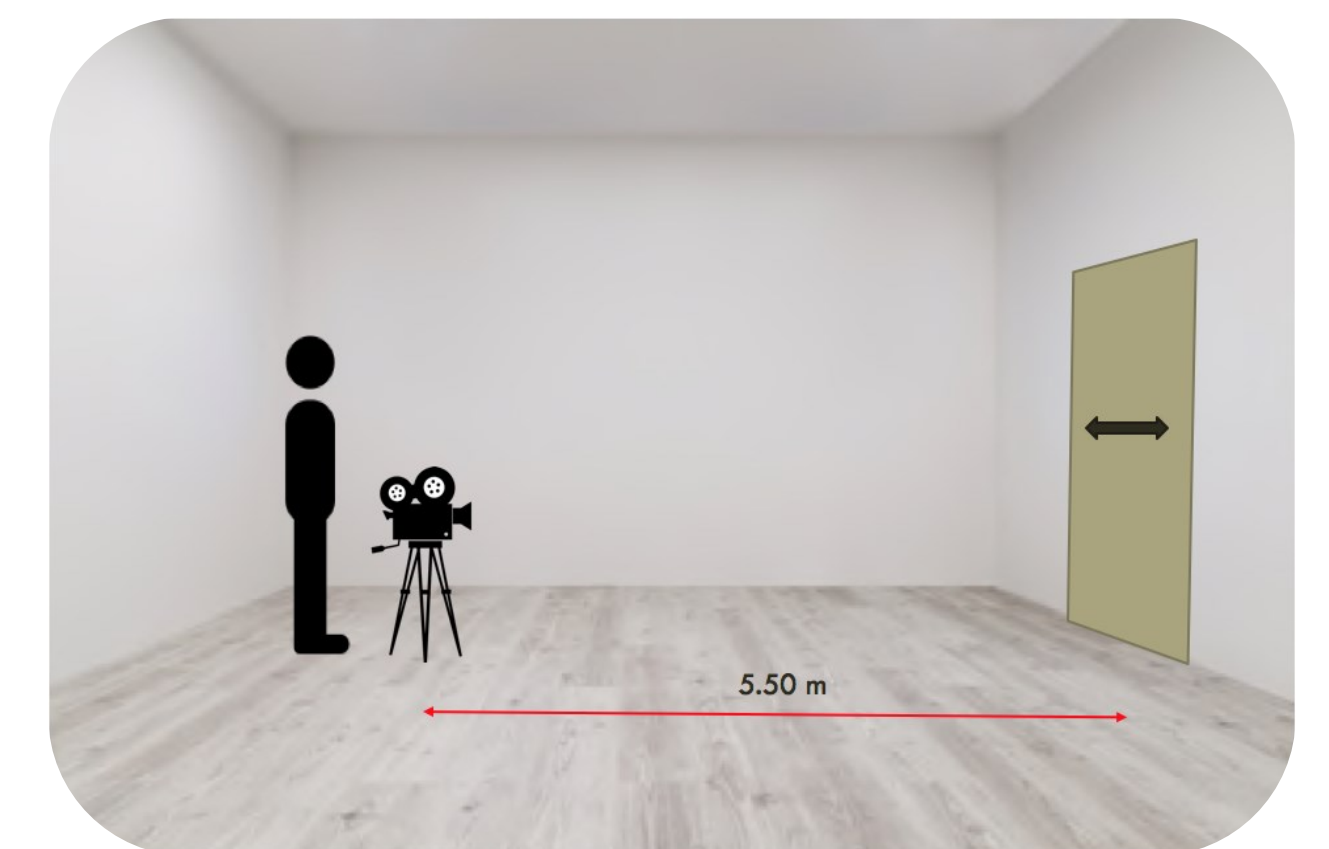
INTEROCEPTIVE ACCURACY After each trial they indicated the number of felt heartbeats, which was compared to the actual number of heartbeats measured via ECG:

$$IAcc = \frac{1}{4} \sum (1 - \frac{|\text{recorded heartbeats} - \text{counted heartbeats}|}{\text{recorded heartbeats}})$$

Body-scaled Action Task

Participants completed a variation of the body-scaled action task, in which they gave visual judgements about whether their body could fit through a series of projected doors varying in width and height based on the participants' actual dimension.

EXTEROCEPTIVE ACCURACY Signal detection theory (SDT) was used to calculate *Hit rate* and *false alarm rate* and the resulting *d'* prime curve was used as a sensitivity index.



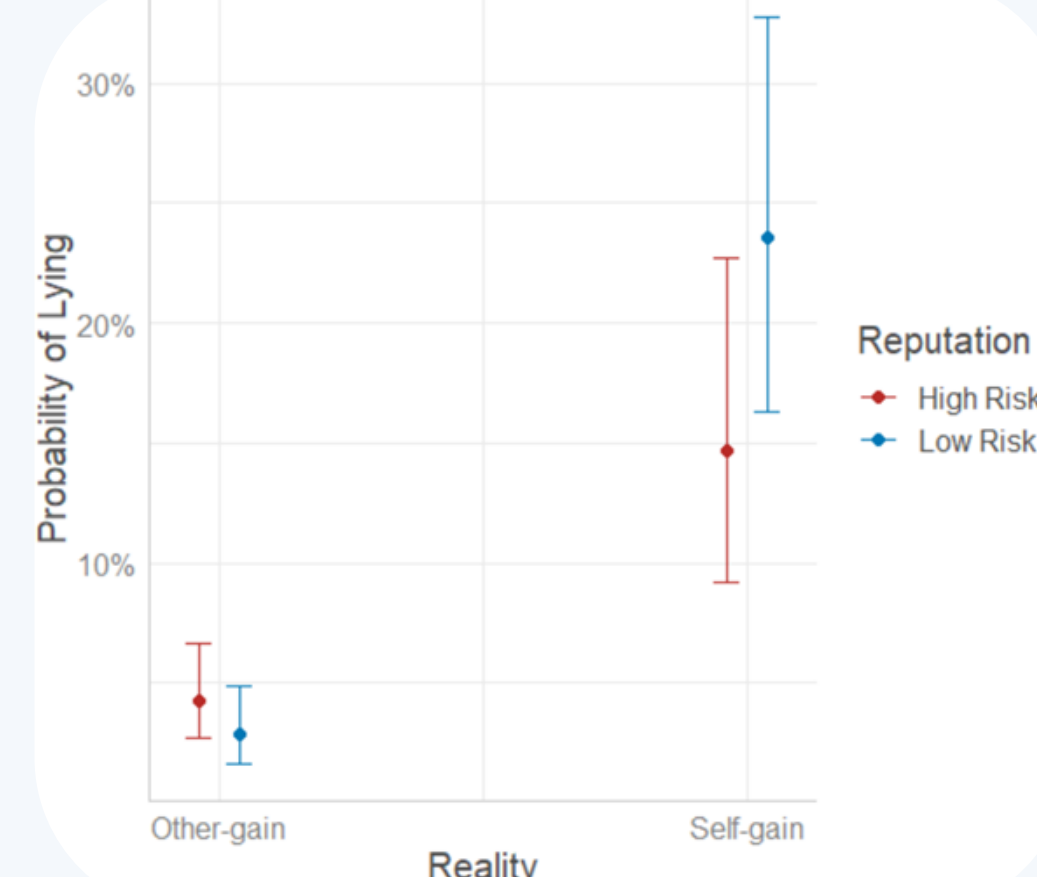
Results

Generalised multilevel mixed model with tendency to lie (Lie/Truth) as the dependent dichotomous variable, Reputation (High Risk; Low Risk) and Reality (Unfavourable; Favourable) as within-subject predictors and interoceptive accuracy and exteroceptive accuracy as between-subject moderating variables.

Participants told more egoistic lies (to increase their own payoff) than altruistic lies (to increase the other player's payoff) ($estimate = 1.36704$, $SE = 0.31232$, $\chi^2 = 19.159$, $p < .001$).

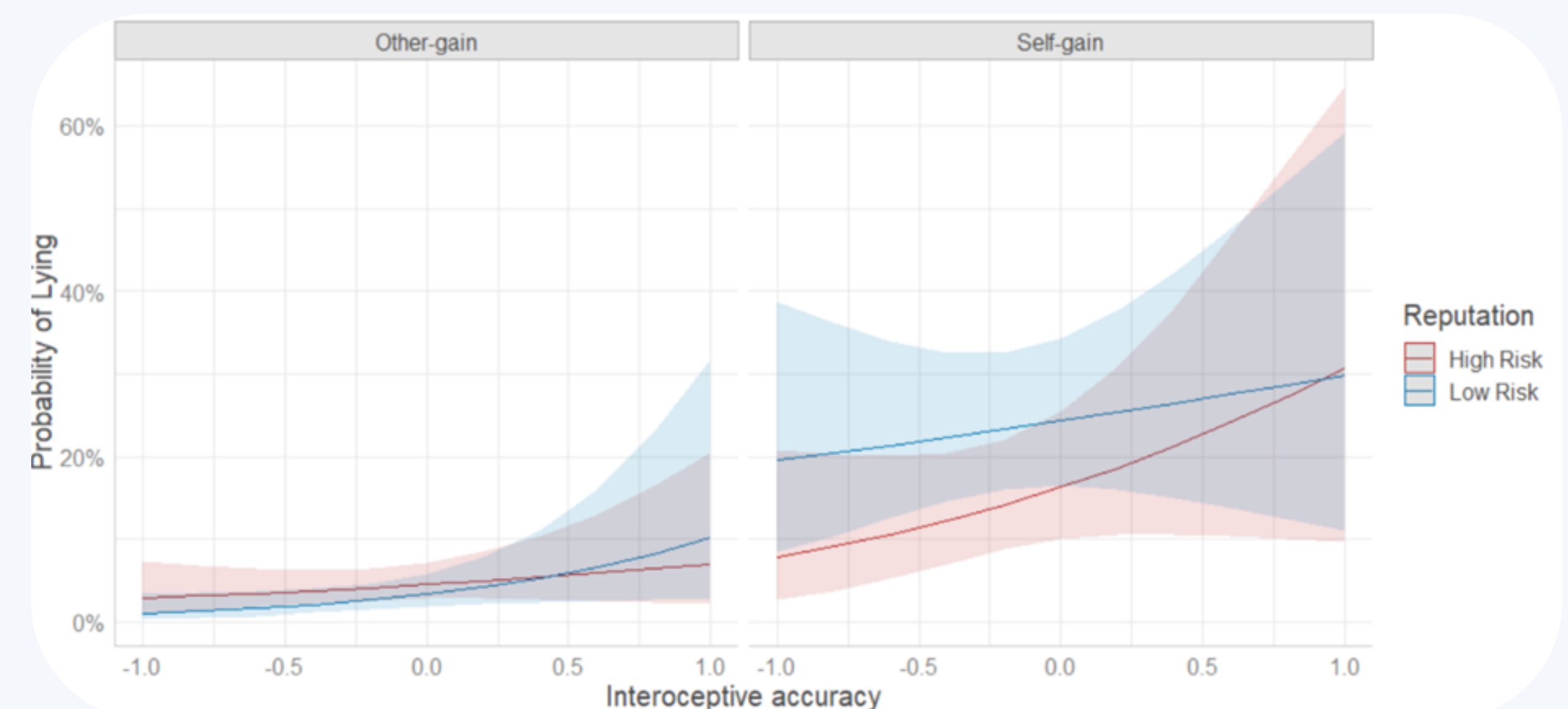
When participants believed their reputation was at risk they told significantly less egoistic lies than when choices were secret ($estimate = -0.582$, $SE = 0.151$, z -ratio = -3.864 , $p < .001$)

There was a non-significant correlation between measures of interoceptive and exteroceptive accuracy ($r = 0.04$, $p = .716$)



Interoceptive accuracy moderated the effect of reputation on deceptive behaviour interaction ($estimate = -1.265$, $SE = 0.484$, $\chi^2 = 6.833$, $p < .01$)

SIMPLE SLOPES: Participants with low interoceptive accuracy reduced egoistic lies (and enhanced altruistic) when reputation was at risk, whereas those with high interoceptive accuracy did not.



Discussion

Together, our findings suggest that although integrated, interoceptive and exteroceptive accuracy constitute distinct facets of corporal awareness that can differentially impact higher order processes such as morality. We found that people's moral behaviour in a social context may be influenced by individual differences in the capacity to accurately read cues arising from within the body. Specifically, our results suggest that people with low interoceptive accuracy tend to monitor their moral behaviour based on whether their actions are transparent to others, whereas people with high interoceptive accuracy do not.

References

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