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Trust in time: Decision time moderates the impact of deliberation on trust behaviour

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Abstract

Social decisions in economic trust games are thought to be impacted by dual modes of thinking, though the literature remains divided on precisely how. For example, research has shown that deliberation causes increased, decreased, and no change in a Trustors decision to trust a stranger with a small investment. And in light of such contradictory evidence, there is a clear lack of research on key moderators. Here, we examined the moderator of decision time, based on the assumption that deliberative, controlled cognitive processes is more effortful and requires time to engage in. Participants ($N = 317$) were randomly assigned to either a deliberation or intuition condition and then played as the Trustor in a standard one-shot version of the investment game. Duration during the decision to trust and number of tokens sent to the Trustee were both indexed. Results showed that Trustors in the deliberation condition with longer decision times (+1SD) sent fewer tokens to the Trustee, compared to both Trustors in the intuition condition with longer decision times and Trustors in the deliberation condition with shorter decision times (-1SD). The impact of a deliberation manipulation thus required increased time to deliberate.

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The Trust game is a classic behavioral economic paradigm often used in social decision making research (Berg et al, 1995; Sanfey, 2007). In the standard one-shot version, player 1, or the trustor, is given a sum of money (e.g. \$5). The trustor can anonymously send this money to player 2, the trustee, or keep the entire sum, ending that round of the game. If the trustor sent money, that sum grows (typically 3x or 4x) and the trustee is faced with a decision to either send back a fair share of the money to trustor and keep a reasonable portion (e.g., a 10/10 split) or keep the entire sum and leave player 1 with nothing (e.g., a 0/20 split). Assuming rational self-interest, the trustor should not trust the trustee as they should never return the invested money. In practice, however, the trustor typically sends money to the trustee and the trustee typically returns a fair share, behaviours indicative of preferences beyond purely economic (Fehr & Fischbacher, 2002; Sanfey, 2007).

This basic paradigm encapsulates and isolates consequential behaviours from real-world social interactions, including that risky initial overture one must make when seeking a new social connection. Such trusting behaviour, variously termed as strategic cooperation, expectancy of positive reciprocity, or trust per se, is impacted by cognitive processes. Broadly, the dual process approach assumes that social decision-making is modulated by the mode or type of cognitive system in operation, i.e., intuitive or deliberative systems (Evans, 2003; Kahneman, 2003; Sloman, 1996; Strack & Deutch, 2004). The intuitive system involves rapid, more automatic, stimulus driven attention to and processing of exogenous features, absent any higher-order direction or control. The deliberative system involves slower, more effortful, goal-oriented attention to and sequential processing of endogenous features or goal-relevant stimuli and inhibition of goal-irrelevant stimuli. However, theory and research have been sharply divided across domains in social decision-making (Rand et al., 2012; Fehr et al., 2007). For example,

deliberative thinking has been linked to both more and less selfish decision-making. In particular, it remains unclear how these processes impact player 1's trusting behaviour. Indeed, in a recent meta-analysis, the evidence was highly mixed, as some research found that deliberation increased player 1 trust, some research found that deliberation decreased player 1 trust, and the preponderance of research found no effect (Capraro, 2024). The author highlighted the need for future research on deliberation in trust and noted a complete lack of studies examining the role of key moderators.

In the current research, we thus conducted one of the first studies on a key moderator: decision time. We assume that for deliberation to have an effect, there must be time to deliberate, or that deliberation without duration is no deliberation at all. This is consistent with the idea that deliberation is based on a slower, serial cognitive process or system (e.g., Kahneman, 2003; Slovic, 1996; Strack & Deutsch, 2004). Thus, more time is required in a decision phase for manipulations that promote deliberation to impact behaviour. Past research has typically either used manipulations that induce or reduce deliberative processes (see Capraro, 2024) or correlated decision time, as a black-box measure of deliberation, with behavioural outcomes of interest (Rand et al., 2012). Rarely (if ever), has the interactive effect between these variables been examined. Here, we manipulated deliberation vs. intuition and had participants play a Trust game and measured the duration of the decision as player 1. We expected that participants randomly assigned to the deliberation condition would require increased decision time to show an impact on trust decisions and shed light on the nature of dual processes in trusting behaviour.

Method

Participants

Participants were recruited by the panel provider Bilendi & respondi (<https://www.bilendi.de/>) in March 2023. They had to be resident in Germany and be at least 18 years old to participate. Participation was remunerated according to the Bilendi & respondi payment scheme (40 Cent/person and survey completion). 317 participants completed the survey. All materials and procedures were carried out in accordance with guidelines and principles outlined in the Declaration of Helsinki. All participants provided informed consent at the beginning of the study. Though uncommon in economics research, we sought a post-hoc review of our protocols, and materials were approved (#A2025-0146) by the Universitätsmedizin Rostock Ethics Commission, who concluded that the research posed no ethical issues.

Procedure

The study was conducted online in a between-subject design. The questionnaire was programmed using SoSci Survey (Leiner, 2023) and distributed by the panel provider Bilendi & respondi in March 2023. The survey begins with obtaining informed consent followed by a brief welcome including the information that every 10th participant would receive an additional payment based on their choices in the survey. Participants were then introduced to the trust game. After passing a comprehension check¹, participants learned their role in the trust game, i.e. trustor or trustee. As the focus of this study is trusting behaviour, most participants were assigned to the role of the trustor. The remaining subjects were assigned to the role of the trustee to determine payoffs. This study is part of a bigger research project on trusting behavior for which in total 43 trustees were recruited. Therefore, each trustor in this study was randomly matched with 1 of 43 trustees to determine the outcome of the trust game. Subjects were

¹ Participants who failed to answer the 4 questions more than three times were eliminated from the survey.

informed that they were randomly matched with an anonym participant of the other role to determine the outcome of the interaction and that every 10th participant is paid this amount in addition to their participation fee.

Before deciding the transfer amount, trustors were randomly assigned to complete either the deliberative and intuitive thinking writing tasks. Participants in the trustee condition did not complete the writing task and decisions were elicited immediately using the strategy method in the standard trust game. That is, trustees were presented with a table of all 10 possible transfers of the trustor and asked to indicate how much should be transferred back for each multiplied amount. After deciding, all participants completed a small follow-up questionnaire including socio-demographics, and a general question each about risk attitude and life satisfaction. Furthermore, we measured self-esteem (Van Collani and Herzberg, 2003), emotional expressive coping (Stanton et al., 2000) and Big-5 personality (Rammstedt and John, 2007). Based on the stated transfer, trustors were asked about their expectations and their own anticipated behavior in the role of the trustee. Moreover, we asked 5 questions to measure the extent to which trustors accounted for the trustee's perspective in their own decision making. Finally, participants were informed whether they received the additional payment and had the opportunity to indicate if they wanted to get informed about the outcome of the interaction via mail.

Deliberation versus Intuition Manipulation

We manipulated deliberate and intuitive thinking by having trustors complete a short writing task. In the deliberation condition, trustors were asked to briefly summarise in a text box what thoughts they have about making this decision. In the intuition condition, trustors were asked about their feelings regarding the decision. Exact instructions in the deliberation conditions were: "Before you decide how many tokens you would like to transfer to person 2:

Please try to briefly summarise in words what thoughts you have about making this decision.” In the intuition condition they were: “Before you decide how many tokens you would like to transfer to person 2: Please try to briefly describe in words what feelings you are experiencing / play a role in your decision.” In both conditions, we increase focus on the task by adding: “Feel free to briefly close your eyes and listen to yourself before you respond here.”

Participants wrote on average 13.25 words ($SD = 15.13$, $Min = 1$, $Max = 103$) in the deliberation condition and 9.05 words ($SD = 10.11$, $Min = 1$, $Max = 53$) in the intuition condition. In both conditions, most participants (above 80%) wrote at least 20 words.

Trust Game

We used a standard one-shot version of the investment game developed by Berg et al. (1995), which is the predominant experimental paradigm for analysing trusting behavior. We used tokens as the experimental unit, which were converted into euros at a rate of 1 to 1. In our version of the game, player 1 (trustor) is endowed with 10 tokens. Of those 10 tokens, any discrete amount could be transferred to player 2 (trustee). This transfer is tripled and the trustee decides how much of this amount to send back to the trustor and the game ends

Moderator: Decision Time

The SociSurvey software records the time spent (in seconds) on each page of the survey from loading the page to leaving it. Our measure of decision time is the time spent on the decision page. Participants on average took 10.25s ($SD = 7.26$) to decide. To ensure that the any effect was specific to decision time and not duration in general, we also indexed manipulation time as the time spent on the deliberation or intuition page. After exclusions (described below), decision time was natural log transformed to account for positive skew.

Statistical Analyses

We conducted moderated multiple regression (using the PROCESS Macro in SPSS, Hayes, 2012, see also West, Aiken, & Krull, 1996) to examine the interaction between cognitive condition and decision duration on player 1's trust decisions. Follow-up analyses examined the impact of gender, age, and manipulation time as covariates. Extreme outliers in decision time and scores of extreme influence, identified respectively via visual inspection of boxplot analysis ($N = 3$) and cook's distance $Z\text{score} > 5$ ($N = 1$, $Z\text{-score} = 10.9$; next closest $Z\text{-score} < 5$) in SPSS as well as participants with a relative speed index, i.e. a data quality index defined as the relative speed of completing the survey compared to the median, above 2 ($N = 8$) were excluded from all analyses (final $N = 305$; see Leiner, 2019 for recommendations). Data analyzed in the current study available upon reasonable request to the corresponding author.

Results

We first conducted a moderated multiple regression analysis of the impact of condition, decision time, and their interaction on Trust (see Figure 1). Results revealed a significant condition by decision time interaction effect, $t(302) = 2.15, p = .032$. Simple effects analyses of the conditional effect at a longer decision time (defined as +1 SD on the decision time variable) revealed that people who took longer to decide in the deliberation condition offered significantly fewer tokens ($M = 5.42$ tokens), compared to people who took longer to decide in the intuition condition ($M = 6.38$), $t(302) = 2.28, p = .023$. There was no conditional effect at a shorter decision time (defined as -1 SD on the decision time variable, $p = .444$). Simple slope analyses revealed that in the Deliberation condition, there was a significant negative relationship between decision time and tokens, $t(302) = -2.38, p = .018$. There was no significant relation in the Intuition condition ($p = .530$). Together, these effects demonstrate that deliberation decreased

player 1's trust behavior only when participants took relatively longer to decide. Notably, results remain unchanged if age, gender, or manipulation time are included as covariates in the same multiple regression analyses.

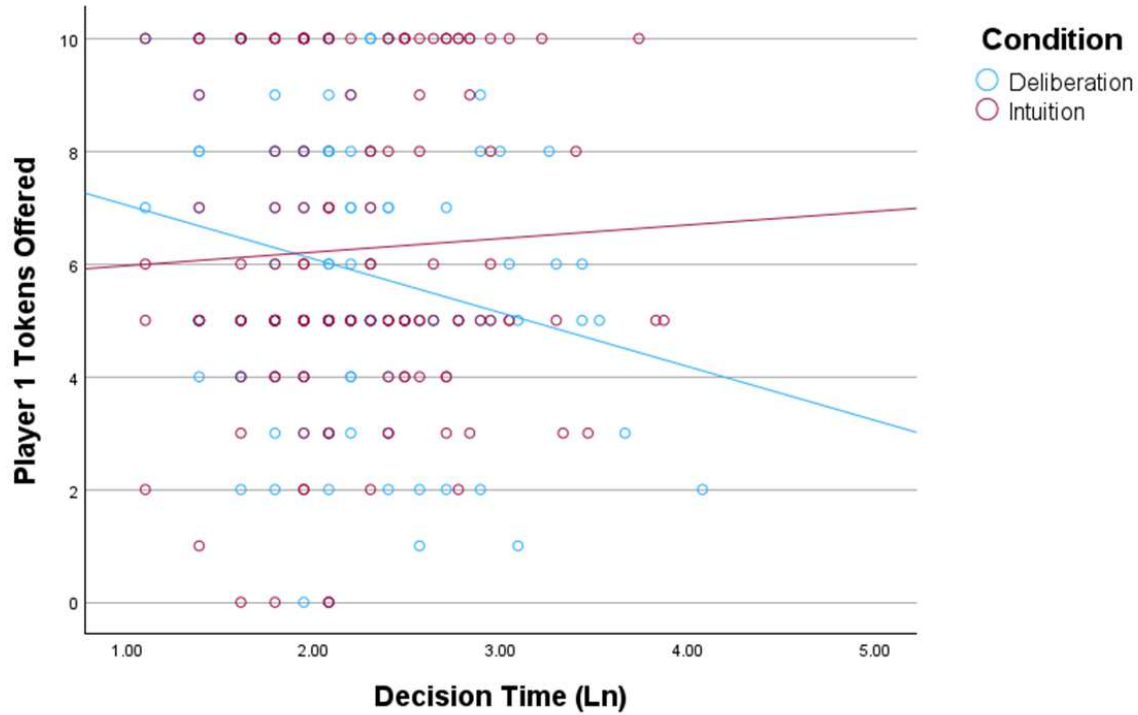


Figure 1. The interaction between Condition and Decision Time on Player 1 Tokens offered.

Discussion

Though dual process models have made critical contributions to understanding social decision making processes (e.g., Kahneman, 2003; Strack & Deutsch, 2004), the role that deliberation vs intuition plays in trust, as encapsulated in the classic behavioral economic Trust Game, is currently unclear. A recent meta-analysis found that deliberation has been found to

promote, stymie, and (primarily) have no effect of player 1's trust behavior in the trust game (Capraro, 2024). The author noted the surprising lack of research on potential moderators. To bridge this gap, we examined a theoretically critical moderator, decision time. We reasoned that deliberation requires time to impact a social decision like the decision to trust a stranger with one's own money. Here, we randomly assigned participants to either a deliberation or intuition condition and had participants play the role of player 1 in a one-shot anonymous version of the trust game. Results showed that the duration to decide moderated the link between deliberation and trust. Specifically, participants in the deliberation group showed decreased trust only if they took longer to make a decision, compared to both participants in the deliberation group that took less time to decide and participants in the intuition group that took longer to make a decision.

These results thus demonstrate that deliberation, theoretically reliant on the more effortful and slower cognitive system (Kahneman, 2003), does appear to require time. It is possible that deliberation manipulations in past research may have had mixed results because the methodology didn't allow for enough time in a deliberative condition or participants assumed to be engaged in deliberation were acting more intuitively and weren't accounted for. More broadly, these results are consistent with research demonstrating a link between deliberation and more prosocial behavior. Notably, research has had to contend with the fact that links between deliberation versus intuition and social decisions have been inconsistent and even opposing. Initial claims have consequently become nuanced (e.g., Capraro, 2024; Chen & Krajbich, 2018; Rand et al., 2014). Based on the current results, we wonder to what degree could the conflicting or opposing results be tied to methodologies that restricted the impact of deliberation or intuition. That is not to say that the current results can't be explained by the various perspectives (indeed, several of the noted perspectives can). However, increased decision time does not invariably promote

deliberation (e.g., Evans, 2003) and deliberation manipulations may not have had the predicted impact if the decision period did not allow for effortful, time-consuming cognition. We recommend that future research should examine the interaction between deliberative manipulations and time to make a decision, not only in trusting behavior, but across domains in social decision-making.

Data Availability

Data analyzed in the current study available upon reasonable request to the corresponding author.

Funding Declaration

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