

Determinants of Trust: The Role of Personal Experiences

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Abstract

Social interactions pervade daily life and thereby create an abundance of social experiences. Such personal experiences likely shape what we believe and who we are. In this paper, we ask if and how personal experiences from social interactions determine individuals' inclination to trust others? We implement an experimental environment that allows us to manipulate prior social experiences—either being paid or not being paid by a peer subject for a task—and afterwards measure participant's willingness to trust others. We contrast this situation with a control condition where we keep all aspects of the prior experiences identical, except that we remove the social dimension. Our key finding is that after positive social experiences, subjects' willingness to trust is substantially higher relative to subjects who made negative social experiences. No such effect is obtained in the control condition where we removed the social aspect of experiences. Findings from a difference-in-difference analysis confirm this pattern. Our results cannot be explained by rational learning, income effects, pay-related mood, disappointment aversion and reference-dependence. Delving into the underlying mechanisms, we provide evidence that non-standard belief patterns are an important driver of experience effects.

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1 Introduction

Trust is a pervasive feature of human relationships. It constitutes a social lubricant for any kind of transactions. In particular, trust allows the realisation of (efficiency) gains from trade and cooperation when contracts are incomplete or too costly to be enforced (Arrow, 1974). Ample evidence suggests that trust fosters aggregate social and economic outcomes (see, e.g., Putnam, 1995; La Porta, Lopez-de Silanes, Shleifer and Vishny, 1997; Knack and Keefer, 1997; Guiso, Sapienza and Zingales, 2004). However, trust cannot be taken for granted. It requires individuals to make themselves and their resources vulnerable to exploitation by others. Understanding the determinants of trust hence poses an important challenge for the social sciences and has potentially far-reaching implications for policy and workplace design.

The decision to trust others is typically conceptualized as an interplay of the institutional setting—capturing the incentives and constraints that individuals face—and individual primitives—prior beliefs and preferences.¹ Traditionally, economic research has focused primarily on institutional factors—for instance, by implementing reputational concerns through feedback mechanisms and competition (see, e.g., Camerer and Weigelt, 1988; Bolton, Katok and Ockenfels, 2004; Charness, Cobo-Reyes and Jiménez, 2008; Charness, Du and Yang, 2011; Huck, Lünser and Tyran, 2012; Wibrál, 2015).

In this paper, we study the malleability of individuals’ willingness to trust others beyond institutional forces. We start from the observation that individual behavior is embedded in a constant flux of social interactions that can lead to positive and negative experiences. As emphasized in Akerlof (1983), such personal experiences are often powerful and particularly meaningful events to individuals, with the consequence that when “people go through experiences, frequently their loyalties, or their values, change” (Akerlof, 1983). Indeed, evidence presented in Alesina and La Ferrara (2002) for instance suggests that prior (traumatic) experiences and belonging to groups that (historically) have been discriminated are negatively associated with trust.

Taking this as point of departure, we implement a novel experimental set-up to make the following contributions: First, we provide *causal* evidence that prior social experiences shape people’s willingness to trust others. Using a difference-in-difference approach, we pin down the critical role of the *social* aspect of prior experiences. Neither rational learning, nor income effects, pay-related mood, disappointment aversion or reference-dependence can explain our results. Second, delving into the underlying mechanisms, our findings highlight the important role of non-standard belief patterns

¹This is not to say that institutions and individual primitives are unrelated entities (Greif, 1994).

as a driver of social experience effects.

In the experiment, we employed a 2 (positive vs. negative) \times 2 (social vs. nonsocial) factorial design: specifically, we exogenously varied whether subjects made positive or negative experiences as well as whether these experiences were social in nature or determined by a random device. The experiment had two stages: In Stage 2, we measured subjects' willingness to trust by employing a variant of Berg, Dickhaut and McCabe's (1995) trust game. Subjects decided to trust or not to trust a randomly assigned second-mover subject.² In addition, we elicited subjects' beliefs about the trustworthiness of second-movers. In Stage 1, we implemented experiences in a controlled way. Subjects worked on a real effort task where it was uncertain whether they would be paid for completing it. Whether subjects were paid or not was determined as follows: In the nonsocial condition, a random device determined subjects' pay. In the social condition, subjects were randomly assigned to dictator subjects, who determined their pay.³ Thus, we implemented exogenous variation in whether subjects made a positive—they were paid—or negative—they were not paid—experience and whether this experience was social or nonsocial in nature. Importantly, subjects in the social treatment were informed about the distribution of prosocial and selfish dictators in Stage 1 before moving to Stage 2. Therefore, negative and positive experiences in the social condition did not contain any objective information about the level of prosociality in society. In other words, rational learning cannot explain potential experience effects in the social treatment.

Our identification strategy builds on a difference-in-differences analysis where we compare experience effects on subjects' willingness to trust between the social and the nonsocial condition. This allows us to isolate the social aspect of experience effects and rules out outcome-based explanations such as income effects, pay-related mood, disappointment aversion and reference-dependence. We find a significant and sizeable experience effect on trust behavior in the social condition. Subjects who experienced being paid prior to the trust decision showed a greater willingness to trust subjects who experienced not being paid. The amount entrusted is more than twice as large after positive than negative social experiences. Importantly, difference-in-difference

²A vast literature centers around the trust game and among others shows that it is reducible to individual primitives: beliefs regarding the trustworthiness of the involved parties (Costa-Gomes, Huck and Weizsäcker, 2014); preferences with respect to “social risk taking,” for instance, betrayal aversion (Bohnet and Zeckhauser, 2004); and preferences with respect to the outcomes of others (Cox, 2004; Ashraf, Bohnet and Piankov, 2006). See, for instance, Fehr (2009) for an overview. A recent literature also looks at the *biological* foundations of trust (see, e.g., Fehr, Fischbacher and Kosfeld, 2005; Kosfeld, Heinrichs, Zak, Fischbacher and Fehr, 2005).

³Dictator subjects did not participate in the trust game.

regressions reveal that this treatment effect is significantly larger than in the nonsocial experiment, providing *causal* evidence for *social* experience effects on trust.

In a second step we attempt to uncover the mechanisms underlying social experience effects. We focus on non-standard belief effects as a potential channel.⁴ Beliefs about the trustworthiness of others are arguably a key determinant of trust. A potential mechanism could be that subjects' beliefs about others' trustworthiness are affected disproportionately by past experiences in similar contexts that easily come to mind and then dominate attention. Such an account of non-standard experience-based belief formation relates to recent models of boundedly rational belief formation (e.g. Gennaioli and Shleifer (2010); Bordalo, Coffman, Gennaioli and Shleifer (2016)) and postulates that when contemplating about whether or not to trust others, prior *social* experiences become salient and shape the corresponding process of belief formation.⁵ We exploit our measure of subjects' beliefs about the trustworthiness of other subjects. Again relying on a difference-in-difference identification approach, we find that beliefs about the trustworthiness of others are affected by social experiences, but not by non-social experiences.

This paper contributes to several literatures. Falk, Becker, Dohmen, Enke, Huffman and Sunde (2015) document substantial within-country heterogeneity of trust, based on a globally representative dataset. In fact, this heterogeneity is greater than the corresponding between-country heterogeneity. Importantly, little is known about the determinants of the large variation of trust within countries, i.e., within a given institutional framework. Our results can be viewed as a first step to uncover this heterogeneity by underscoring the importance of *social* experiences as a driver of differences in individuals' willingness to trust within institutional settings.⁶

Our findings also relate to the recent literature on the influence of macroeconomic experiences on individuals stock market participation (Malmendier and Nagel, 2011),

⁴As outlined above, neither our findings on trust nor our findings on beliefs about others' trustworthiness can be explained by rational learning.

⁵Specifically, when facing a trust decision, prior social experiences likely come to mind and disproportionately shape beliefs about others' trustworthiness, where positive experiences cause optimistic beliefs while negative experiences cause pessimism. Nonsocial experiences are arguably less similar to the trust situation and thus likely come to mind less easily, implying a smaller influence on the belief formation process. See Bordalo, Gennaioli and Shleifer (2017) for an account of similarity-based cognition in the context of memory and choice.

⁶Relatedly, Dohmen, Falk, Huffman and Sunde (2012) and Kosse, Deckers, Schildberg-Horisch and Falk (2016) study effects of the social environment on trust: Dohmen et al. (2012) document strong associations of trust attitudes between individuals and their parents in Germany (see also Nunn and Wantchekon, 2011); Kosse et al. (2016) show causal evidence that providing low socio-economic-status children with a (trustworthy) mentor for the duration of a year fosters their trust. While these studies cannot point to specific mechanisms through which social environment effects operate, our results contribute by showing that specific and well-defined social experiences affect trust.

inflation expectations (Malmendier and Nagel, 2016), and preference for redistribution (Giuliano and Spilimbergo, 2014). By studying experience effects in a controlled laboratory environment, we can highlight patterns that are difficult to identify with observational data. First of all, our findings underscore the paramount importance of *personal* experiences. In our experiment, all subjects knew that other subjects made positive and negative experiences. However, only personal experiences affected behavior. Second, our findings reveal that non-standard belief patterns seem to be a key ingredient of experience effects.

Relatedly, our results contribute to the literature on non-standard belief formation. Following Tversky and Kahneman (1974), individuals’ belief formation is increasingly understood to be affected by specific heuristics, most prominently availability (Tversky and Kahneman, 1973) and representativeness (Gennaioli and Shleifer, 2010; Bordalo et al., 2016) which allow individuals to make quick but often biased probabilistic judgments, as well as limited attention more broadly (Enke and Zimmermann, 2017; Enke, 2017). In this paper, we provide evidence that belief formation is affected by recent personal experiences that have an associative link to the specific decision context at hand. When contemplating about the trustworthiness of another person, recent social interactions—but not non-social experiences—seem to come to mind and influence beliefs—even if these encounters did not contain any relevant information.

The remainder of this paper is organized as follows. We present the experimental design in Section 2 and show the empirical results of the experiments in Section 3. Section 4 concludes.

2 Experimental Design

We wanted to implement an experimental environment that would meet the following challenges: (i) expose subjects to random experiences to establish causality; (ii) switch the social component of experiences on and off; (iii) have a clean incentivized measure of trust; (iv) implement experiences that are in a fully rational sense unrelated to the trust decision.

The basic structure of our experiment consisted of two stages. In Stage 2, we measured the willingness to trust others using a standard trust game. In Stage 1, subjects were randomly exposed to experiences. We employed a simple 2×2 design. In the first dimension, we exogenously vary exposure to *negative* versus *positive* experiences. In the second dimension, we exogenously vary whether subjects’ experiences are caused by an unrelated third party (*social* treatment) or by a random choice device (*non-social*

treatment). A difference-in-differences analysis comparing experience effects between the social and the non-social treatment allows us to identify *causal social* experience effects on individuals' willingness to trust.

2.1 Stage 1 - Social Treatment

In the social treatment, subjects were randomly assigned to distinct roles—dictator, trustor, and trustee. In the first stage of the social treatment, dictators and trustors participated in a production dictator game. In the second stage, trustor and trustee played a trust game. Thus, only the trustors participated in both stages, and they constitute our group of interest. Trustors knew that subjects in the role of the dictator and the trustee subjects only participated in one of the two stages and that they knew nothing about the game they did not participate in.

In the production dictator game (DG), the dictators and the trustors were paired randomly in groups of two. Within each group, both subjects worked on a real-effort task. The real-effort task required subjects to type multiple combinations of letters and numbers, for instance, Ldh24tHuixY5Th21o7FzTT35, into the keyboard. Subjects had as much time as they needed to correctly type 10 different combinations. Completing the real-effort task generated €5, respectively, that were stored in a joint virtual account.

The dictators could then choose to keep the entire amount of money in the account (€10) for themselves or split it evenly with the other subject (the trustor). Thus, depending on the dictator's decision, the trustor either received €5 or no payment at all. The task was deliberately simple and all subjects completed it. That way, in Stage 1 we exposed all trustors to either a positive or negative experience.

We decided to implement a real-effort experiment where both the dictator and the trustor had to work equally hard to jointly generate €10, because we wanted to make the social norm of sharing equally very salient. Based on this norm, we define receiving no money from the dictator in the production dictator game as a negative social experience, and obtaining €5 as a positive social experience.⁷

In terms of procedures, it is important to note that trustors were randomly matched with a group of dictators that had already made their decisions in earlier experimental sessions. In this group of dictators, exactly half chose the equal split and the other half

⁷Arguably, trustors that do not receive their fair share of the produced €10 are likely to perceive this as a negative social interaction, as has been found in numerous previous studies on the (production) DG (for instance, Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Konow, 2000; Falk and Fischbacher, 2006; Cappelen, Hole, Sørensen and Tungodden, 2007; Andreoni and Bernheim, 2009; Krupka and Weber, 2013).

kept everything for themselves. After the trustors were informed whether their dictator shared equally or not, they learned the actual distribution with which trustors in the experiment received the €5 payment or not. Thus, they learned that in 50% of all cases, trustors received the €5 payment and in 50% of all cases, trustors received no payment. That way, we designed the experience of positive and negative social interactions to contain no objective information about the distribution of “selfish” and “unselfish” subjects in the pool. Hence, rational trustors should hold identical beliefs about the likelihood to encounter “unselfish” or “selfish” subjects later on in the experiment, regardless of the nature of their prior social interaction. In other words, we rule out rational learning from experiences as a driver of experience effects in our setting.

2.2 Stage 1 - Non-social Treatment

In the non-social treatment we removed the social component of the experience in Stage 1, keeping everything else constant. Specifically, instead of having a dictator decide whether trustors were paid for the real-effort task, trustors in the control experiment were paid based on a 50-50 random choice device.

By manipulating only the origin of the decision that determined whether trustors got paid or not in Stage 1, we kept the potential for income effects and pay-related mood or disappointment effects constant between the treatments. After all, trustors provided the same effort in the social and non-social treatment, and in both treatments only half of the trustors received a payment for the exerted effort. The only difference between the conditions was the social aspect of the Stage-1 experience. Thus, a comparison of experience effects on trust between the the social and the non-social treatment allows us to isolate the net effect of *social* experiences.

2.3 Stage 2 - Trust Game

Stage 2 did not differ between the social and the non-social treatment. We measured subjects willingness to trust and elicited their beliefs about the trustworthiness of others.

Willingness to Trust: In the trust game (TG), trustors and trustees were randomly paired in groups of two. Within each group, both subjects were endowed with €5. In a sequential setup, the trustor could first send any amount between €0 and €5 (in 10-cent intervals) to the second-mover subject (the trustee). The amount received by

the trustee was doubled. The trustee then decided how much money to send back.⁸ The amount sent by the trustor measures their willingness to trust and will be our outcome of interest.

Beliefs about Trustworthiness: We elicited the trustors' beliefs about the trustworthiness of the trustees after we measured their willingness to trust. We asked subjects' the average amount trustees send back in case a trustor sends €1, €3, and €5.⁹

2.4 Procedures

The experiment was conducted in the BonnEconLab at the University of Bonn and was computerised using softwares z-Tree, ORSEE, and BoXS (Fischbacher, 2007; Greiner, 2004, and Seithe, 2012). In total, 258 subjects participated in the social treatment (96 dictators, 96 first movers and 96 second movers), and 182 subjects participated in the nonsocial treatment (91 first movers and 91 second movers).¹⁰ Average earnings were €4.50 for trustors, €7.50 for dictators, and €7.10 for trustees.

3 Evidence on Social Experience Effects

First, we look at results separately for the social and the non-social treatment. Then, we compare experience effects between the treatments in a difference-in-differences analysis in order to cleanly identify causal effects of *social* experiences on trust. In a final step, we delve into the mechanisms underlying the social experience effects on trust.

3.1 Main Results

Figures 1 and 2 capture our main results. Figure 1 shows the average entrusted amounts for the social treatment (left panel) and the non-social treatment (right panel), sepa-

⁸The trustees could send back any amount between between €0 and the sum of their endowment and the doubled amount sent to them by the first movers. For instance, if a trustor sent €5, the trustee could send back any amount between €0 and €15. In case a trustor sent 50 cents, the trustee could send back any amount between €0 and €6. We used the strategy method to elicit the behavior of the trustees (Brandts and Charness, 2000, 2011).

⁹We incentivized trustors by paying €0.50 for each time their guess was within the €0.20 range of the correct answer.

¹⁰Because of software malfunction, data are missing for a single trustor from the trust game of the main experiment.

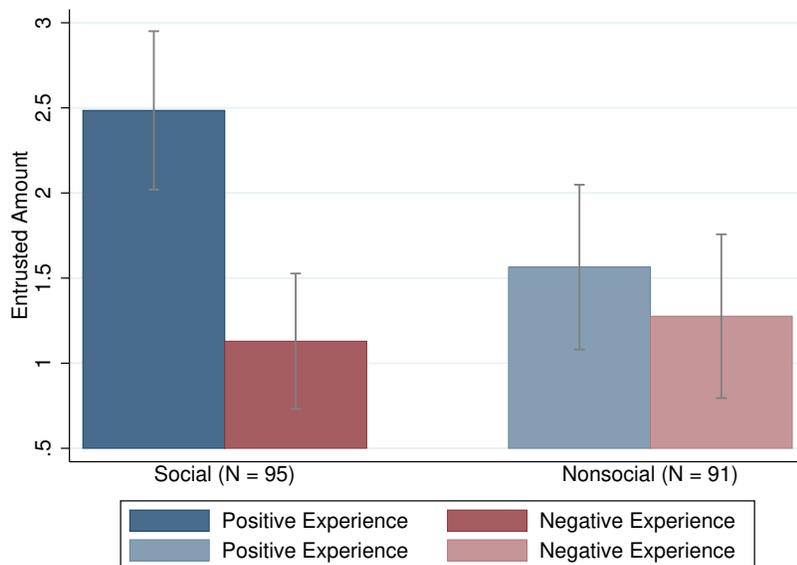


Figure 1: Means of entrusted amounts per treatment for the social (left panel) and non-social (right panel) treatment.

rated by positive experiences and negative experiences. Figure 2 presents the corresponding distributions.

The left panel of Figure 1 reveals that trustors that made a positive social experience in Stage 1 sent on average about half of their endowment (€2.49) to the second mover in the trust game, while trustors that made a negative social experience sent less than a quarter of their endowment (€1.13). This difference in trust is substantial and significant (see Columns (1) and (2) of Table 1).¹¹ A comparison of the distributions of entrusted amounts of money (see left panel of Figure 2) confirms this result. Trustors entrust larger amounts more frequently after positive than negative experiences in the social treatments.¹²

Result 1. *Subjects display a greater willingness to trust following positive experiences in prior positive social interactions, compared to prior negative experiences.*

The right panel(s) of Figures 1 and 2 reveal that trustors sent fairly similar amounts of money to their respective second movers, irrespective of whether they made a positive or negative non-social experience in Stage 1. Specifically, trustors that were exposed to a negative experience in Stage 1 sent on average €0.29 less compared to those that were

¹¹*P*-values reported in this paper always refer to two-sided tests.

¹²Non-parametric Mann–Whitney *U* and Kolmogorov–Smirnov tests confirm this result and yield *P*-values below 0.001.

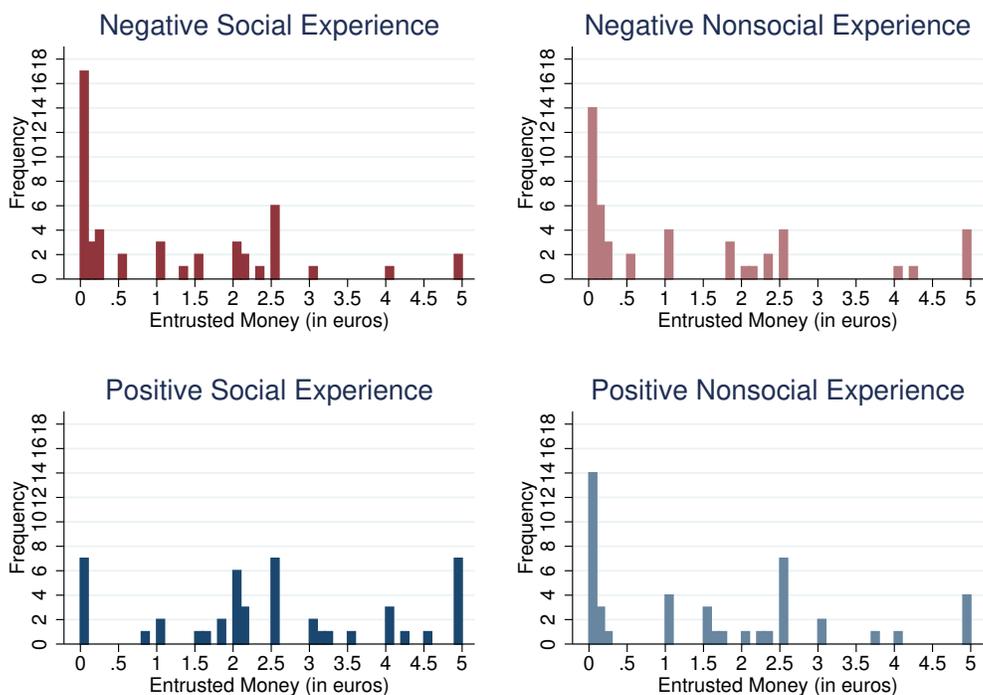


Figure 2: Entrusted Amounts in the Social and Nonsocial treatments, separately for positive (lower panel) and negative (upper panel) experiences in Stage 1.

lucky and got paid in Stage 1. This treatment effect is not statistically significant (see columns (3) and (4) of Table 1). The distributions of entrusted amounts of money reveal very similar trust behavior between the negative and positive experience treatments (see Figure 2).¹³

In order to flesh out the social aspect experience effects properly, we compare the social and non-social experience effects in a difference-in-difference linear regression (see Columns (5) and (6) of Table 1). The corresponding coefficient of the interaction is negative and significant in both specifications, establishing our main finding: personal experiences of *social* interactions causally affect individuals' willingness to trust beyond nonsocial negative or positive experiences.

Result 2. *The experience effects on trust in the social treatment is significantly larger compared to the nonsocial treatment.*

Taken together, our results reveal specific causal experience effects on trust. Prior exposure to social interactions shapes subjects' willingness to trust others. These

¹³Similarly, employing Mann–Whitney U and Kolmogorov–Smirnov tests—which yield P -values of 0.4527 and 0.737, respectively—we do not find support that they differ significantly.

Table 1: Comparing Experience Effects on Trust between Social and Nonsocial Treatments

	OLS: Entrusted Amount					
	Social Treatment		Non-social Treatment		Diff-in-Diff Analysis of Social and Non-social	
	(1)	(2)	(3)	(4)	(5)	(6)
1 if Pos. Exp.	1.36*** (0.30)	1.35*** (0.31)	0.29 (0.34)	0.29 (0.35)	1.36*** (0.30)	1.33*** (0.31)
1 if Nonsocial					0.15 (0.31)	0.11 (0.33)
1 if Pos. & Nonsocial Exp.					-1.07** (0.46)	-1.04** (0.46)
1 if Female Gender		-0.09 (0.39)		-0.34 (0.38)		-0.22 (0.27)
Age & IQ Controls		Yes		Yes		Yes
Constant	1.13*** (0.20)	1.18*** (0.41)	1.28*** (0.24)	1.47*** (0.32)	1.13*** (0.20)	1.29** (0.32)
Observations	95	95	91	91	186	186
Adjusted R^2	0.18	0.14	0.00	-0.03	0.09	0.08

In Columns (1) and (3), we regress trust on a condition dummy (= 1 for positive experience) for the social and the nonsocial treatment, respectively. Columns (2) and (4) show the former regressions when adding individual controls—gender, age and a proxy for IQ. In Columns (5) and (6), we regress the expected return on an experience dummy (= 1 for positive experience) and a treatment dummy (= 1 for the nonsocial treatment) and an interaction variable between the two dummies. Robust standard errors in parentheses. Significant at the 1 (5) [10] percent level: *** (**) [*].

experience effects are specific in the sense that they can be cleanly traced back to social factors. In the next section we analyze the underlying mechanisms of these findings. In Appendix A we examine who benefits from the efficiency gains that result from higher trust after positive social experiences.

3.2 Drivers of Social Experience Effects: Beliefs

Our results provide clean evidence that personal experiences of prior social interactions are an important determinant of individuals’ willingness to trust others. Result 2 implies that this effect cannot be due to income effects, pay-related mood, disappointment or reference-dependence effects, as such alternative explanations would also have predicted experience effects in the non-social treatment.

Previous research has demonstrated that trust behavior is reducible to two individual primitives: beliefs about the trustworthiness of others (Costa-Gomes et al., 2014) as well as preferences with respect to social risk taking (Bohnet and Zeckhauser, 2004) and outcomes of others (Cox, 2004; Ashraf et al., 2006). In the following, we focus on

beliefs as a potential channel through which experience effects might operate.¹⁴

First recall that by design, Result 2 cannot be explained by rational learning, since all trustors in the social experiment knew the frequency with which dictators paid or did not pay trustor subjects. Therefore, irrespective of their individual experience, all trustors obtained the same objective information from Stage 1. To further substantiate this point, we actually asked trustors at the end of the experiment whether they still recall the frequencies with which dictator subjects paid or did not pay trustors in Stage 1: We find that 84 out of 95 trustors recalled the correct frequencies at the end of the experiment and that our results are robust to including only these 84 subjects who correctly recalled the frequencies (see Appendix A).

Even though we can exclude rational learning, non-standard belief patterns could potentially explain social experience effects. Specifically, akin to accounts in Gennaioli and Shleifer (2010) and Bordalo et al. (2016), when trustors contemplate about whether or not to trust, recent encounters with other individuals in somewhat similar situations may easily come to mind and affect the belief formation process, even if these encounters are not informative from a rational perspective. Arguably, the personal experiences of the trustors in Stage 1 of the social treatment will be directly available to them. For trustors with negative social experiences in Stage 1, selfish behavior will likely be very salient. Analogously, fair behavior may be particularly salient to trustors with positive social experiences in Stage 1. At the same time, the nonsocial experiences of trustors in the nonsocial treatment presumably are less likely to come to mind when facing the trust decision in stage 2, since these experiences might not be associated with fair or unfair behavior, but rather with good or bad luck.

We investigate such a non-standard belief channel by considering trustors' beliefs about the trustworthiness of trustees, i.e., how much money they expected trustees to send back on average in case €1, €3, and €5 were sent.¹⁵ We analyze trustors' beliefs on the treatment cell level. We aggregated the three belief measures into one measure by taking the average of the expected rates of return implied by the three stated beliefs. Figure 3 shows the means of average expected money returned per treatment cell (as well as the actual returned amounts of trustees).

Trustors' beliefs seem to differ substantially between negative and positive experiences in the social treatment, while they do not differ much for the non-social treat-

¹⁴We discuss the potential role of preferences in the concluding remarks as well as in Appendix B.

¹⁵Beliefs are rather well-calibrated. Mean beliefs of trustors across all treatments are fairly similar to the actual mean amounts trustees intended to send back (see Figure 5 in Appendix A). In addition stated beliefs are positively associated with actual behavior (see Table 5 in Appendix A).

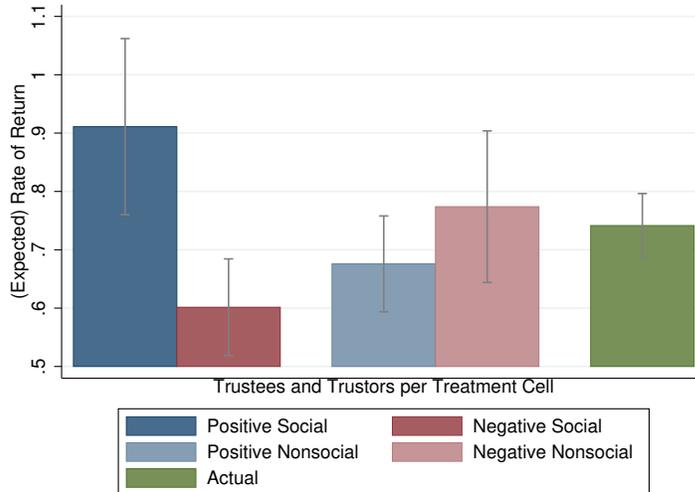


Figure 3: Means of Average Expected Returns for the Social treatment (left panel) and the Nonsocial treatment (right panel), separately for positive (paid in Stage 1) and negative (not paid in Stage 1) experiences in Stage 1.

ment.¹⁶ After a negative experience in the social experiment, trustors' average expected return is €0.60. It is €0.91 after the corresponding positive experience. This difference of €0.31 is significantly different from zero in an OLS regression of the expected returns on an experience dummy, see Columns (1) and (2) of Table 2. Thus, trustors are substantially less optimistic about the others' trustworthiness after a negative than a positive social experience.¹⁷ We find a much smaller difference with the opposite sign for the nonsocial experiment: Trustors' average expected return is €0.77 after a negative experience and €0.68 after a positive experience in the nonsocial experiment. This difference is not significantly different from zero in an OLS regression, see Columns (3) and (4) of Table 2.

To complete our corresponding analysis, we compare the experience effects on beliefs between treatments. We find that the experience effect on beliefs in the social treatment is significantly larger than that in the nonsocial experiment (see Columns (5) and (6) of Table 2. This implies that social experiences, as opposed to non-social experiences, have specific, non-standard effects on beliefs about others' trustworthiness.

Result 3. *The experience effects on trustors' expected return of entrusting money in the social experiment is significantly larger than in the nonsocial experiment.*

¹⁶This pattern also emerges when looking at the expected rates of return for each individual belief measure, see Figure 6 in Appendix A.

¹⁷Again, notice that this holds despite the fact that subjects obtained the same objective information in both conditions regarding the frequency with which dictators shared money in Stage 1.

Table 2: Comparing Experience Effects on Beliefs between Social and Nonsocial Treatments

	OLS: Average Expected Rate of Returns					
	Social Treatment		Non-social Treatment		Diff-in-Diff Analysis of Social and Non-social	
	(1)	(2)	(3)	(4)	(5)	(6)
1 if Pos. Exp.	0.31** (0.12)	0.30** (0.12)	-0.10 (0.12)	-0.08 (0.11)	0.31*** (0.12)	0.30** (0.12)
1 if Nonsocial					0.17 (0.12)	0.17 (0.13)
1 if Pos. & Nonsocial Exp.					-0.41** (0.17)	-0.39** (0.16)
1 if Female Gender		-0.10 (0.14)		-0.10 (0.11)		-0.11 (0.09)
Age & IQ Controls		Yes		Yes		Yes
Constant	0.60*** (0.07)	0.68*** (0.14)	0.77*** (0.10)	0.83*** (0.11)	0.60*** (0.07)	0.67*** (0.10)
Observations	95	95	91	91	186	186
Adjusted R^2	0.04	0.05	0.01	0.02	0.03	0.03

In Columns (1) and (3), we regress the expected return on a condition dummy (= 1 for positive experience) for the social and the nonsocial treatment, respectively. Columns (2) and (4) show the former regressions when adding individual controls—gender, age and a proxy for IQ. In Columns (5) and (6), we regress the expected return on an experience dummy (= 1 for positive experience) and a treatment dummy (= 1 for the nonsocial treatment) and an interaction variable between the two dummies. Robust standard errors in parentheses. Significant at the 1 (5) [10] percent level: *** (**) [*].

4 Conclusion

Our results show a substantial effect of personal experiences from negative versus positive social interactions on the willingness to trust others. Findings from a nonsocial control condition reveal that the social aspect of experiences is a key driver of our results. Delving into the underlying mechanisms, our findings suggest that experience effects on trust operate via non-standard belief patterns, where experiences shape beliefs about the trustworthiness of others.

These findings provide a first step to uncover the pronounced heterogeneity of trust within given institutional settings that the literature has identified, by underscoring the importance of past experiences as a driver of differences in individuals’ willingness to trust. Our results also relate to the literature on experience effects more broadly by emphasizing the crucial role of *personal* experiences as well as by identifying beliefs as a crucial mediator of experience effects. Furthermore, based on our findings, policy makers and workplace designers who are interested in promoting trust should keep spillover effects from unrelated personal experiences in mind. By encouraging fairness

between individuals, trust may be fostered as a welcomed side effect and virtuous circles may be initiated.¹⁸

Finally, notice that while we do find clean evidence for a belief channel, this does not imply that social experiences may not also operate via other channels, in particular preferences. In fact, Table 6 in the Appendix B provides suggestive evidence that an effect of prior social experiences that is not based on beliefs is likely to be present as well. We use linear regressions to analyze experiences effects on trustors' willingness to trust, while controlling for beliefs. We find that the social experience effect is indeed reduced when controlling for average expected returns. The size of the treatment effect in the social treatment when controlling for trustors' beliefs is substantially reduced. Despite of these reductions, the (remaining) effect sizes are still large and significant, suggesting that unrelated social experiences might drive behavior beyond pure belief effects. In Appendix B, we discuss in detail how, e.g., betrayal aversion, altruism, and indirect reciprocity may be affected by unrelated social experiences and, in turn, potentially explain parts of our findings.

¹⁸However, one should be cautious, as trust may be promoted in situations that lead to exploitation. In our TG, for instance, first movers who experienced fair treatment earned 54 Cents on average less than first movers who experienced unfair treatment.

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Appendix A - Robustness and Additional Findings

Robustness of Main Result

Table 3: Comparing Experience Effects on Trust between Social and Nonsocial Treatments - Reduced Sample

	OLS: Entrusted Amount							
	Social Treatment			Nonsocial Treatment		Difference-in-Differences Analysis of Social and Nonsocial Treatment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 if Pos. Exp.	1.36*** (0.30)	1.35*** (0.31)	1.35*** (0.34)	0.29 (0.34)	0.29 (0.35)	1.36*** (0.30)	1.33*** (0.31)	1.34*** (0.33)
1 if Nonsocial						0.15 (0.31)	0.11 (0.33)	0.07 (0.34)
1 if Pos. & Nonsocial Exp.						-1.07** (0.46)	-1.04** (0.46)	-1.04** (0.48)
1 if Female Gender		-0.09 (0.39)	-0.02 (0.41)		-0.34 (0.38)		-0.22 (0.27)	-0.18 (0.28)
Age & IQ Controls		Yes	Yes		Yes		Yes	Yes
Constant	1.13*** (0.20)	1.18*** (0.41)	1.17*** (0.43)	1.28*** (0.24)	1.47*** (0.32)	1.13*** (0.20)	1.29** (0.32)	1.30*** (0.33)
Sample Observations	Full 95	Full 95	Partial 84	Full 91	Full 91	Full 186	Full 186	Partial 175
Adjusted R^2	0.18	0.14	0.13	0.00	-0.03	0.09	0.08	0.08

In Columns (1) and (4), we regress the entrusted amount on a condition dummy (= 1 for positive experience) for the social and the nonsocial treatment, respectively. Columns (2) and (3) show the former regression when adding individual controls—gender, age and a proxy for IQ—(2) as well as taking only the sample of subjects who recalled the correct frequency of dictator behavior (3). Column (5) shows the regression of (4) with demographic controls. In Column (6), we regress the entrusted amount on a condition dummy (= 1 for positive experience) and a treatment dummy (= 1 for the nonsocial treatment) and an interaction variable between the two dummies. In Columns (7) and (8) show the regression of Column (6) when adding demographic controls (7) as well as taking only the sample of subjects who recalled the correct frequency of dictator behavior (8). We state robust standard errors in parentheses. Significant at the 1 (5) [10] percent level: *** (**) [*].

Expected Earnings

Our key result is that positive social experiences enhance subjects' willingness to trust. In the following, we analyze whether trustors benefit from the resulting efficiency gains. In order to assess this, we calculate the expected earnings for each trustor based on their actual willingness to trust and on the average intentions of trustees. Recall that we used the strategy method to elicit trustees' willingness to send back money. That is, trustees stated how much they would send back for each potential amount trustors could have send to them. Figure 4 shows trustees' intended average rate of return for any given entrusted amount. Overall, trustees intended to return less than 75% of what

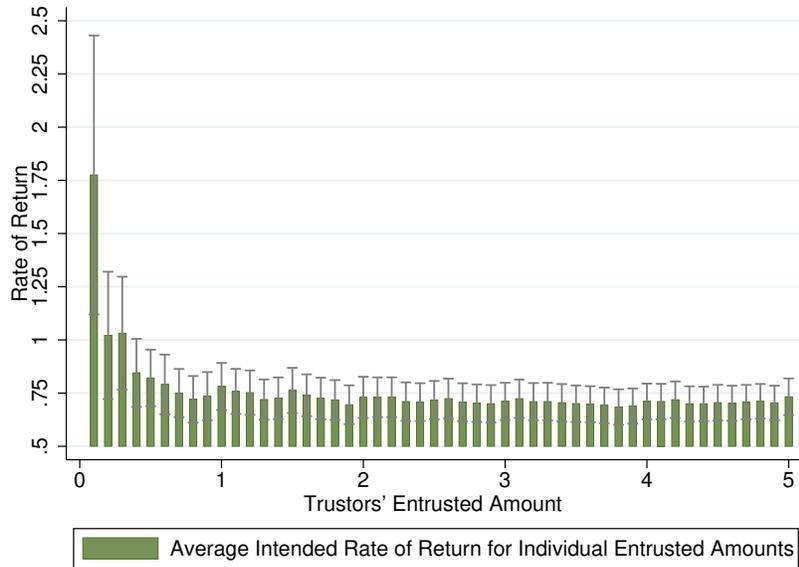


Figure 4: Means of how much trustees intended to send back for each entrusted amount.

Table 4: Comparing Experience Effects on Expected Earnings between Social and Nonsocial Treatments

	OLS: Expected Earnings					
	Social Treatment		Non-social Treatment		Diff-in-Diff Analysis of Social and Non-social	
	(1)	(2)	(3)	(4)	(5)	(6)
1 if Pos. Exp.	-0.40*** (0.09)	-0.39*** (0.09)	-0.09 (0.09)	-0.09 (0.10)	-0.40*** (0.09)	-0.39*** (0.09)
1 if Nonsocial					-0.03 (0.09)	-0.02 (0.09)
1 if Pos. & Nonsocial Exp.					0.30** (0.13)	0.30** (0.13)
1 if Female Gender		0.03 (0.11)		0.09 (0.11)		0.06 (0.08)
Age & IQ Controls		Yes		Yes		Yes
Constant	4.71*** (0.06)	4.69*** (0.11)	4.67*** (0.07)	4.62*** (0.10)	4.71*** (0.06)	4.66*** (0.09)
Observations	95	95	91	91	186	186
Adjusted R ²	0.18	0.15	0.00	-0.03	0.10	0.09

In Columns (1) and (4), we regress the expected earnings of trustors on a condition dummy (= 1 for positive experience) for the social and the nonsocial treatment, respectively. Columns (2) and (4) show the former regressions when adding individual controls—gender, age and a proxy for IQ. In Columns (5) and (6), we regress the expected return on an experience dummy (= 1 for positive experience) and a treatment dummy (= 1 for the nonsocial treatment) and an interaction variable between the two dummies. Robust standard errors in parentheses. Significant at the 1 (5) [10] percent level: *** (**) [*].

was entrusted to them.¹⁹ That is, trustors lost on average money when sending positive

¹⁹This finding is consistent with what studies typically find for this type of trust game (see, for instance Camerer, 2003; Ashraf et al., 2006).

amounts to trustees. This finding suggests that personal experiences of positive social interactions lead to lower expected earnings. This is precisely what we find. Positive social experiences significantly reduced trustors' expected earnings by €0.40 relative to negative social experiences, see Columns (1), (2), and (3) of Table 4. This treatment effect is significantly larger than the experience effect in nonsocial experiment, see Columns (6), (7), and (8) of Table 4. Therefore, the personal experience effect of unrelated social interactions affects not only trustors' willingness to trust, but also their expected outcomes. While positive social interactions decrease expected outcomes of trustors in our experiment—by improving trust towards not trustworthy trustees—, it could well be the case that in different situations—where trustees are substantially more trustworthy—the relationship between positive social interactions and expected outcomes of trustors are positive.

Beliefs

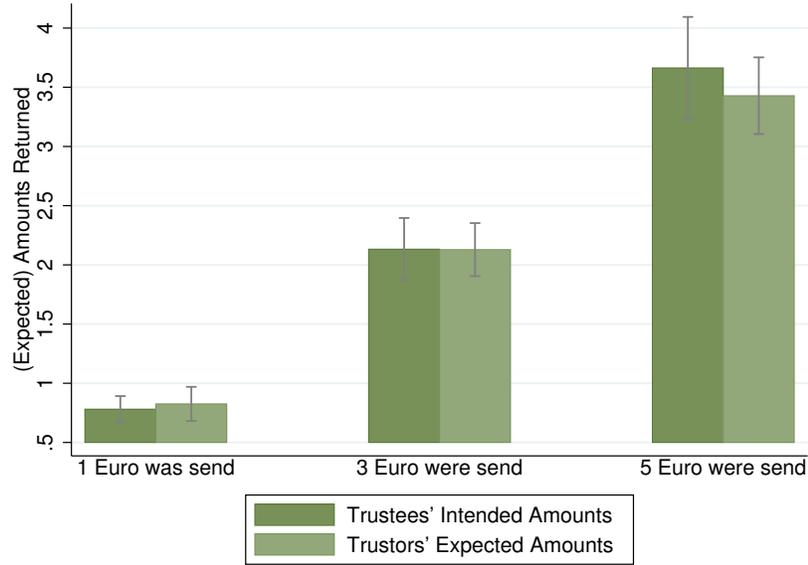


Figure 5: Means of how much trustees intended to send back and of how much trustors expected trustees to send back.

We investigate such a non-standard belief channel by considering trustors' beliefs about the trustworthiness of trustees, i.e., how much money they expected trustees send back on average in case €1, €3, and €5 were sent. Beliefs are rather well-calibrated. Mean beliefs of trustors across all treatments are fairly similar to the actual mean amounts trustees intended to send back, Figure 5. In addition stated beliefs are positively associated with actual behavior, see Table 5.

Table 5: Relationship Between Trustors' Willingness to Trust and Expected Returns

	OLS: Entrusted Amount			
	(1)	(2)	(3)	(4)
€1-Belief	0.47*** (0.12)			
€3-Belief		0.36*** (0.09)		
€5-Belief			0.20*** (0.05)	
Average Expected Rate of Return				0.95*** (0.23)
Constant	1.22*** (0.15)	0.84*** (0.20)	0.92*** (0.20)	0.91*** (0.19)
Observations	186	186	186	186
Adjusted R^2	0.08	0.12	0.07	0.11

We regress the entrusted amount on beliefs measures. In Column (1), we take the belief how much trustors expected trustees return after €1 was sent to them. In Column (2), we take the belief how much trustors expected trustees return after €3 was sent to them. In Column (3), we take the belief how much trustors expected trustees return after €5 was sent to them. In Column (4), we take the average expected rate of return, which we calculate from all three beliefs questions. We state robust standard errors in parentheses. Significant at the 1 (5) [10] percent level: *** (**) [*].

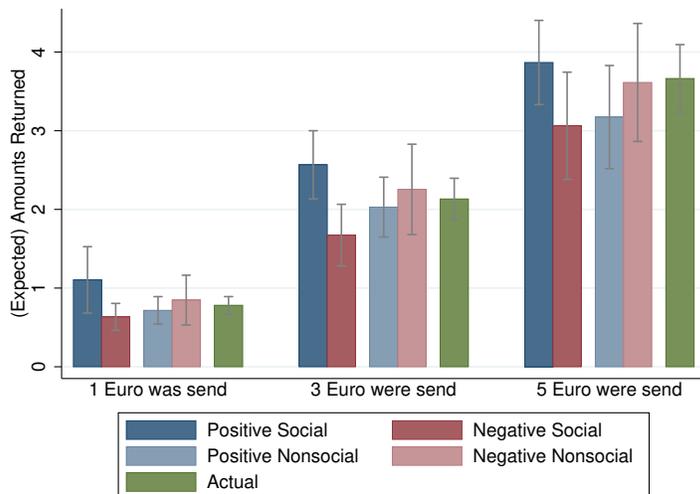


Figure 6: Means of (expected) money send back by trustees. The expected amounts are stated separately for the social and the nonsocial treatments—separately for positive and negative experiences in Stage 1.

Appendix B - Preference Channel

Our results suggest that non-standard beliefs drive unrelated social experience effects, while other important factors seem to be at play as well. In the following, we discuss these in more detail. In doing so, we focus on the main determinants of trust besides beliefs that have been established by the economic literature—that is, preferences regarding social risk taking (Bohnet and Zeckhauser, 2004) and outcomes of others (Cox, 2004; Ashraf et al., 2006)—as well as indirect reciprocity. While our experiments were designed to test whether unrelated social experiences affect trust and whether non-standard beliefs are at play, we cannot discriminate between the different potential preference channels.

Betrayal Aversion Trusting others is a risky endeavour. Bohnet and Zeckhauser (2004) have shown that individuals’ willingness to trust others is characterized by betrayal aversion (rather than plain risk aversion). Betrayal aversion could explain our findings in the case that positive and negative unrelated social experiences differentially affect individuals’ attitudes towards betrayal. Bohnet, Herrmann and Zeckhauser (2010) provide suggestive evidence for such a relationship. Bohnet et al. (2010) find that Gulf residents demand higher trustworthiness to trust anonymous trustees than Western residents. Bohnet et al. (2010) argue that this could be explained by differences in reference points of trustworthiness, which result from differences in accustomed levels of trustworthiness. Betrayal aversion is stronger, the further believed trustworthiness is deviating from the reference point of trustworthiness.²⁰ Therefore, Gulf residents

²⁰While Gulf residents may develop trust primarily between family members, their reference point of trustworthiness regarding strangers is relative large. Western residents in turn produced trust

Table 6: Treatment Effects on Trust When Controlling for Beliefs

	OLS: Entrusted Amount			
	Social Treatment			
	w/o controlling for beliefs	with controlling for beliefs		
	(1)	(2)	(3)	(4)
1 if Pos. Exp.	1.36*** (0.30)	1.35*** (0.31)	1.06*** (0.31)	1.06*** (0.32)
Standardized Average Expected RoR			0.56*** (0.25)	0.56*** (0.15)
1 if Female Gender		-0.09 (0.39)		0.00 (0.37)
Age & IQ Controls		Yes		Yes
Constant	1.13*** (0.20)	1.18*** (0.41)	1.26*** (0.20)	1.24*** (0.37)
Observations	96	95	95	95
Adjusted R^2	0.17	0.14	0.28	0.25

In Columns (1) and (2) we regress the entrusted amount on an experience dummy (= 1 for positive experience) for the social treatment. In Column (2), we add individual controls—gender, age and a proxy for IQ. Columns (3) and (4) repeat the analyses while adding trustors’ expected returns as a control. Robust standard errors in parentheses. Significant at the 1 (5) [10] percent level: *** (**) [*].

anticipate betrayal aversion for lower trustworthiness than Western residents, which decreases their willingness to engage in trusting others.

Our findings are consistent with this account as long as negative unrelated social experiences increase the reference point of trustworthiness, while positive unrelated social experience decrease the reference point of trustworthiness. Accordingly, the willingness to trust others of betrayal averse trustors decreases in light of negative social experience and improves in light of positive social experiences.

Other-regarding Preferences Cox (2004); Ashraf et al. (2006) have shown that trust behavior is partly driven by individuals’ altruism regarding the outcomes of others. Our social experience effects could be driven by altruism if the following holds: Individuals’ altruism changes differentially between the positive and negative social experiences—even if those are caused by an unrelated third party; Negative unrelated social experiences lead trustors to care less for the outcome of their trustee and positive unrelated social experiences result in trustors caring more for the outcome of their trustee. If that would be the case, trustors’ willingness to trust is larger after positive than negative unrelated social experiences, since such positive experiences lead trustors to want that their trustee receive a larger outcome. Suggestive evidence that unrelated social experiences may affect altruism is presented by Kosse et al. (2016). Kosse et al. (2016) find that providing low socio-economic-status children with a mentor for the

because of formal rules, such as contract law, which accustomed them to a relatively low reference point of trustworthiness.

duration of a year fosters their altruism.

Indirect Reciprocity Another potential mechanism for how unrelated social experience affect trust could be indirect reciprocity. Upward indirect reciprocity (Nowak and Sigmund, 2005) predicts that kind and unkind treatment by someone may be reciprocated to an unrelated third party. In our context, Stage 1 induces experiences of kind and unkind social interactions, depending on treatment. Trustors may indirectly reciprocate their Stage 1 experience by sending a lower amount to the trustee after unkind social interactions rather than kind ones.

Appendix C - Instructions

Main experiment, first mover, F [UF] condition

Production Dictator Game

This experiment consists of two parts. Your payments for part 1 and part 2 are independent of each other. You get paid in cash at the end of the experiment.

You participate with a different subject in each part of the experiment.

A participant is randomly assigned from a group of participants to participate with you in part 1. Your participant only participated in part 1 and has no knowledge regarding part 2. Your participant took part in part 1 at an earlier date and is not present in the laboratory today.

A participant from another group of participants is randomly assigned to participate with you in part 2. Your participant in part 2 participated only in part 2 and has no knowledge regarding part 1. Your participant in part 2 took part in part 2 at an earlier date and is not present in the laboratory today.

Please note that: First, the groups from which your first and your second participant are randomly chosen from are not identical. No member from one group is also a member in the other group. Second, you will never know anything about your two participants and your identify is not revealed to anyone in this experiment.

[next screen]

Part 1

Your task and the task of your first participant is to type combinations of numbers and letters into the keyboard.

For instance: Ldh24tHuixY5Th21o7FzTT35

You will see combinations of numbers and letters on your screen. Type these numbers and letters one by one into the entry field below and do this case-sensitive. After you have typed a combination into the keyboard, press the “continue”-button. After you have typed a combination into the keyboard and pressed the button, a new combination appears.

[next screen]

For you:

You receive 25 cents for any correctly typed combination. You need to accumulate €2.50 and you have as much time as you need to do so. You cannot accumulate more or less than €2.50. The experiment will not continue unless you have accumulated €2.50.

For your participant:

Your participant also accumulated €2.50, not more and not less.

Shared account:

Both amounts of money are stored in a shared account. The conductors of the experiment double this amount such that €10 are stored in your joint account.

[next screen]

Your payment:

As explained above, €10 are on your joint account.

Your participant will decide how the €10 are shared between the two of you. Your participant can allocate the money fairly such that both of you receive €5. Your participant can also allocate the money unfairly such that both your participant receives the entire €10 receive.

As explained above, your participant already took part in this experiment at an earlier date. Thus, your participant has already decided how to allocate the €10. Your participate has already decided whether you receive €5 or whether you receive no payment at all.

Comprehension question: Which amount of money cannot be earned by you in part 1? €0 or €2.50 or €5.00.

[next screen]

Before you will be made aware that you do or do not receive €5, we would like you to accumulate €2.50 in the typing-task.

[next screen]

typing-task

[next screen]

Thank you for accumulating €2.50. Your participant has also accumulated €2.50. Additionally, the conductors of the experiment added another €5 to your joint account such that €10 are on your joint account.

You will be informed how much money your participant shared with you on the next screen.

[next screen]

Your participant has allocated the €10 such that you receive €5 [0]. Therefore, your payoff for part 1 is €5 [0].

Please notice that your participate was randomly assigned to you from a group of potential participants. In this group of potential participants 48 out of 96 shared the €10 evenly and 48 out of 96 kept the entire €10 for themselves.

Trust Game

[next screen]

In part 2 you and your participant receive two different roles: You are the sender. Your second participant is the re-sender. The both of you receive an endowment of €5. Part 2 has two stages.

Stage 1:

In Stage 1 you can send an amount of money to the re-sender. You can send any amount of money between €0 and €5 in steps of 10 cents. You can send €0, 10 cents, 20 cents, 30 cents, ..., 90 cents, €1, ..., €4.80, €4.90, €5. The amount of money that you send will be doubled by the conductors of the experiment. For instance, if you send €2.40, then the re-sender will receive €4.80, and if you send €0, your re-sender receives €0.

Stage 2:

In stage 2 the re-sender is asked to send back an amount of money to you. This amount is doubled. The re-sender chooses an amount between €0 and the sum of his endowment and the doubled amount that you send in the first stage.

Payments:

You will receive: $5 - \text{Amount that you send to the re-sender} + \text{Amount that the re-sender sends back to you}$.

The re-sender receives: $5 + 2 \times \text{Amount that you send to the re-sender} - \text{Amount that the re-sender sends back to you}$.

Example:

Consider the case that you send €2.40, then the re-sender received €4.80. The re-sender can send an amount of money between €0 and €9.80 back to you. For instance, the re-sender could send €3.60 back to you such that the overall amounts is shared fairly between the two of you which means that you both receive €6.20.

However, the re-sender could also behave unfairly and not send any amount of money back to you. In this case you would receive $5 - 2.40 = €2.60$ and the re-sender would receive €9.80.

Please notice that if you do not send any money to the re-sender, your payment for part 2 of the experiment will be €5.

[next screen]

Which amount of money do you want to send to the re-sender?

Control experiment, first mover, L [BL] condition

Production Lottery

This experiment consists of two parts. Your payments for part 1 and part 2 are independent of each other. You get paid in cash at the end of the experiment.

You participate with a different subject in part 2 of the experiment.

A participant from another group of participants is randomly assigned to participate with you in part 2. Your participant in part 2 participated only in part 2 and has no knowledge regarding part 1. Your participant in part 2 took part in part 2 at an earlier date and is not present in the laboratory today.

Please note that: You will never know anything about your participant and your identity is not revealed to anyone in this experiment.

[next screen]

Part 1

Your task is to type combinations of numbers and letters into the keyboard.

For instance: Ldh24tHuixY5Th21o7FzTT35

You will see combinations of numbers and letters on your screen. Type these numbers and letters one by one into the entry field below and do this case-sensitive. After you have typed a combination into the keyboard, press the “continue”-button. After you have typed a combination into the keyboard and pressed the button, a new combination appears.

[next screen]

For you:

You receive 25 cents for any correctly typed combination. You need to accumulate €2.50 and you have as much time as you need to do so. You cannot accumulate more or less than €2.50. The experiment will not continue unless you have accumulated €2.50.

Your account:

Your money is stored in an account. The conductors of the experiment double this amount such that €5 are stored in the account.

[next screen]

Your payment:

As explained above, €5 are on the account.

Whether you will receive the €5 will be determined randomly. You could receive the entire €5 or you could receive no payment at all.

Comprehension question: Which amount of money cannot be earned by you in part 1? €0 or €2.50 or €5.00.

[next screen]

Before you will be made aware that you do or do not receive €5, we would like you to accumulate €2.50 in the typing-task.

[next screen]

typing-task

[next screen]

Thank you for accumulating €2.50. The conductors of the experiment added another €2.50 to your account such that €5 are on your account.

You will be informed how whether you were randomly selected to receive the €5 or not on the next screen.

[next screen]

The computer randomly chose that you receive €5 [0] for part 1. Therefore, your payoff for part 1 is €5 [0].

Please notice that whether you earned €5 or not was randomly determined. You can think of it as if a ball was drawn from an urn. In the urn were 96 balls. 48 balls were red and 48 were blue. If a red ball would have been drawn, then you had received €5. If a blue ball would have been drawn, then you had received €0. In your case, a red [blue] ball was drawn randomly.

Trust Game

Like in Section 4

Belief Elicitation

In the following, we will ask 3 questions with respect to Part 2 of the experiment. In part 2, you decided how much money to send to your participant. Next to you, 95 other subjects have made the same decision as you. In total, 96 subjects (first-mover) decided to send money to 96 participants (second-mover). Those 96 participants in turn decided how much money to send back.

Our three questions deal with how much you think these participants decided to send back on average.

1. Assume that a subject (first-mover) decided to send €1 to the second-mover. What do you think, how much money was returned to that subject on average? You receive €0.5 if your prediction lays within the €0.2 range around the correct answer.

2. Assume that a subject (first-mover) decided to send €3 to the second-mover. What do you think, how much money was returned to that subject on average? You receive €0.5 if your prediction lays within the €0.2 range around the correct answer.

3. Assume that a subject (first-mover) decided to send €5 to the second-mover. What do you think, how much money was returned to that subject on average? You receive €0.5 if your prediction lays within the €0.2 range around the correct answer.