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Master of Science in Economics

The strategic communication of psychological similarity and its effect on economic partnership formation

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Abstract

This paper investigates the strategic communication of psychological similarity and its effect on partnership formation. I experimentally test if and why individuals would use psychological similarity as a strategy and if it increases the likelihood of partnership formation. I hypothesise that the awareness of a psychological similarity creates a connection that motivates the individuals to display more trustworthy behaviour. I designed a trust game with hidden action to simulate a real-world partnership. The experiment employed 200 participants on MTURK and formed 100 randomized pairs. Results show that individuals are willing to use psychological similarity as strategy if they share a similarity with their partner (66%) but not willing to deceive at a small cost when they are different (4%). The individuals that chose to communicate similarity were more likely to show trustworthy behaviour, indicating that they do so in order to form a connection. Although not significant, results also show that individuals who are informed they share a psychological similarity with their partner are 10% more likely to engage in a partnership than individuals who are not informed.

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1. Introduction

The advancement of our civilization has mostly been enabled by partnerships that were formed throughout history. Great movements and occurrences are usually known and symbolised by a single group or person but what is often overlooked is that strong leaders are craftsmen in influencing people around them and have an aptitude for forming different partnerships (Cardona, 2000).

All individuals possess resources in some form, but no individual have the same allocation of resources, which leads to individuals exchanging different forms of their available resources with the goal of achieving a better outcome (Feenstra, 2004). This exchange institutes a partnership that can be either enforced or unenforced and is introduced in economics through contract theory, a field of study which have been largely developed by Hart and Holmstrom (1987). Central to contract theory is the problem of hidden action, it is due to behaviour that cannot be enforced after the partnership is formed (Bolton and Dewatripont, 2005). Due to hidden action being present, a considerable amount of trust needs to develop in establishing most forms of partnerships (Arrow, 1974).

Investigating factors that build trust and promote partnerships is thus important as it might help us discover and understand whether hidden psychological factors are at play. Businesses or employers must choose between different individuals when they want to allocate a contract, in many cases there are more than one individual that might have the same merits to complete the contract and yet someone needs to be chosen. That might lead us to think that there are psychological factors that influence this process of partnership allocation. This paper will focus on psychological elements that might influence this process of economic partnership formation.

The standard economic model is based on rational individuals that are maximisers and motivated by self-interest, their economic behaviour should not be influenced by psychological elements (Von Neumann and Morgenstern, 1944). According to this view, trust is irrational and should not influence the economic decisions of individuals. However, studies such as Smith (2003) experimented in the form of trust games have found significant results where individuals display that different levels of trust influence their economic behaviour.

The question then arises as to what influences different levels of trust? Various studies have shown that individuals trust other people more when they are similar (Farmer *et al*., 2007; Solnick and Schweitzer, 1999; Charness and Gneezy, 2007). Studies have also indicated the effect of in-group favouritism and how individuals act more generous and less envious towards individuals when they are informed that they share the same group (Chen and Li, 2006; Ockenfels and Werner 2014).

Another question that arises is if strategic communication between individuals can increase trust or promote partnerships formation? Charness and Dufwenberg (2006) investigated the effect of strategic communication in the form of free form messages on trust development and partnership formation. They designed a trust game where the trustee has the option to send a one-shot free-form message to the trustor before they commenced the trust game. Deviating from the standard economic model, they found that strategic communication in the form of promises had a significant positive effect on the likelihood of partnership formation, significantly higher than both no communication and communication in the form of cheap-talk.

Since the study of Charness and Dufwenberg (2006) indicate that communication of promises influence trust but not the communication of cheap-talk, this motivates the question whether there are other psychological factors that could be strategically communicated to develop trust and form partnerships. Since we also know that similarity influences economic behaviour. In this paper, I want to investigate whether the strategic communication of psychological similarity can promote partnership formation. The first contribution will be to test whether individuals are willing to use psychological similarity as strategy and why they would choose to do so. The second contribution will be to test whether the strategic communication of psychological similarity creates the in-group effect and increases the likelihood of partnership formation.

This paper will use a similar approach as in Charness and Dufwenberg (2006) to investigate the effect of the strategic communication of psychological similarity on trust development and partnership formation, it will be experimented in a trust game designed with hidden action to simulate a real-world partnership. This will be tested both between different independent individuals that are either informed or uninformed and for dependent individuals that have the option to update their strategy after they are informed. I argue that

the communication of psychological similarity will form a connection between two individuals and hypothesize that it will result in more individuals choosing to engage in a partnership. Similarly, I will test why individuals would use psychological similarity as a strategy; if they use it and display trustworthy behaviour afterwards, I interpret that they chose to strategically communicate psychological similarity in order to form this connection.

The psychological similarity is tested through two ideologies that individuals have, namely the political ideology that individuals feel closest to and associate themselves with (Jost *et al*., 2009) and the phone operating system they use and brand of the phone manufacturer they associate themselves with (Butt *et al*., 2008). The trust game will be based on Qualtrics designed questionnaires that I will run on the online labour market Amazon Mechanical Turk (MTurk). There will be 200 participants of which 100 randomized pairs will be formed.

Results show that individuals are willing to use the communication of psychological similarity as strategy if they are similar (66%) but not willing to deceive at a small cost when they find out they are different (4%). Results also show that individuals chose to communicate similarity in order to form a connection; 63.64% of individuals who chose to communicate similarity displayed trustworthy behaviour and 41.12% of individuals who chose not to use similarity as strategy displayed trustworthy behaviour. Although not statistically significant, results also show that individuals who are informed they share a psychological similarity with their partner are 10% more likely to go into a partnership than individuals who are not informed. Of the same group of individuals, only 4% more individuals decided to engage in a partnership after they were informed they share a psychological similarity. This indicates that individuals are willing to use psychological similarity as a strategy when they are similar and that it increases the likelihood to form a partnership by 10%.

Chapter two provides a literature review and additional motivation. Chapter three will describe the theoretical analysis and explain the motivational behaviour behind the connection that is formed through the strategic communication of a psychological similarity. Chapter four will cover the experiment. Chapter five and six will explain the result and provide a discussion. Chapter 7 will conclude, and Chapter 8 will discuss both limitations and future potential.

2. Literature Review

The standard economic model is based on rational individuals that are motivated by self-interest and are maximisers that are not influenced by emotions or psychological influences (Von Neumann and Morgenstern, 1944). This implies that the standard economic choices of an individual should not be influenced by psychological elements such as the name, the appearance or characteristics of another individual. It also implies that trust is irrational, since individuals seek unnecessary risk when they trust someone at the expense of their own material gain. However, studies such as Smith (2003) experimented in the form of trust games and found significant results where individuals do display trust and that it influences their economic choices.

A question then arises as what factors influence the level of trust and to what extent it influences their economic decision-making? A group of studies have found that physical characteristics influence economic behaviour; Solnick and Schweitzer (1999) found that individuals are more generous towards individuals that they find attractive in dictator games and Farmer *et al.* (2014) found that individuals convey more trust toward individuals that look physically similar to them. Studies have also found that anonymity and social distance influence economic behaviour; Charness and Gneezy (2007) compared the generosity of individuals in dictator games between anonymity and when the family name of their economic partner is revealed, they found that individuals are significantly more generous towards individuals if they know their family name. Hoffman et al. (1994) studied the effect of anonymity of choices in bargaining games and found that individuals are more generous when other individuals can observe their choices, this deviates from the standard economic model since the economic behaviour or individuals is influenced by social concern of what other individuals think of them. This also indicates that the economic behaviour of individuals is influenced by their belief of what other individuals think.

These studies show that people tend to be more generous and display more trustworthy behaviour towards other individuals when they know more about them, share similar characteristics or have likeable characteristics. An explanation for this phenomenon might be that individuals act more generous towards individuals that they would like to be in the same group with, which leads to in-group favouritism.

Studies have investigated in-group favouritism; Chen and Li (2006) and Ockenfels and Werner (2014) have found that individuals are significantly more generous and less envious towards individuals when they are informed that they share the same group identity, however they found it is belief dependent, since the effects are more subtle when they also know that the other person is not aware that they share group identity. Ben-Ner *et al*. (2006) also investigated in-group favouritism between different in-group identities including family kinship, political views and religious orientation, they found that individuals act more generous towards in-group individuals in all identity categories. These studies indicate that individuals are more generous and display a higher level of trustworthy behaviour when they are informed that they share an identity. A logical explanation for this phenomenon is that a connection formed when individuals are informed that they share a similarity and due to this connection, they display in-group favouritism.

Another question that arises is if strategic communication between individuals can increase trustworthy behaviour or promote partnerships formation? Charness and Dufwenberg (2006) investigated the effect of strategic communication in the form of free form messages on trust development and partnership formation. They designed a trust game where the trustee has the option to send a one-shot free-form message to the trustor before they commenced the trust game. The trustor chooses in or out and trustee chooses to roll or not roll. They classified the communication as either cheap-talk or promises. According to the standard economic model communication should not influence the likelihood of partnership formation. However, they found that communication in the form of promises had a significant positive effect on the likelihood of partnership formation, significantly higher than both no communication and communication in the form of cheap-talk. They argue that individuals experience guilt-aversion, which makes them display trustworthy behaviour because individuals are averse to letting other individuals down. They also argued that individuals experience guilt-aversion to a higher degree when they send a promise, which is why promises lead to higher partnership formation.

In the Charness and Dufwenburg (2006) study, the individual that was given the option to send a one-shot free-form message had no information about the other individual, nor did it specifically look at why individuals would choose to communicate. This raises two important questions: First, what would the individual do with the information if they learn something

about the other individual such as a psychological similarity? Second, why would the individual communicate this psychological similarity if they chose to do so? This will be addressed in this paper.

Since the study of Charness and Dufwenberg (2006) indicate that strategic communication of promises influence partnership formation but not the communication of cheap-talk and the earlier mentioned studies have shown that similarity increases trustworthy behaviour, this also further motivates the question whether psychological similarity could be strategically communicated to develop trust and form partnerships.

3. Theoretical Analysis

I need to set up an experiment that will be able to test the influence of the communication of psychological similarity on the outcome of a trust game. In this chapter I will explain the trust game itself, the two psychological similarities used in the experiment and the theory on why it is important to test for the connection that is formed through the strategic communication of psychological similarity.

3.1. Trust game

The trust game used in this paper is the same used by Charness and Dufwenberg (2006) and is outlined in Figure 1 with the payoffs in USD (Player A| Player B).

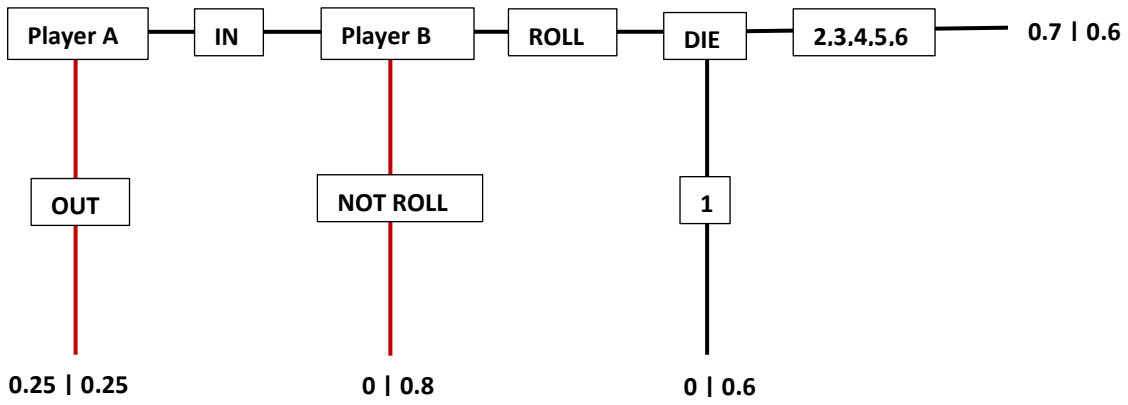

Figure 1: Trust game with hidden action

Player A chooses whether to engage in a partnership or not (IN or OUT) and Player B chooses whether to ROLL or NOT ROLL. If Player chooses OUT, then both receive $0.25. If Player A chooses IN, then Player chooses to ROLL or NOT ROLL; If Player B chooses NOT ROLL, then

Player A receives nothing, and Player B receives $0.8; If Player B chooses ROLL, then Player B receives $0.6 and there is a 1/6 chance that Player A receives nothing and a 5/6 chance that Player A receives $0.7.

The subgame-perfect equilibrium within the trust game is where the payoffs are $0.25 for both players (OUT/NOT ROLL). This is because Player A's can see that if they choose IN, Player B's dominant strategy is to NOT ROLL. Thus, the dominant strategy of Player A is to choose OUT, resulting in the subgame-perfect equilibrium. The game is specifically designed with a high degree of uncertainty so that; Player A displays a high degree of trust in order to choose IN; and if Player A chooses IN, that Player B displays a high degree of trust by choosing to ROLL.

The characteristics of this trust game provides a good framework to test if strategic communication of psychological similarity can influence the outcome of the trust game. In this paper, Player B will have the option to communicate a psychological similarity to Player A before they commence the trust game, I will test why Player B would choose to do so and if it influences the likelihood that Player A chooses IN. Player B's will also have the option to lie and deceive at a small cost of $0.1 if they find out that Player A's do not share the same psychological similarity as them.

3.2. Psychological similarities

Psychological similarity is referring to the choices individuals make in their daily lives such as the ideologies they associate themselves with or ideals individuals believe they strive towards. The idea is to find two ideologies or choices that have an impact on Individuals in their daily lives that individuals can choose to communicate in a standard one-shot message, however it should not give away personality traits such as rationality, selfishness, greediness or guilt levels, the reason is that those traits can be learned through repeated games and will cause them to behave according to what they think an individual with such a trait will do (Battigalli and Dufwenberg, 2009). This information about the other individual should also be relatively easy attainable. The two ideologies that fit is the political ideology that individuals feel closest to and associate themselves with (Jost *et al*., 2009) as well as the phone operating system they use and operating system of the brand of phone manufacturer they associate themselves with (Butt *et al*., 2007). Each participant will either be asked about their political

ideology or the phone operating system they associate themselves with, but not both. Political ideology might be argued as an important 'high-stake' ideology since it is concerned with the policies that guide individuals living within a country. Phone ideology might be argued as a less important 'low-stakes' ideology since it represents a common association among a brand name or design philosophy. These two different types of ideologies are used for robustness to test the outcome of using psychological similarity as a strategy.

3.3. Beliefs and behavioural motivations

The standard economic model implies that the communication of a psychological similarity should not influence the outcome of the trust game or the likelihood that individuals decide to engage into a partnership. In this section I will explain why it is relevant to test for the connection that is formed between the two individuals and how it might increase trustworthy behaviour through two behavioural motivations.

Traditional game theory is a toolset that is used to analyse and formulate the decisions of exclusively rational individuals (Osborne and Rubinstein, 1994). Thus, we need expanded theories to analyse and formulate why individuals would deviate from standard economic theory. Geanakoplos *et al*. (1989) expanded on traditional theory and formulated psychological game theory, which not only depend on the individual's belief of the outcome but depends on the belief the individual has about the belief of others. Psychological game theory thus made it possible to formulate and test behavioural motivations that determine the behaviour of individuals due to their beliefs about other individual's beliefs. Two behavioural motivations that influence behaviour due to belief of other individual's beliefs is guilt aversion (Charness and Dufwenberg, 2006; Battigali and Dufwenberg, 2007) and intention-based reciprocity (Charness and Rabin, 2002).

The first behavioural motivation that explains how psychological similarity might increase trust is through guilt aversion, individuals experience a disutility from letting other individuals down, meaning that they experience a disutility from doing less than what their belief is of what the other individual is expecting (Dufwenberg, 2002). Battigalli and Dufwenberg (2007) formulated a theory to use and analyse guilt in simple form games, whereby an individual feels guilt to the level of which the individual believes he/she is letting another individual down. Based on previous research that individuals display in-group favouritism, I hypothesise

that the strategic communication of a psychological similarity will form a connection and that this connection will increase guilt-aversion among both individuals. This connection raises the expectation of Player A that Player B would choose ROLL and it also raises the expectation of Player B that Player A would choose IN. Due to their belief that the other individual expects them to be more trustworthy, they would feel higher level of guilt for letting the individual down. Due to a higher level of guilt-aversion, they should display more trustworthy behaviour.

The second behavioural motivation that explain how psychological similarity might increase trust is due to Intention-based reciprocity. Rabin (1993) was one of the first studies to incorporate fairness into economic games wherein theoretical evidence is shown that the preferences of individuals are influenced by the outcome of other individuals. Charness and Rabin (2002) expanded and sought out to test social preferences with simple experimental games, they found that individuals are indeed willing to sacrifice payoffs to achieve a fairer outcome that benefits total social welfare. This indicates that the utility of individuals is also dependent on the outcome of others and that individuals are motivated by reciprocity. Based on previous research that individuals display in-group favouritism, I hypothesise that the strategic communication of a psychological similarity will form a connection and that this connection will increase their need to reciprocate. I also hypothesise that the connection will motivate them to act in their best interest as a group, which is to display trustworthy behaviour.

The connection formed through the strategic communication of psychological similarity is thus important because it increases the degree of already established behavioural motivators for trustworthy behaviour. The experiment is set up to test for this connection.

4. Experiment

4.1. Hypotheses

As outlined in the introduction, this paper has the aim to answer four questions, First, I state the questions and hypotheses that is predicted by the theory that the strategic communication of a psychologically similarity forms a connection. Second, I explain experimental environment and how the questionnaires are set up to test these hypotheses. It should be noted that in each test I compare shares of individuals and the null hypothesis represents the notion that there is no difference between the shares.

Hypothesis 1

The first question is whether individuals are willing to use psychological similarity as strategy in order to form a connection. Based on the hypothesis that psychological similarity forms a connection, I hypothesize that a larger share of Player B's choose ROLL when they chose to use similarity as strategy than when they chose not to use similarity as a strategy.

Hypothesis 2

The second question is whether individuals are willing to lie and deceive about their psychological similarity in order to form a connection. Based on the hypothesis that psychological similarity forms a connection, I hypothesize that a larger share of Player B's choose ROLL when they chose to deceive than when they chose not to deceive.

Hypothesis 3

The third question is whether individuals trust other individuals more when they have the belief that they are psychologically similar. Based on the hypothesis that the strategic communication of a psychological similarity forms a connection, I hypothesise that between independent Player A's, a larger share of Player A's would choose IN when they are informed that they share a psychologically similarity with Player B than Player A's who are not informed.

Hypothesis 4

The fourth question is whether individuals will update their preferences about trusting someone when they are informed they are psychologically similar. Based on the hypothesis that the strategic communication of a psychological similarity forms a connection, I hypothesise that a larger share of the same group of Player A's will choose IN after they are informed they share a psychologically similarity with Player B.

4.2. Experimental Environment

The trust game with hidden action was conducted on Amazon Mechanical Turk (MTurk) in the form of questionnaires designed on Qualtrics. The following two paragraphs will explain the decision behind using MTurk and the design of the experimental set up will follow.

The online labour market MTurk is becoming increasingly common to conduct behavioural research. It is a platform where it is easy to obtain participants at a relatively low price. It is also very convenient to control factors pertaining to the participants such as country of origin, political affiliation or which phone platform the participant uses. Furthermore, there have

been economic studies that specifically tested the behaviour or participants in virtual platforms to compare it to results laboratory experiments; Horton *et al*. (2011) looked at the economic behaviour of participants on MTurk due to priming, framing and deception and found that participants respond as predicted, similarly to how individuals respond in laboratories; Amir *et al*. (2012) experimented with economic games on MTurk where the pay off's were determined by the outcome of the games, they recruited MTurk participants to play in a dictator game, ultimatum game, trust game and a publics good game, they found that participants also respond as predicted, similarly to participant in the laboratory even when the payoffs are below $1. These studies show that MTurk is a practical and valid platform to recruit participants even with low payoffs. Another study that might be relevant to clarify the validity of using MTurk regarding political ideology; Clifford *et al*. (2015) studied samples drawn from MTurk of individuals claiming to have either a liberal or conservative political ideology, the study found that their views and values imitate those of general liberal and conservative individuals in public.

In my experiment, there were four questionnaires that were each filled in by 50 participants (25 is for political ideology and 25 is for phone ideology) exclusively from the US, I ensured that no worker on the MTurk platform filled in any of the questionnaires more than once. After each questionnaire, there was a unique key generated that the worker had to fill in. There were also control questions to test whether the worker paid attention, if the control questions were filled in incorrect, the questionnaires are rejected. There was also a standard set of demographic questions including gender, age, state of origin within the US and employment status, this was to observe if there is no skewed representation of participants (Appendix C provides a general description of the demographics of the participants).

The instruction and naming of the questionnaires were neutrally constructed, the word 'economic game' and not 'trust game' was used, this is to avoid priming or framing affects, which have an impact on games as concluded by various studies (Dufwenberg *et al*., 2011; Engel and Rand, 2014; Alekseev *et al*., 2016). This approach is also used with the aim to avoid experimenter demand, so that the questionnaires do not direct the participants in any direction.

4.3. Experimental Design

The trust game with hidden action consists out of two individuals as mentioned in the theoretical analysis, Player A and Player B. There were two questionnaires for both Player B and Player A. Both Player A and B received $0.25 for participating and were able to receive additional payoffs determined by the outcome of the game. The additional payoff structure is displayed in Table 1 (See Appendix A for the experimental instructions for both Player A and Player B).

Table 1: The additional payoff structure

			Player A	Player B
Player A: OUT			$0.25	$0.25
Player A: IN	**Player B: NOT ROLL**		$0	$0.8
Player A: IN	**Player B: ROLL**	**DIE:1**	$0	$0.6
Player A: IN	**Player B: ROLL**	**DIE:2-6**	$0.7	$0.6

Due to the static game design, the trust game only requires each participant to make one decision without knowing about the other's choice, which made it is possible and suited to design questionnaires for Player A and Player B individually and afterwards complete a randomized pairing of Player A and B's. The randomized pairing and the die roll is computationally generated in Microsoft Excel. If Player B's chose to use psychological similarity as a strategy, they were randomly paired with Player A's that were informed that they are psychologically similar. If Player B's chose not to use psychological similarity as a strategy they were randomly paired with Player A's that were not informed. (Appendix B shows the experiment outcomes and respective earnings of the participants; each participant was paid through MTurk after the randomized pairing in the form of bonusses).

The questionnaires were design and the hypotheses were tested in the following order:

4.3.1. Questionnaires for Player B

1. The first questionnaire asked Player B what their choice of either political ideology or phone operating system is, they were told that Player A is psychologically similar and asked if they want to inform Player A know that they are similar, afterwards they played the trust game.

2. The second questionnaire asked Player B what their choice and association is of either political ideology or phone operating system, they were told that Player A is psychologically different and asked if they want to deceive Player A to let Player A know that they are similar at a cost of $0.1, afterwards they played the trust game.

Hypothesis 1 will be tested by comparing the share of Player B's in the first questionnaire that chose to use strategy and ROLL against the share of Player B's that chose not to use strategy and ROLL. Hypothesis 2 will be tested by comparing the share of Player B's in the second questionnaire that chose to deceive and ROLL against the Player B's that chose not to deceive and ROLL.

4.3.2. Questionnaires for Player A

1. The third questionnaire consists out of two rounds, the first round is considered as the control round which is the trust game where it asked Player A's whether they want to engage in a partnership, afterwards they are asked what their choice and association is of either political ideology or phone operating system, then they are asked if they want to update their choice on whether to engage in a partnership given that Player B is psychologically similar.
2. The fourth questionnaire consists out of one round, Player A's are first asked what their choice and association is of either political ideology or phone operating system, then will be told that Player B is similar and then asked whether they want to engage in a partnership.

Hypothesis 3 will be tested by comparing the share of Player A's choosing IN between the control round and the questionnaire with one round. Hypothesis 4 will be tested by comparing the share of Player A's choosing IN between the control round and the second round in the questionnaire with two rounds.

After the questionnaires, Player A's were asked to guess which percentage of Player B's decided to roll. I can use these percentages to analyse the expected beliefs of Player A and compare between Player A's that chose IN and Players A's that chose OUT.

After the questionnaires, Player B's were informed that we asked the guesses of Player A's and asked what they predict Player A guessed when Player A's are informed and also when they are not informed. I can use these percentages to analyse the belief of Player B's, what

they believe the effect of the strategic communication of psychological similarity will have on Player A's belief. This will allow us to know how accurate Player B think the effect of the strategic communication of psychological similarity will influence Player A's belief.

5. Results

First, I state the outcome of Player B's, testing hypothesis 1 and 2. Second, I state and visualise the outcome of Player A's, testing hypothesis 3 and 4. Third, I look at the guesses of both Player A and B's on the percentage of Player B's that chose to ROLL.

5.1. Player B

Result 1: The share of Player B's that are willing to psychological similarity as strategy and the share of Player B's who are willing to deceive at a small cost are summarised in Table 2.

Strategy: With Political ideology, 16 of 25 (64%) Player B's chose to use psychological similarity as strategy when Player A is similar. With Phone ideology, 17 of 25 (68%) Player B's chose to use psychological similarity as strategy when Player A is similar. Combined, 33 of 50 (66%) Player B's chose to use psychological similarity as strategy when Player A is similar.

Deceive at a cost: With Political ideology, 2 of 25 (8%) Player B's chose to deceive Player A when Player A is different. With Phone ideology, 0 of 50 (0%) Player B's chose to deceive Player A at a cost when Player A is different. Combined, 2 of 50 (4%) Player B's chose to use deceive at a cost in order to use psychological similarity as strategy when Player A is different.

Table 2: Share of Player B's who chose to use similarity as strategy or to deceive

	Strategy	Deceive at a cost
Player B	33/50 (66%)	2/50 (4%)

I will now test hypothesis 1 and the compare the share of Player B's who chose to use strategy that chose ROLL against the share of Player B's who chose not to use strategy that chose ROLL. The results are summarised in Table 3. 21 of 33 (63.64%) Player B's who decided to use psychological similarity as strategy decided to ROLL and 7 of 17 (41.12%) of Player B's who decided to not use psychological similarity as strategy decided to ROLL. I performed a formal test for the difference in proportions between the two shares of Player B's who chose to ROLL.

I used a One-tailed Test for proportions since we are analysing whether the proportion of Player B's choosing both to use strategy and ROLL is significantly higher than the proportion of Player B's choosing not to use strategy and ROLL, which are two independent groups. The results are only significant at p = 0.10 significance level, we can marginally reject the null hypothesis that the two proportions are similar. More Player B's who decided to use psychological similarity as strategy decided to ROLL than Player B's who decided to not use psychological similarity as strategy.

Table 3: The shares of Player B's who decided to ROLL given their choice on strategy or not

	Strategy	No Strategy	Z Statistic	P - Value
Player B's who chose ROLL	21/33 (63.64%)	7/17 (41.12%)	1.52	0.06

Result 2: Only 2 of 50 (4%) individuals that chose to deceive at a cost when they were informed that Player A is psychologically different, we can assume that individuals are averse to lying about their ideology when they are aware of a direct cost. Thus, I do not have enough data to test Hypothesis 2 and why they would choose to deceive.

5.2. Player A

Result 3: The effect of the communication of psychological similarity on Player A's likelihood to choose IN is summarised in Figure 2. With political ideology, 18 of 25 (72%) Player A's chose IN when they were uninformed and 21 of 25 (84%) Player A's chose IN when they were informed that they share the same political ideology. With the phone ideology questionnaires, 17 of 25 (68%) Player A's chose IN when they were uninformed and 19 of 25 (76%) Player A's chose IN when they were informed that they share the same phone ideology. Combined, this results in 70% of Player A's that decided to engage in partnerships without being informed and 80% of Player A 's that decided to engage in partnerships when they were informed they share the same ideology.

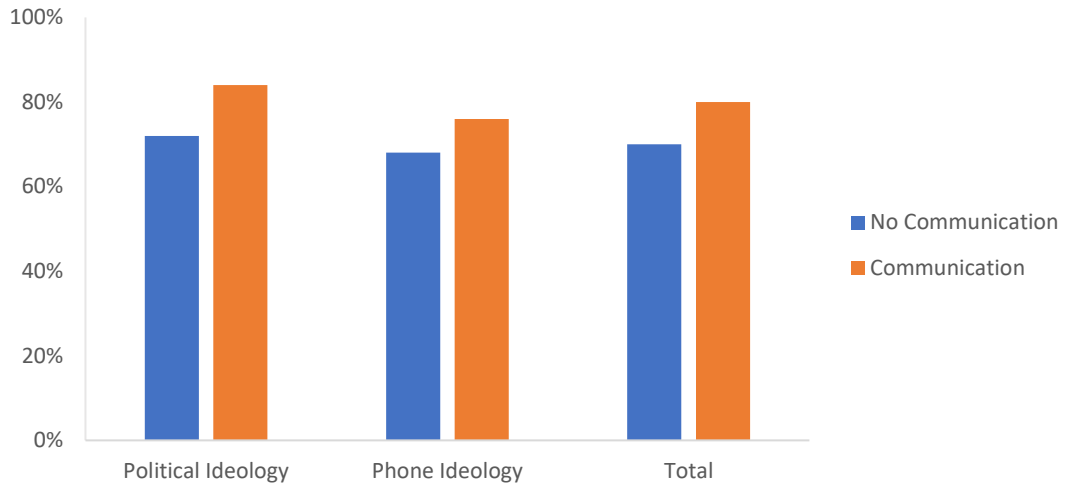

Figure 2. The effect of similarity on Player A's likelihood to choose IN

In Table 4, I performed a formal test for the difference in proportions between the different shares of Player A's choosing IN. I used a One-tailed Test for proportions since we are analysing whether the proportion of informed Player A's that chose IN is significantly higher than the proportion of uninformed Player A's that chose IN, which are two independent groups. The results are insignificant and the null hypothesis cannot be rejected. Limited evidence show there is a 10% more likelihood that Player A will choose IN given that they believe they are psychologically similar to Player B.

Table 4: The effect of communicating similarities between different Player A's

	No communication	Communication	Z Statistic	P - Value
Between Player A's	35/50 (70%)	40/50 (80%)	1.12	0.13

Result 3: The effect communication of psychological similarity has on each individual Player A when they have the option to update their choice is summarised in Figure 3. With political ideology, 18 of 25 (72%) Player A's chose IN with no communication and 19/25 (76%) of the same group chose IN when they were informed they share the same political ideology. With phone ideology, 17 of 25 (68%) Player A's chose IN with no communication and 18/25 (72%) of the same group chose IN when they were informed they share the same phone ideology. Combined, this results in 70% of Player A's that decided to engage in partnerships with no communication and 74% of the same group chose IN after they were informed they share the same ideology.

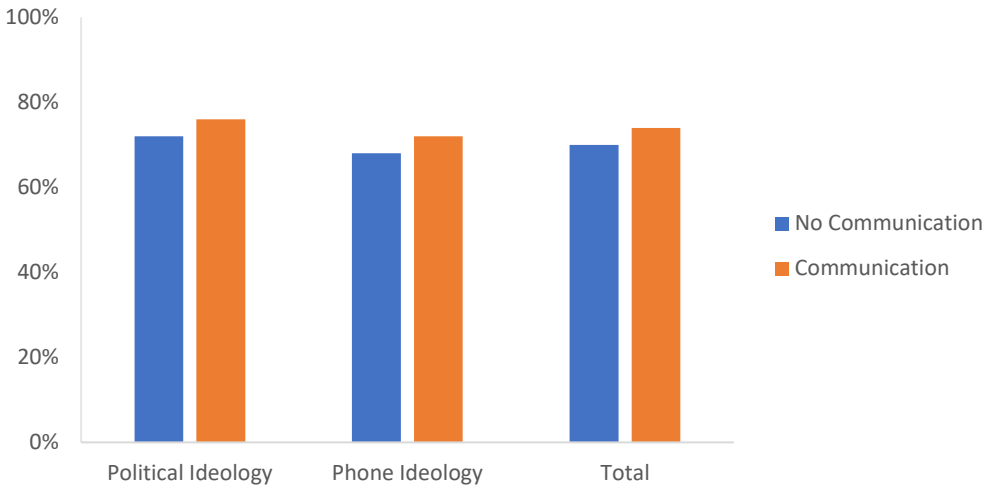

Figure 3. Before and after Player A's were informed that Player B is similar.

In Table 5, I performed a formal test for the difference in proportions between the shares of Player A's choosing IN before and after they are informed. I used a One-tailed McNemar's Chi-squared test since we are analysing whether the proportion of Player A's that chose IN is significantly higher after they were informed than before they were informed. The results are insignificant and the null hypothesis is also not rejected. Limited evidence show there is a 4% larger share of same group of Player A's choosing IN after they are informed.

Table 5: Tests of proportions (one-tailed) for the effect of communicating psychological similarities

	Before communication	After Communication	Chi-Square	P - Value
Player A's with two rounds	35/50 (70%)	37/50 (74%)	0.5	0.24

5.3. Guesses of Player A and B's

The expected belief of each individual is important because it enables us to incorporate the beliefs each individual has about the belief of others to analyse their corresponding behaviour. Table 6 illustrates the averages of the percentage that Player A's guessed of which Player B's would ROLL. Pooled data of Player A's show that the Player A's who chose IN had significantly higher guesses of Player B's percentage that would ROLL than Player A's who choose OUT, 60% against 30%. I used a one-tailed Mann-Whitney Rank sum test since we need a non-parametric statistical test to analyse whether a randomly selected guess from

Player A who chose IN will be higher than a guess from randomly selected Player A who chose OUT.

Table 6: Statistical tests for the averages of guesses (%) of Player A's for Player B to ROLL.

Player A			
IN	OUT	Z-statistic	P-Value
60.36	29.65	4.49	0.00

Table 7 summarises Player B's prediction on the effect psychologically similarity will have on Player A's guess of the percentage of Player B's choosing to ROLL. Player B's were asked to predict what the average Player A guessed on the percentage of Player B's that chose to ROLL, for both the uninformed Player A and informed Player A. The average of Player B predictions of the uninformed Player A's guess is 47% and is significantly higher than the informed Player A's guess which is 57%. I formally tested the difference between the two guesses with a one-tailed Mann-Whitney Rank sum test since we need a non-parametric statistical test to analyse whether a randomly chosen guess from Player B of an informed Player A will be higher than a randomly chosen guess from Player B of an uninformed Player A.

Table 7: Player B guesses (%) of Player A guess when uninformed or informed

Player A			
Uninformed	Informed	Z-statistic	P-Value
47.45	56.94	2.21	0.01

6. Discussion

6.1. Player B and behavioural motivation

Results indicate that individuals are willing to use psychological similarity as strategy, 66% choose to use it as strategy. Player B's that chose to use psychological similarity as strategy were also 22.5% more likely to choose ROLL than Player B's who did not choose to use psychological similarity as strategy, this indicates that Player B's more likely used psychological similarity as strategy in order to reciprocate and achieve a higher mutual payoff. This validates the hypothesis that individuals would most likely use psychological similarity in

order to form a connection and that due to the connection, they have behavioural motivators that cause them to display more trustworthy behaviour. An explanation for this might be that Player B's are aware that psychological similarity creates a connection and believe more Player A's would expect them to roll. Due to this higher expectation they would feel more guilt not to ROLL and thus decide to show trustworthy behaviour and ROLL.

Table 7 shows that Player B clearly thinks that using psychological similarity as strategy will influence Player A's belief. This provides a good insight of what Player B think will happen to the belief of Player A when they choose to use psychological similarity as strategy. What is surprising is that Player B's make accurate guesses as shown in Table 4 of what happens when Player A's are informed or uninformed. Player B's predicted that Player A guess will likely increase by 10% and similarly 10% more of Player A's chose IN when they were informed they share a psychological similarity. Clearly Player B's are aware that using psychological similarity as a strategy influences the belief of Player A, this also fits into the behavioural motivators that is strengthened by the connection; Player B's who used psychological similarity as a strategy knew their partner would trust them more, so they decided to show more trustworthy behaviour in return. According to the two behavioural motivators; Player B was either motivated by guilt-aversion, by feeling more guilt for not showing trustworthy behaviour in return when they believed that Player A will more likely trust them; or by reciprocity, by being motivated by returning the favour so that they can benefit as a team.

6.2. Player A and behavioural motivation

Player A's who were informed they share a psychologically similarity with Player B's are 10% more likely to engage in partnership than Player's who were not informed. Of the same group, only 4% more of Player A's decided to engage in a partnership after they were informed they share a psychological similarity. Although both results were not statistically significant, there is a larger difference between different Player A's who were informed and not informed (10%) than in between individual Player A's different rounds when Player A is able to update his/her strategy when they were informed (4%).

What this indicates is that there is a marginal positive effect that the communication of psychological similarity has on the likelihood of individuals deciding to engage in a partnership. What it also might indicate is that an individual who would like to judge whether

to engage in a partnership in a rational manner without the effect of psychological biases, should judge the economic merits of the partnership first and make the decision before accepting information on the individual in question for partnership. It is less likely that the individual will update his/her strategy after deciding on the partnership on economic merit than being informed about the individual's psychological similarities before deciding based on economic merit.

In Table 6 we observe Player A's guesses on the percentage of Player B's who chose to ROLL, there is strong significance that Player A's who chose IN (60%) believe that a higher percentage of Player B's will choose ROLL than Player A's who chose OUT (30%). This result is in harmony with the two behavioural motivations explained in the theoretical analysis, namely guilt-aversion and intention-based reciprocity. Due to the belief of Player A that more Player B's will choose to ROLL, Player A feels guilty for letting Player B down, because they know Player B sacrifices the highest payoff and would only choose ROLL for having the utility of reciprocity, thus more Player A's will choose IN in order to achieve the state of reciprocity. Also due to the belief of Player A that more Player B's will choose ROLL, is that Player A would only choose IN in order to reciprocate rather than playing a safe strategy and choose OUT. Reciprocity as behavioural motivation can thus reasonably be used to justify the effect of more Player A's choosing IN due to their belief that a higher percentage of Player B's will choose ROLL.

As with all experiments, it should be noted that the results observed might be due to other factors, it might be that the participants are not engaged enough and simply observe psychologically similarity as a choice unrelated to the trust game. It might also be due to experimenter demand, where the individuals answer questions according to what they think the answer should be and is guided by the placement of the questions. As mentioned earlier, the aim regarding the methods used in the experiment was to avoid these effects.

7. Conclusion

The aim of the experiment was to test whether individuals are willing to use psychological similarity as a strategy, why they would choose to do so and if psychological similarity increases the likelihood of partnership formation.

With Player B's, 66% percent decided to use psychological similarity as strategy, of the Player B's that chose to use the strategy, they were 22.5% more likely to choose ROLL than Player B's who chose not to use the strategy. This indicates that individuals will most likely use psychological similarity as strategy to form a connection when they have the option. Which supports the idea individuals are aware that the strategic communication of similarity creates a connection which increases trustworthy behaviour.

Only 4% of Player B's decided to deceive Player A at cost to lie about their psychological similarity when they found out Player A's were different. This indicates that individuals will not lie and deceive when they are aware of a direct cost associated to the action.

Player A's are 10% more likely to engage in a partnership with another individual when they believe they are psychologically similar than an individual who they believe is not psychologically similar. This indicates that individuals do experience some degree of psychological bias to form a partnership when they believe they are psychologically similar. Only 4% more Player A's of the same group decided to engage in a partnership if they are informed that they share a psychological similarity when they already made a choice based on economic merits. This indicates that there is also a possible degree of psychological bias that individuals experience when they have already made a choice but to a much smaller degree than between different individuals who are informed and uninformed about psychological similarities.

These results provide insight into real-world applications regarding trust development and partnership formation. When an individual wants another individual to form a partnership with them, I can argue that he/she will most likely (66% of the time) use psychological characteristics they know about the person as a strategy if they share the same psychological element. This strategy of psychological similarity will give the individual a 10% more likelihood of being chosen if the individual is informed about this before they decide based on merit. It will also only give a 4% more likelihood of being chosen if the individual is informed after he/she decided based on economic merit.

If it is important for the individual to make a rational decision without the influence of psychological biases, it is important that the individual who makes the decisions stay anonymous and that they decide based on merit before they look at the psychological

characteristics of the person. This is relevant in modern day applications, as individuals we make partnership decisions everyday regarding both our personal and professional lives. In both aspects it is becoming increasingly important to make unbiased decisions in order to diversify and integrate different elements of society. If individuals want to maximise the economic value of partnership it would be rational to judge a potential partnership by its economic merits without the influence of psychological biases. Given the fact that this paper also observed that individuals are willing to use psychological similarities as a strategy, the individual deciding on the partnership should try to avoid these signals if their aim is to make rational decisions.

8. Limitations and Future Research

This study is subject to a few limitations which will be discussed in this chapter as well as potential research that could stem out of this research.

As with most studies and models within economics, the trust game is a simplified version of real-world trust dilemmas and partnership formation. The specific trust game with hidden action is used because it involves a high degree of uncertainty as is experienced in the real-world. The payoffs of the trust game are specifically designed to be higher than normal wages within Amazon Mechanical Turk to create incentive so that the participants value the outcome of the game. The environment within a simplified trust game also enables us to test specific variables, so that we have a controlled environment. These characteristics make it attractive to use this specific model, to test the effect of the strategic communication of psychological similarity in a controlled environment that also simulates the real-world as close as possible.

The research of this paper was also subject to a few constraints, it would be optimal to conduct the trust game with more than 200 participants and within a lab with higher payoffs. Due to limiting number of participants and to achieve some degree of statistical significance, only two ideologies were used. It would be ideal to test more ideologies, this will enable us to distinguish between the effect of different ideologies on trust development and have a more robust model of the overall effect of psychological similarity. It would also be interesting to conduct this experiment with participants from different countries, however this study is not testing specific levels of trust, but rather the fluctuations in levels of trust given certain

conditions. Thus, we can observe and predict that it is possible that similar fluctuations will happen with the trust levels of participants from other countries.

There are alternative explanations for the increase in generosity or kind economic behaviour than a connection that is formed between the individuals. Alternative theories might have to do with the perception of themselves and making decisions that make individuals feel good about themselves. Individuals want to both think of themselves as good individuals and be perceived by other individuals as good individuals (Ariely *et al*., 2009). Another explanation might be that individuals really care for other individual's outcomes more than their own (Levine, 1998). Another explanation might be that they are inequality-averse and have a utility for achieving similar payoffs (Engelmann and Strobel, 2004). It would be interesting to explore in depth how these theories explain an increase in trustworthy behaviour, however, the theory in this paper is routed in the theories behind in-group favouritism and is based on behavioural economic motivators that explain the effect of strategic communication. Thus, the alternative explanations mentioned should also be captured in the control group where Player B did not use strategic communication and Player A is not informed.

The experiment was set up to test the connection and the effect of this connection on partnership formation, but not to the extent of which this formation is attributed to individual behavioural motivations, it would be interesting to set up an environment that find out if individuals are stronger influenced by guilt aversion or intention-based reciprocity. Thus, it will enable a deeper analysis to test how this connection increases trustworthy behaviour through different behavioural motivators.

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Appendix

A1 – Questionnaires for Player A with two rounds

You are Player A.

- You must choose if you want to go in a Partnership with Player B.
- You have the option IN or OUT.
- If you choose OUT, both you and Player B will receive an additional $0.25.
- If you choose IN, Player B has the option to ROLL or NOT ROLL.
- If Player B chooses NOT ROLL, you will receive $0 and Player B will receive $0.8 (Player B is aware that you will receive $0).
- If Player B chooses ROLL, you have an 1/6 chance of receiving $0 and a 5/6 chance that you will receive $0.7.

Summary of Outcome:

			Player A	Player B
Player A: OUT			$0.25	$0.25
Player A: IN	**Player B: NOT ROLL**		$0	$0.8
Player A: IN	**Player B: ROLL**	**DIE:1**	$0	$0.6
Player A: IN	**Player B: ROLL**	**DIE:2-6**	$0.7	$0.6

Q1

Do you choose to go in a Partnership with Player B?

YES/NO

Q2

Which political ideology do you most associate yourself with and feel closest to?

LIBERAL/CONSERVATIVE

Q3

Player B also associates the most and feels closest to a (Selected Choice) political ideology.

Do you choose to go in a Partnership with Player B?
(This answer will override your first answer)

YES/NO

Q4

Which percentage of Player B's do you guess have chosen to ROLL:

Appendix

A2 – Questionnaires for Player A with one round

Similar to A1

Q1

Which political ideology do you most associate yourself with and feel closest to?

LIBERAL/CONSERVATIVE

Q2

Player B also associates the most and feels closest to a (Selected Choice) political ideology.

Do you choose to go in a Partnership with Player B?
(This answer will override your first answer)

YES/NO

Q3

Which percentage of Player B's do you guess have chosen to ROLL:

Appendix

A3 – Questionnaires for Player B with strategy

You are Player B

- Assume that Player A has decided to go into a partnership with you (IN).
- You have the option to ROLL or NOT ROLL.
- If you choose NOT ROLL you will receive an additional $0.8 and the Player A that will be paired with you will receive $0.
- If you choose ROLL you will receive an additional $0.6 and Player A will have a 5/6 chance of receiving $0.7.

Summary of Outcome:

			Player A	Player B
Player A: OUT			$0.25	$0.25
Player A: IN	**Player B: NOT ROLL**		$0	$0.8
Player A: IN	**Player B: ROLL**	**DIE:1**	$0	$0.6
Player A: IN	**Player B: ROLL**	**DIE:2-6**	$0.7	$0.6

Q2

Studies have found that people trust other people more when they think they are similar to one another or when they make similar choices.

Given that you know Player A associates themselves the most and feel closest to a (Selected Choice) political ideology. Do you want to let Player A know you have a similar political ideology and feel closest to a (Selected Choice) ideology?

YES/NO

Q3

Player A knows that you have a similar political ideology and feel closest to a (Selected Choice) ideology.

Do you choose to ROLL or NOT ROLL?

ROLL/NOT ROLL

Q4

We have asked all Player A's to guess which percentage of Player B's chose to ROLL, which percentage do you think Player A's have guessed that Player B's have chosen ROLL:

Q5

Which percentage do you think Player A's have guessed that Player B's have chosen ROLL given that they know Player B has the same political ideology:

Appendix

A4 – Questionnaires for Player B with deceiving strategy

Similar to A3

Q2

Studies have found that people trust other people more when they think they are similar to one another or when they make similar choices.

Given that you know Player A associates themselves the most and feel closest to a (Unselected Choice) political ideology. Do you want to let Player A know you have a similar political ideology and feel closest to a (Unselected Choice) ideology at a deduction of $0.1 from your additional bonus payoff?

YES/NO

Q3

Player A believes you have a similar political ideology and feel closest to a (Unselected Choice) ideology.

Do you choose to ROLL or NOT ROLL?

ROLL/NOT ROLL

Q4

We have asked all Player A's to guess which percentage of Player B's chose to ROLL, which percentage do you think Player A's have guessed that Player B's have chosen ROLL:

Q5

Which percentage do you think Player A's have guessed that Player B's have chosen ROLL given that they know Player B has the same political ideology:

Appendix

B1 – Number of outcomes and respective earnings

Outcome	Number of Groups			Average Earnings	
	Political	Phone	Total	Player A	Player B
IN/ROLL	20	25	45	$0 (1/6) | $0.7(5/6)	$0.6
IN/NOT ROLL	20	12	32	$0	$0.8
OUT/ROLL	3	7	10	$0.25	$0.25
OUT/NOT ROLL	7	6	13	$0.25	$0.25

Appendix

C1 – Demographic Questions

Please answer the following demographic questions:

Q1

Gender:

Q2

Age:

Q3

State of residence within the US:

Q4

Which describes your current situation:

Q5

How many HIT's do you usually complete in a day on MTurk:

C2 – Demographic Description

This is a general description of the demographic of the 200 participants. Regarding the gender of the participants, 56% were male and 44% were female. Regarding the age of the participants, 36% were between ages of 21 to 30, 39.5% were between the ages of 31 to 40, 14.5% were between the ages of 41 to 50 and 7.5% were between the ages of 51 to 60. Regarding their employment status, 63.5% were employed, 11% were unemployed, 20% were self-employed, 4% were students and 1.5% described their employment status as other. All the participants were from various states across the US, with the most individuals from Florida and California with 8.5% each and New York with 6.5%. All individuals that indicated they complete more than 500 Amazon Mechanical Turk assignments a day were not used in the experiment, since it might indicate that they do not pay a high level of attention. The identity of the participants were anonymous and only their worker ID's on Amazon Mechanical Turk were collected in order to assign their respective payoffs.