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The Relationship between General Trust and Trust Behavior:
An exploratory investigation using the Trust Game and Faith Game

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Abstract

Trust is instrumental in politics, economics, law, interpersonal relationships, and other areas of society, and has been actively studied in various social science fields, including socio and political science. Previous studies have reported that countries with higher levels of trust have more equitable income distribution, less corruption, and more social prosperity, and that trust rises and falls with the social environment and aging, such as interpersonal relationships. Trust behavior, which is a way in which people show trust toward others, is defined as behavior that entrusts one's gain to others with the risk of losing benefits. It is composed of multiple factors, including general trust, reciprocity, and risk avoidance, with this study focusing on general trust, which is a belief that people use to determine whether to trust strangers. In other words, it is the tendency to make presumptions about the degree of others' altruism. General trust shows a positive correlation with trust behavior in the trust game but shows weak or non-correlation with trust behavior in the faith game. Trust and faith games have been used as experimental paradigms for measuring trust behavior. This study has examined whether the correlation between general trust and trust behavior is based on presumed altruism. Study 1 has exploratorily examined whether the correlation between general trust and trust behavior differs between these games. A total of 769 monitors recruited by a crowdsourcing company participated in the online-based questionnaire and economic games. The results showed that general trust would be correlated with trust behavior in both games, and the rate of trust behavior would be higher in the trust game than in the faith game. The results indicate that the relationship between general trust and trust behavior was not based solely on presuming altruism toward others, suggesting that other factors were involved. Consequently, Study 2 has examined whether general trust reflects the expectation of reciprocity using the prisoner's dilemma game. A total of 581 monitors collected by a crowdsourcing company participated in the online-based questionnaire and the prisoner's dilemma game. The results showed that general trust has positive associations with both cooperative behavior and presumed cooperation in the prisoner's dilemma game.

Hence, general trust reflects not solely a presumption of altruism toward others, but the presumption of reciprocity. Therefore, it is considered unlikely to be correlated with trust behavior in the faith game, which is defined by guessing whether other people's behavior is unilaterally altruistic. However, as the studies that examine the relationship between the faith game and general trust remain scarce, it is necessary to confirm whether the results of this study are a stable phenomenon. On that basis, it will be necessary to consider whether general trust reflects presumed reciprocity, presumed altruism toward others, or both.

Keywords: General trust, Trust game, Faith game, Prisoner's dilemma game

1. Introduction

Trust is instrumental in politics, economics, law, interpersonal relationships, and other areas of society, and has been actively studied in various social science fields, including socio and political science (Barber, 1983; Knack & Keefer, 1997; Putnam, 1994; Rothstein & Uslaner, 2005; Yamagishi, 1998). Previous studies have reported that countries with higher levels of trust have more equitable income distribution, less corruption, and more social prosperity; additionally, trust rises and falls in accordance with aging and aspects of the social environment, such as interpersonal relationships (Sturgis et al., 2010; van Lange, Vinkhuyzen, & Posthuma, 2014) Trust behavior, the manner in which people display trust toward others, is defined as behavior that entrusts one's gain to others with the risk of losing benefits (Yamagishi, 1998). This study exploratively examined whether the relationship between general trust and trust behavior is based on the presumed altruism of others.

The Trust Game has been used as an experimental paradigm for measuring trust behavior (Berg, Dickhaut, & McCabe, 1995). The Trust Game (Figure 1) is an economic game played in pairs. Two participants are paired after being provided with the capital for the game, with one person acting as the depositor of the money and the other person acting as the distributor of the money. The depositor decides whether to hand over the given money to the distributor, who will distribute it or keep it for himself/herself. If money is deposited, the money deposited by the depositor is tripled and given to the distributor. Following this, the distributor decides whether to divide the sum—the (tripled) amount received plus the amount he/she was originally given—equally, or keep it for himself/herself. If the distributor keeps the money for himself/herself, the depositor receives nothing and the distributor receives the full amount. If the depositor keeps the money, and the distributor does nothing, then both parties receive the money given to them in the beginning. In this game, behavior changes depending on how you anticipate the distributor to behave. If the depositor anticipates that the distributor will divide the tripled money in half (between them), the profit will be greater if the money is deposited than if the money is kept from the distributor. However, if the depositor predicts that the distributor will keep it all for himself/herself, the depositor will benefit more from keeping the money to himself/herself than from depositing it. In the Trust Game, trust behavior is defined as the depositor's behavior of depositing money with the distributor (Berg, Dickhaut, & McCabe, 1995). In other words, if the depositor predicts that the distributor will allocate the money equally, the depositor is likely to exhibit trust behavior (Eckel & Wilson, 2004.) Many studies employing the Trust Game have shown that some people even trust strangers (McCabe, Rigdon, & Smith, 2003).

Trust behavior comprises multiple factors, including general trust, reciprocity, and risk avoidance (Mifune & Li, 2018); this study focused on general trust. General trust is the belief that people use to trust strangers in situations where the only information available is that the

interacting partner is a human being (Yamagishi, 1998). In other words, general trust conveys the tendency to make presumptions about the degree of others' altruism because whether one trusts a stranger is possibly determined by whether they can trust strangers. Therefore, the more altruistic they infer that others are, the more likely it is that they will engage in trust behavior. In previous studies, general trust has demonstrated a positive correlation with trust behavior in the Trust Game (Aksoy, Harwell, Kovaliukaite, & Eckel, 2018; Yamagishi et al., 2013, 2015.) This result indicates that trust behavior in the Trust Game is partially based on the presumed altruism of others. However, as reciprocity and altruism may affect trust behavior in the Trust Game, it is possible that the correlation between general trust and the Trust Game may not be due to presumed altruism of others.

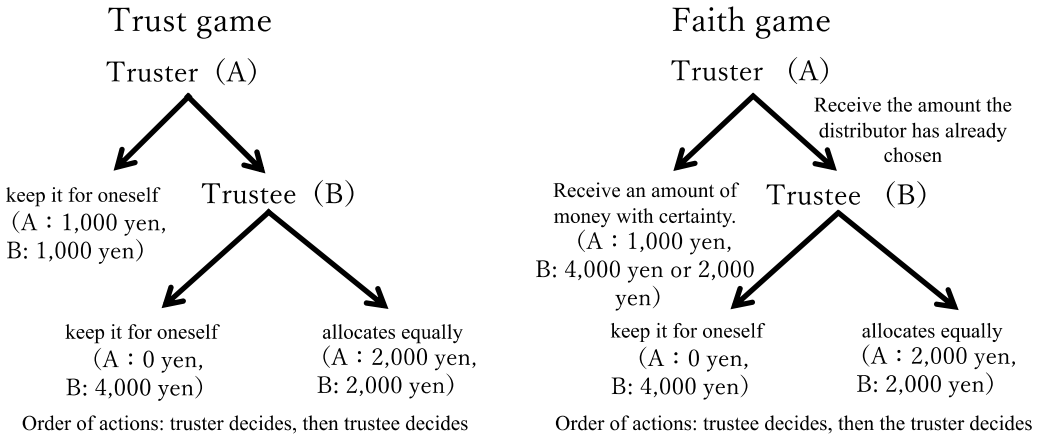

Figure 1 Structures of Trust Game and Faith Game (Nishina and Mifune, 2021)

The Faith Game (Faith Game; Figure 1) measures whether trust behavior is caused solely by the presumed altruism of others (Kiyonari & Yamagishi, 1999.) Like the Trust Game, the Faith Game is played in pairs, with one person acting as the distributor and the other person acting as the depositor. The distributor chooses whether to allocate the capital equally or keep it for himself/herself. If the distributor chooses to keep the money for himself/herself, the distributor receives the money as is, and the depositor receives nothing. The depositor chooses whether to receive the amount distributed by the distributor without knowing which option the distributor has chosen (trust choice) or to receive the money from the experimenter with certainty (sure choice). The depositor is told that the distributor does not know that the depositor has this option, and that the depositor's choice does not affect the money the distributor receives. In other words, the distributor is partially playing a dictator's game, determining its own rewards by its own choices (Forsythe, Horwitz, Savin, & Sefton, 1994; Kahneman, Knetsch, & Thaler, 1986). The depositor decides whether to leave the reward to the interaction partner's choice or to receive it with certainty. Thus, the basic game structure is identical to that of the Trust Game, and the depositor in the Trust Game corresponds to the depositor in the Faith Game.

The differences from the Trust Game are that the distributor's reward does not depend on the depositor's actions, and the depositor decides between a trust choice and a sure choice but the distributor does not know that the depositor has this choice. In other words, the depositor cannot expect reciprocity, that is, to receive a fair distribution from the distributor by making a trust choice. In addition, altruism is not reflected in the trust choice because the distributor's reward does not change regardless of which choice the depositor makes. Therefore, the depositor will possibly make a trust choice if he/she thinks that others are altruistic, and a sure choice if he/she thinks that others are selfish. In other words, the behavior of the depositor in the Faith Game is likely to exhibit a trust behavior that reflects how altruistic he/she thinks others are. Few studies have examined the correlation between general trust and Faith Game, but these studies reported a weak or non-correlation (Mifune & Li, 2018; Yamagishi et al., 2015). One reason for weaker correlation revealed in the Faith Game compared to the Trust Game is that general trust may include other factors such as reciprocity as well as presumed altruism of others. However, due to the scarcity of findings on the relationship between general trust and trust behavior in the Faith Game, we cannot conclude whether the aforementioned reasons are valid. Therefore, the present study aimed to exploratively examine whether the relationship between general trust and trust behavior is based on presumed altruism of others.

2. Study 1

2.1 Methods

Participants in Study 1, participants were recruited using Lancers Inc. (https://www.lancers.jp/). On Lancers, 100 participants were recruited for each of the 8 conditions for an independent experiment. The 8 conditions were based on game (Trust Game or Faith Game) x interaction partner (the partner-specified condition or the partner-unspecified condition) x gender (male or female.) People were instructed not to participate in the same experiment as their participating experiment on the recruitment advertisement due to the system's difficulty in preventing the double-booking by pre-screening. Participants signed up by accessing the survey site where the experiment would be conducted through a link in the application details. Eight hundred people responded, but two people who responded with a gender different from our description and 29 people who were unsuccessful in sending their answers were excluded from the analysis. Thus, in total, 769 participants (401 men, 368 women) participated in this study with a mean age of 40.48 years (SD = 9.84). The application and experiments was opened on July 10, 2019 and closed on the same date. Some of the results of this study have been reported in another paper (Nishina and Mifune, 2021); however, this is the first report on the relationship between general trust and trust behavior.

2.2 Experimental tasks

All tasks were designed using Google Forms and conducted online. Participants were first asked to specify their gender, and then, to read the instructions on the game they were going to participate in (Trust Game or Faith Game). Money was used as an incentive as per instructions of the game, and participants were instructed to imagine the participating scenes and then answer questions. Fixed amounts were paid as the actual rewards. After playing the games, they answered questions about general trust.

2.3 Trust Game

In the Trust Game, the experimenter gave 1,000 yen each to the depositor and the distributor. The depositor decides whether to deposit the money with the distributor or to keep it for himself/herself. If the depositor deposits the money, the distributor decides whether to divide the 4,000 yen—the sum of the 3,000 yen he/she received and the 1,000 yen he/she originally received from the experimenter—equally, or to keep it for himself/herself. All participants adopted the role of the depositor, and chose whether to deposit the money with the distributor or keep it for themselves.

2.4 Faith Game

In the Faith Game, the experimenter first gives 4,000 yen to the distributor. The distributor chooses whether to allocate the 4,000 yen equally or keep it for himself/herself. The depositor chooses whether to receive the amount distributed by the distributor (trust choice) or to receive 1,000 yen from the experimenter with certainty (sure choice) without knowing which option the distributor has chosen. All participants assumed the role of depositor and made their choices.

2.5 General trust scale

Two scales were used to measure general trust. For the first scale, the 5 items scale used in the previous study (Yamagishi et al., 2015), participants chose the answer from 7 items from “1. Strongly disagree” to “7. Strongly agree.” For the second scale, the items of Trust used Social Survey trust (GSS trust), and participants were asked “Do you think most people are trustworthy? Or do you think it is always better to be cautious?” and to choose the answer either “0=always better to be cautious” or “1=most people are trustworthy.”

2.6 Study ethics

This study was conducted with the approval of the ethical review committee of the Kochi University of Technology.

3. Results

This study regarded the choices of depositing money with the partner in the Trust Game or receiving money from the distributor in the Faith Game as exhibiting trust behavior. The overall rate of trust behavior was 46.2%, the mean of general trust was 3.28 (SD = 0.91), and the mean of GSS trust was 0.38 (SD = 0.49.) Table 1 shows the correlations of each variable for each game.

Table 1 Correlation coefficients between each variable (Study 1)

	Trust Game		Faith Game	
	General trust	GSS trust	General trust	GSS trust
GSS trust	0.59 **		0.62 **	
Trust behavior	0.33 **	0.22 **	0.15	0.11

** p < .01. * p < .05.

To explore the relationship between general trust and trust behavior, we used trust behavior (0 = untrust, 1 = trust) as the dependent variable, game (0 = Trust Game, 1 = Faith Game) and general trust as independent variables to perform a logistic regression analysis. The analysis revealed that the main effects of game (B = -0.22, p < .001, 95% CI [-0.293, -0.138]), the main effects of general trust (B = 0.27, p < .001, 95% CI [0.19, 0.35]), and that the interaction between game and general trust were significant (B = -0.10, p = .001, 95% CI [-0.19, -0.02]). Because the interaction between game and general trust was significant, we conducted a logistic regression analysis using general trust as the independent variable and trust behavior as the dependent variable for each game. The Trust Game showed a positive effect (B = 0.37, p < .001, 95% CI [0.25, 0.49]), as did the Faith Game (B = 0.18, p = .003, 95% CI [0.06, 0.30]). The results indicate that those with a high degree of general trust demonstrate trust behavior in both the Trust Game and Faith Game, but the correlation is weaker in the Faith Game than in the Trust Game.

We also analyzed GSS trust. The results showed that the main effects of game (B = -0.21, p < .001, 95% CI [-0.29, -0.13]) and GSS trust were significant (B = 0.18, p < .001, 95% CI [0.10, 0.26].) As for general trust, we performed a logistic regression analysis with GSS trust as the independent variable and trust behavior as the dependent variable for each game. The results showed a positive effect for both Trust Game (B = 0.26, p < .001, 95% CI [0.14, 0.37]) and Faith Game (B = 0.12, p = .038, 95% CI [0.07, 0.23].) This result implies that those who exhibit a high degree of trust in GSS trust as well as general trust, demonstrate trust behavior in both games. As with general trust, the correlation pattern displayed a weaker trend for the Faith Game than for the Trust Game, but the interaction between the games and GSS trust was not significant (B = -0.68, p = .088, 95% CI [-0.15, 0.01].)

4. Discussion

The results of Study 1 showed a positive correlation for both Trust Game and Faith Game regardless of the partner-specified condition or the partner-unspecified condition, but the correlation was stronger for Trust Game than for Faith Game. This result is consistent with previous studies (Yamagishi et al., 2013, 2015.) The results indicate that the relationship between general trust and trust behavior was not based solely on presumed altruism of others, suggesting that other factors were involved. Trust behavior comprises multiple factors, including general trust, reciprocity, and risk avoidance (Mifune & Li, 2018). If the relationship between general trust and trust behavior is not based solely on presumed altruism of others, it may reflect factors such as reciprocity and risk avoidance. Study 2 will focus on reciprocity.

5. Study 2

Study 2 examined whether general trust reflects expectations of reciprocity. In the Faith Game, as we cannot expect reciprocity due to the game structure, players can only determine whether their partners are trustworthy based on presumptions of others' altruism. If general trust also reflects presumed reciprocity, then players use both presumed altruism and presumed reciprocity in the Trust Game to determine whether the partner is trustworthy; however, they may only be using presumed altruism in the Faith Game to determine if the partner is trustworthy. This difference seems to make the relationship between general trust and trust behavior stronger in the Trust Game than in the Faith Game. One of the experimental paradigms measuring cooperative behavior (reciprocity) is the prisoner's dilemma game. The prisoner's dilemma game is an economic game played in pairs. Two participants are paired after being given the capital for the game, and choose to cooperate or not cooperate with each other. If they both choose to cooperate, each receives double the amount of the capital. If one person chooses to cooperate and the other chooses not to cooperate, the person who chooses to cooperate receives nothing and the person who chooses not to cooperate receives triple the amount of the capital. If they both choose not to cooperate, each receives the same amount of the capital. Study 2 used the prisoner's dilemma game to examine the association between general trust and presumed reciprocity.

6 Methods

6.1 Participants

In Study 2, participants were recruited using Lancers (https://www.lancers.jp/). On Lancers, 200 participants were recruited for each of the 4 conditions of the prisoner's dilemma game as an independent experiment. The 4 conditions were based on interaction partner (the partner-

specified condition or the partner-unspecified condition) x gender (male or female.) People were instructed not to participate in the same experiment as their participating experiment on the recruitment advertisement due to the system's difficulty in preventing the double-booking by pre-screening. Participants signed up by accessing the survey site where the experiment would be conducted through a link in the application details. Eight hundred people responded; however, 64 people who were unsuccessful in sending in their answers were excluded from the analysis. One hundred and fifty-four participants who made a mistake on the confirmation regarding partner-specified and partner-unspecified procedures were excluded from the analysis. Thus, a total of 581 participants (286 men and 295 women) with a mean age of 40.84 years (SD = 10.58) participated in this study. The call for applications and experiments was opened on March 3, 2020 and closed on March 4, 2020. Some of the results of this study have been reported in another paper (Nishina & Mifune, 2021), but this is the first report on the relationship between trust behavior and general trust.

6.2 Experimental tasks

All tasks were constructed using Google Forms and conducted online. Participants were first asked to specify their gender, then to read the instruction on the prisoner's dilemma game before beginning the experiment. Money was used as an incentive in the game instructions, and participants were instructed to imagine the participating scenes before answering. Fixed amounts were paid as rewards. After playing the games, they answered questions about general trust.

6.3 Prisoner's dilemma game

In the prisoner's dilemma game, the experimenter gave the participants and their partners 1,000 yen each as a capital sum, and the participants chose whether to hand the money to their partners or keep it for themselves. Participants then answered the question whether they thought their partners would choose to hand the money to the participants or keep it for themselves.

6.4 General trust scale

The same scale was used in Study 1.

7. Results

In the Prisoner's dilemma game, the choice to handover the capital to the partner was regarded as a cooperative behavior. The overall rate of cooperative behavior was 51.3%. The mean of general trust was 3.97 (SD = 1.04) and the mean of GSS trust was 0.39 (SD = 0.49.) Table 2 shows the correlation of each variable for each of the three conditions.

To examine the relationship between general trust and cooperative behavior, we used cooperative behavior as the dependent variable and general trust as the independent variable to perform a logistic regression analysis. The analysis revealed a significant positive effect on general trust (B = 0.31, p < .001, 95% CI [0.22, 0.41]). We performed the analysis with GSS trust as the dependent variable and obtained the same result as for general trust. There was a significant positive effect on GSS trust (B = 0.29, p < .001, 95% CI [0.20, 0.38].)

To examine the relationship between general trust and the degree to which one believes their partner is willing to cooperate with him/her, we used presumed cooperation as the dependent variable and general trust as the independent variable to perform a logistic regression analysis. The analysis showed a significant positive effect on general trust (B = 0.60, p < .001, 95% CI [0.23, 0.42].) We performed the analysis with GSS trust as the dependent variable and obtained the same result as for general trust. There was a significant positive effect on GSS trust (B = 0.32, p < .001, 95% CI [0.23, 0.41]).

Table 2 Correlation coefficients between each variable (Study 2)

	General trust	GSS trust	Cooperative behavior
GSS trust	0.60 **		
Cooperative behavior	0.28 **	0.27 **	
Presumed cooperation	0.28 **	0.29 **	0.81 **

** p < .01. * p < .05.

8. Discussion

Results of Study 2 demonstrate that general trust was positively associated with both cooperative behavior and presumed cooperation. It suggests that general trust reflects not solely a presumption of altruism of others, but also the presumption of reciprocity.

9. Conclusion

The correlation between general trust and trust behavior was positive in both Trust Game and Faith Game, regardless of the difference between the partner-specified condition and the partner-unspecified condition. However, it was weaker in the Faith Game than in the Trust Game (Study 1.) This result is consistent with those of previous studies (Yamagishi et al., 2013, 2015.) General trust showed a positive correlation not only with cooperative behavior in the prisoner's dilemma game, but also with the presumed cooperation expecting the provision

from the partner (Study 2.) These results suggest that general trust may reflect the expectation that the partner will cooperate (return) with one's cooperative behavior. In other words, the psychological tendencies evaluated based on general trust may include not only presumed altruism of others, but also presumed reciprocity of others. In other words, general trust, as measured based on items such as "most people are trustworthy," may not estimate whether other people act purely altruistically toward others. Instead, it may estimate whether the other person will respond without betraying you if you trust the person, that is, whether he/she will act reciprocally. Trust behavior and general trust are known to show a positive correlation with Agreeableness of the Big Five personality traits (Dinesen & Bekkers, 2017; Müller & Schwieren, 2020; Nishina, Takagishi, Inoue-Murayama, Takahashi, & Yamagishi, 2015). Agreeableness also exhibits a positive correlation with the tendency to act reciprocally (e.g., Dohmen, Falk, Huffman, & Sunde, 2008; Perugini, Gallucci, Presaghi, & Ercolani, 2003). General trust also demonstrates a positive correlation with prosociality as measured by social value orientation (van Lange, 1999). However, prosocial people are not motivated solely by enhancing the interests of others; they desire equal benefits for others and themselves (Eek & Gärling, 2006) and are more likely to expect that others will cooperate with them as well (van Lange, 1992; Yamagishi et al., 2013). Therefore, it is unlikely that general trust demonstrated correlation with trust behavior in the Faith Game, which is defined by speculating whether other people's behavior is unilaterally altruistic, because general trust, as measured by items such as "most people are trustworthy," also estimates whether people act reciprocally. However, as the studies that examine the relationship between the Faith Game and general trust remain scarce, it is necessary to confirm whether the results of this study demonstrate consistency. For this, it is necessary to consider whether general trust reflects presumed reciprocity, presumed altruism of others, or both.

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