How Trust Impressions Influence Economic Choices

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Abstract: People often judge others based on their facial appearance. Research demonstrates that it takes incredibly low time and effort for people to decide whether someone is trustworthy, competent, dominant, or attractive. These face-based judgments have been shown to bias multiple real-life decisions, from the outcome of a political election to sentencing decisions. In the context of economics, it has been shown that trust impressions influence people's investing and gambling choices. However, there is sparse information about factors that modulate this trust bias. In the present project, we use a face trait rating task, a gambling task, and a set of personality assessments to test whether participants' empathy and sensibility to opponents' loss are modulators of the trust bias. While more research still needs to be done, the results of this project will have important implications to further understand the trust bias and design strategies to mitigate it.

I. Background

"Don't judge a book by its cover" is a popular idiom used to warn people from making premature decisions. Against this conventional wisdom, a vast body of research shows that people make precipitate decisions in numerous situations, using scant or dubious sources of information. One of these lines of research demonstrates that people often judge the personal and social character of others based on their facial appearance (Todorov et al., 2015). Remarkably, these judgments are made at high speed and low cognitive cost. After a brief presentation of a stranger's face, people take as short as 100 milliseconds to decide whether this person is trustworthy, competent, dominant, or attractive (Willis & Todorov, 2006; De Neys et al., 2017).

Notably, face-based impressions can have a significant influence in multiple real-world settings. For instance, research shows defendants with untrustworthy-looking faces require less evidence to be determined guilty in a court of law (Porter et al., 2010). Similarly, competence impressions of political candidates are highly correlated with voting preferences in political elections (Antonakis & Dalgas, 2009). Since research demonstrates that faces are unreliable indicators of people's character, the consequential effects of face-based judgments pose a societal problem (Todorov et al., 2015). Accordingly, the scientific community has been discussing and trying to develop strategies to mitigate them (Olivola et al., 2014). Nevertheless, face-based biases are highly resistant; educating people about their inaccuracy and offering alternative sources of information does not reduce their effect (Rule et al., 2014; Jaeger et al., 2020). Hence, in order to develop effective mitigation strategies, it is crucial to further understand face-based judgments and factors that modulate their effects. The present project follows this motivation while narrowing its focus to facial biases in economic choices.

Research on facial biases on economic choices has traditionally focused on trust impressions, as they seem to exert the strongest effect (Schlicht et al., 2010; Rezlescu et al., 2012;). Often, experiments consist of subjects playing an economic game against other players represented by faces with varying levels of trustworthiness (e.g., trustworthy, neutral, or untrustworthy). Two notable economic games featured in the research literature are the trust game and a poker game. Research using these economic games shows that the perceived trustworthiness of faces has a direct influence on the choices people make.

The trust game is a two-player game, where participants play the role of the investor, and their co-players play the role of the splitter. Each round, participants are given a set amount of money. As investors, their job is to decide how much money they want to invest in their co-players. The experimenter will increment any amount they choose to invest. However, the game has a catch in that participants do not know how much money their co-players will send back. The co-player can split this incremented amount any way they want. They can send back to participants more or less than the

initially invested money. Hence, participants have to balance how much they trust their co-player and how much risk they are willing to take. Studies using this game show a clear pattern of responses. There is a bias favoring trustworthy faces; compared to neutral and untrustworthy faces, trustworthy faces receive significantly larger investments (Stirrat & Perrett, 2010; Rezlescu et al., 2012; Tingley, 2014). For instance, Rezlescu et al. (2012) found that when relying on the partner's face as a sole source of information, trustworthy faces receive an average of 42% higher investments. Further, they showed that even when participants have additional sources of information, like their co-player's behavioral history, although reduced, the trust bias holds. Notably, this bias extends across age groups. Children and older adults have been recorded displaying this trust bias (Ewing et al., 2015; Bailey et al., 2016).

The poker game is also a two-player game where participants play a simplified version of Texas Hold'em poker. Each round, participants play against an opponent represented by a face with varying degrees of trustworthiness. Participants receive a pair of cards and a set of poker chips and are required to place an initial bet. Then, their job is to assess the strength of their cards, guess their co-player's game, and decide whether to enter or abandon a gamble. Research using this type of game also shows the presence of a trust bias. Compared to neutral or untrustworthy faces, participants are less likely to accept gambles against trustworthy faces (Schlicht et al., 2010).

Altogether, evidence indicates trust impressions exert a robust effect on economic choices. Surprisingly, there have been very few attempts to determine factors that modulate this trust bias. One notable attempt was made by Schlicht et al. (2010). This group of researchers used statistical modeling to determine if economic parameters modulated the trust bias in the poker game. They considered three economic parameters: loss aversion, risk aversion, and a sensitivity parameter. The loss aversion parameter measured the participants' aversion to losses compared to their like of proportional gains. The risk aversion parameter measured participants' willingness to take higher-paying risky gambles against lower-paying sure options. Last, the sensitivity parameter measures participants' choice consistency between sure and risky outcomes. The results from this group of researchers showed that, compared to neutral and untrustworthy faces, trustworthy faces were associated with higher levels of loss aversion. This implies that compared to neutral and untrustworthy faces, participants disliked losing more against trustworthy faces.

Even though the results of Schlicht et al. (2010) are interesting, it would be a mistake to assume they present a complete account of the factors that modulate the trust bias in economic choices. The types of games used to study the trust bias indeed have a strong economic component. However, they also have a strong social component. Usually, the outcome of these games ends up affecting all parties involved. Further, the trust bias relies on human faces used as stimuli. These faces are representations of other human beings, which makes these games reduced

representations of real-world social dynamics. Hence, there is reason to believe social factors can modulate the trust bias.

Consistent with the idea that social factors might modulate the trust bias, research on altruism shows a link between altruistic behavior and empathy. This research indicates that empathy encompasses two distinct states: affective and cognitive (Shamay-Tsoory et al., 2009). Affective empathy refers to people's ability to sense or feel what another person is feeling. Alternatively, cognitive empathy refers to people's ability to understand another's intentions, beliefs, or perspective. Various results demonstrate a close connection between affective empathy and altruistic behavior. For instance, Edele et al. (2013) had subjects play economics games and fill personality questionnaires. They found that affective empathy but not cognitive empathy was correlated with altruistic choices. Similarly, Klimecki et al. (2016) explored whether an empathy intervention would influence subjects' choices in an economic game. Their results showed that eliciting affective empathy impacted subjects' choices, while a control intervention did not. Altogether, research indicates a strong relationship between affective empathy and economic choice.

An alternative line of research also consistent with the idea that social factors might modulate the trust bias explores whether face-based impressions can elicit empathic responses. Neuroscientists have been working to understand how empathy is generated in the brain. Part of this research studies the temporal dynamics of empathy. Accordingly, scientists often rely on electroencephalographic recordings, as this technique has a high temporal resolution. To probe human empathy, subjects are shown empathy eliciting stimuli while researchers record their brain activity. This work has found that subjects' empathic response is characterized by an early and a late response. The early response, linked with components N1 and N2, is thought to reflect an automatic process associated with affective empathy. In contrast, the late response, linked to component P3, is thought to reflect a controlled process associated with cognitive empathy (Fan & Han, 2008; Li et al., 2019). Notably, a substantial part of this research has used human faces as empathy eliciting stimuli, and a subset of studies have explored the effects of face-based impressions. For instance, Kopiś et al. (2020) and Meng et al. (2020) have found that attractiveness impressions produced a greater signal in component N2. Though, Meng et al. (2020) suggest this effect might depend on the task at hand. Similarly, Sessa & Meconi (2015) showed that trust impressions elicited a greater response in the P3 component. Research is still in an early phase. However, the current results indicate that facial stimuli and face-based impressions are modulators of people's empathic responses.

Altogether, research demonstrates that trust impressions have a robust effect on economic choices. However, there is too little information on the factors that modulate this type of bias. A group of researchers led by Schlicht et al. (2010) proposed that trustworthy faces elicit higher loss-aversion, which partly explains the trust bias.

However, this interpretation of the trust bias is severely limited as it ignores the social dimension implied by facial stimuli and economic games. The present project seeks to investigate this social dimension of the trust bias for economic choices. Specifically, this project will test the following hypothesis:

H1: Participants' sensibility to an opponent's losses modulates the trust bias in economic choices.

H2: Participants' level of empathy modulates the trust bias in economic choices.

To test these hypotheses, our experiment will replicate Schlicht et al. results for the poker game with one group of participants, while another group of participants plays a variant of the game in which theirs and their co-players' outcomes are decoupled. The contrast in responses between groups will reveal whether sensibility to opponents' loss is a modulating factor of the trust bias. Additionally, participants will complete two empathy assessments, the interpersonal reactivity index (IRI) and the multifaceted empathy test (MET). These assessments will derive empathy scores representing participants' empathy levels. A regression analysis will be used to determine if participants' empathy level is a modulating factor of the trust bias. The results obtained throughout this experiment will contribute to further understand the nature of the trust bias in economic choices. Further, they will open a new route to develop intervention strategies to mitigate the influence of trust impressions in economic choices.

II. Methods

Participants will be recruited through SONA, the University of California, San Diego volunteer system. They will complete the experiment through a webpage on an online server. The experiment consists of the following three tasks: a poker game, a social trait rating task, and two empathy assessments. The order of these tasks will be randomized for each participant.

Stimuli: Participants will be presented with a set of 120 human faces for the social trait rating and the poker game. This image set will be obtained from Yu's lab. For the poker task, a set of 36 pairs of cards will be created. There will be a varying range of values within these pairs; the pair with the lowest probability has a 31.2% probability of winning, while the pair with the highest probability has a 85.3% probability of winning. Similarly, co-players of the poker task will be randomly raising the bet in every game ranging from 500 to 5000 chips raise.

Poker game: Participants' goal for this task is to make rational choices and obtain the best score possible. Each round, participants will receive a pair of cards and a set of chips. Participants will be required to place an initial bet. They will be able to see their pair of cards, their set of chips, their co-player's face, their co-player's chips, and the chips being gambled on a screen. Participant's job is to assess the strength of their cards, guess their opponent's game, and decide whether to enter or abandon a gamble.

After they make their choice, the round ends, and a new one begins. The participant's final score will be revealed at the end of the experiment.

Critically, in this task, participants were randomly separated into two groups: the coupled- and decoupled-outcomes group. In the coupled-outcomes group, participants will be instructed that their choices will influence their final score of the game but also the final score their co-players receive. In contrast, in the decoupled-outcomes group, participants will be instructed that their choice will only influence their final score of the game and will not the final score their co-players receive. The key difference between these groups is that for the coupled-outcomes group, participants should be influenced by the losses they might inflict on their co-players, whereas participants in the decoupled-outcomes group should not care about inflicting losses on their co-players.

Social trait rating: In this task, participants see a face on a screen. Their job will be to judge the face on a social trait and indicate their answer by pressing buttons 1-9. Participants will rate faces on two traits, how trustworthy and how intelligent they appear.

Empathy assessments: In this segment of the experiment, participants will complete the interpersonal reactivity index (IRI) and the multifaceted empathy test (MET) (order will be randomized). The former is a 28 question questionnaire, participants rate statements (0-4), assessing perspective taking, fantasy, empathic concern, and personal distress. The latter is a personality test assessing affective and cognitive empathy. It consists of presenting a series of images depicting various scenes, where participants rate (1-9) the emotion depicted (cognitive empathy) or their arousal (affective empathy).

III. Expected Results

After conducting this experiment, we expect to obtain two main results. First, for responses from the poker task, we will run a repeated measures ANOVA test; that is, one for the coupled winnings group and one for the decoupled winnings group. The dependent variable for this test will be each participant's mean acceptance rate of gambles. Then independent variable will be the trustworthiness level of the faces presented (e.g., trustworthy, neutral, and untrustworthy). The purpose of this analysis is to determine whether there is a difference in gambling behavior within trustworthiness levels. In the coupled winnings group, we expect to find a significant difference between trustworthy faces and neutral and untrustworthy faces, replicating the trust bias. In the decoupled winnings group, we expect to find no significant difference in gambling behavior between trustworthiness levels. This result would indicate that the trust bias was eliminated when controlling participants' sensibility to opponents' losses.

Second, using the data from all three tasks, we will run multiple regression analyses. The analyses will use the following variables:

$$Y_{1.1} = mean\ call\ rate\ for\ ith\ participant\ for\ trustworthy\ faces$$

$Y_{1.2} = mean\ call\ rate\ for\ ith\ participant\ for\ neutral\ faces$

$Y_{1.1} = mean\ call\ rate\ for\ ith\ participant\ for\ untrustworthy\ faces$

$x_0 = mean\ call\ rate\ of\ group\ sample$

$x_{1.1} = mean\ difference\ between\ x_0\ ratings\ and\ trustworthy\ faces\ ratings$

$x_2 = Loss\ aversion\ score\ for\ ith\ participant$

$x_3 = MET\ score\ (affective\ empathy)\ for\ ith\ participant$

$x_4 = IRI\ score\ (empathic\ concern)\ for\ ith\ participant$

Using these variables, we will create the following models to quantify the influence of economic and social factors on the trust bias.

Model 1.1 (modeling rating for trustworthy faces):

$$Y_{1.1} = x_0 + \beta_{1.1} x_{1.1} + \varepsilon$$

Model 1.2 (modeling rating for neutral faces):

$$Y_{1.2} = x_0 + \beta_{1.2} x_{1.2} + \varepsilon$$

Model 1.3 (modeling rating for untrust faces):

$$Y_{1.3} = x_0 + \beta_{1.3} x_{1.3} + \varepsilon$$

Model 2 (modeling the influence of loss aversion):

$$Y = x_0 + \beta_{1.1} x_{1.1} + \beta_2 x_2 + \varepsilon$$

Model 3 (modeling the influence of MET empathy score):

$$Y = x_0 + \beta_{1.1} x_{1.1} + \beta_3 x_3 + \varepsilon$$

Model 4 (modeling the influence of IRI empathy score):

$$Y = x_0 + \beta_{1.1} x_{1.1} + \beta_4 x_4 + \varepsilon$$

Model 5 (modeling the influence of loss aversion and MET score):

$$Y = x_0 + \beta_{1.1} x_{1.1} + \beta_2 x_2 + \beta_3 x_3 + \varepsilon$$

Model 6 (modeling the influence of loss aversion and MET score)

$$Y = x_0 + \beta_{1.1} x_{1.1} + \beta_2 x_2 + \beta_4 x_4 + \varepsilon$$

For Model 1.1, 1.2, and 1.3, we expect $\beta_{1.1} \neq 0$ and $\beta_{1.2}$, $\beta_{1.3}$ to approximate zero. These results will indicate that compared to neutral and untrustworthy faces, there is a bias against trustworthy faces. Hence, these results will replicate the trust bias. For Model 2, we expect $\beta_2 \neq 0$.This result will indicate that loss aversion has a significant influence on participants' gambling choices against trustworthy faces. For Models 3 and 4, we expect that $\beta_3 \neq 0$ and $\beta_3 \neq 0$. These results will indicate that participants' empathy score in the IRI and MET significantly influences participants' gambling choices against trustworthy faces. Last, for Models 5 and 6, we expect that $\beta_3 > \beta_2$ & $\beta_4 > \beta_2$. These results will indicate that participants' empathy scores in the IRI and MET exert more influence on the trust bias than participants' loss aversion.

IV. Discussion

Altogether the present research aims to expand the current understanding of the influence of trust impressions on economic choices. The expected results are that participants' empathy and their sensibility to opponents' losses have a significant effect on the trust bias. These results would be highly relevant for the body of research on facial biases, as they would show there is a social component involved in these types of biases. Further, these results will open a new solution to deal with the problem of facial biases, as they could spark new empathy-based interventions to mitigate facial biases.

V. References

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