Interpersonal distance adjustments after interactions with a generous and selfish trustee during a repeated trust game

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Abstract

How physically close to an individual we choose to stand—our interpersonal distance preference—is thought to closely reflect the trust placed in the individual. However, the exact relationship between interpersonal distance and trust is not well understood and the causal effects of trust on interpersonal distance has not yet been demonstrated and quantified experimentally. Here, we induced trust (vs distrust) in an interaction partner through generous (vs selfish) monetary transactions in a repeated trust game. Subjects' investments in, experienced trust in, and expected back-transfers from the two interaction partners indicated that they learned to distrust more the selfish (vs generous) interaction partner. Further, across two experiments, using a pre-post design in which interpersonal distance preferences were measured before and after the trust game, preferred reflective and reflexive interpersonal distance from the selfish interaction partner increased, whereas interactions with the generous partner did not change these preferences. Importantly, the post-game distance was associated with subjects' experienced trust in the selfish interaction partner, and not their monetary decisions made during the game. These findings are a starting point for our understanding of how interactions with untrusted others can be successful. We speculate that an increased interpersonal distance might be accompanied by an increased psychological distance (e.g. through impersonal communication), which might help prevent a break-down of an interaction with a distrusted partner.

Keywords

Interpersonal distance, trust game, social interaction, belief updating

Introduction

We can intuitively imagine standing further away from someone we trust less (vs more) during a conversation. This preferred distance from another person is a largely automatic behavior (Hall, 1966) that co-determines how successfully we navigate everyday social interactions. Too close a distance feels intrusive and threatening, yet too far a distance feels standoffish and distrusting (Lloyd, 2009). Inappropriate interpersonal distances may also hamper our interactions, because they implicitly signal the relationship type and quality we perceive ourselves having with the person (Hall, 1966), and are closely linked to how much we trust them (Jourard & Friedman, 1970; Skotko & Langmeyer, 1977; Wheeless & Grotz, 1977). Surprisingly, there is little research on the exact nature of the relationship between these two phenomena; To our knowledge it has only been described that interpersonal distance causally affects how much we trust others (Bryan, Perona, & Adolphs, 2012). However, the perhaps more intuitive causal effects of trust on interpersonal distance have not yet been studied. Understanding the directionality of the association between these two concepts is integral for determining how both work alone and in combination to affect social interactions and decision-making. Hence, in two experiments, we tested whether (dis-)trusting another person can cause healthy subjects to adjust their preferred interpersonal distance from them.

The distance we stand from interaction partner influences our trust in them, with uncomfortably close or wide distances detrimental to trust. For example, even though a close distance is associated with enhanced self-disclosure (Jourard & Friedman, 1970; Skotko & Langmeyer, 1977) (an indirect measure of trust (Wheeless & Grotz, 1977)), too close a distance instead decreases trust. When an interaction partner stands within one's personal space (i.e., the area around a person which causes discomfort when intruded; (Hayduk, 1983)), the amount of money entrusted to them and the extent to which they are perceived as trustworthy decreases (Bryan et al., 2012). Running in the opposite causal direction, there is also evidence—albeit somewhat indirect—that trust impacts interpersonal distance. For instance, when observing an interaction where a cartoon agent's actions have a larger (vs smaller) effect on another cartoon agent´s outcome, the physical distance between the two is perceived to be smaller (Shao, Yin, Ji, Yang, & Song, 2020). Thus, the quality of the interaction affects the perceived distance between the cartoon agents. Direct positive social

experiences, such as joint book reading or Lego play, have been shown to decrease the distance to the interaction partners (Candini et al., 2017; Gessaroli, Santelli, di Pellegrino, & Frassinetti, 2013). Negative experiences, such as an aggressive conversation tone or angry facial expression, on the other hand, increase the distance one prefers between themselves and the interaction partner (Cartaud, Ruggiero, Ott, Iachini, & Coello, 2018; Ruggiero et al., 2017; Vagnoni, Lewis, Tajadura-Jimenez, & Cardini, 2018). Further, manipulating the moral impression of an interaction partner affects the interpersonal distance one prefers to have from them (Iachini, Pagliaro, & Ruggiero, 2015; Pellencin, Paladino, Herbelin, & Serino, 2018).

To provide a direct test of whether trust impacts interpersonal distance, we made use of the Trust Game (Berg, Dickhaut, & McCabe, 1995). In a typical setup of this game, two people, an investor and a trustee, aim to maximize their profits through monetary interactions. The amount of money the investor sends to the trustee signals the degree of trust in the trustee, who in turn can reciprocate that trust by making a back-transfer that is profitable for both of them. After multiple interactions, the investor learns to trust or distrust the trustee based on whether they reciprocate or exploit the trust placed in them (Chang, Doll, van 't Wout, Frank, & Sanfey, 2010). In this way, trust and distrust can be experimentally induced through interactions with a generous or a selfish trustee (Fett, Gromann, Giampietro, Shergill, & Krabbendam, 2012; Rosenberger et al., 2019). We predicted that, after interacting with them in the repeated trust game, subjects would prefer a smaller interpersonal distance from the generous trustee and larger interpersonal distance from the selfish trustee. In experiment 1, we measured static and reflective interpersonal distance with a paper and pencil task in which subjects indicate explicitly their preferred interpersonal distance from imagined interaction partners (Duke & Nowicki, 1972). This task measures a deliberative expression of comfortable interpersonal distance on a continuum, while holding stimulus appearance and context constant (Duke & Nowicki, 1972). In experiment 2, we measured more dynamic, reflexive interpersonal distance preferences with a digital stop-motion task (Perry, Rubinsten, Peled, & Shamay-Tsoory, 2013) in which subjects view an approaching interaction partner and indicate on the keyboard when the they should stop in their approach. This task is an extension of the paper and pencil measure, where the expression of comfortable interpersonal distance is substituted with a reflexive halt response to approaching figures. Even though both measures are similarly

sensitive to distance requirements with interaction partners of different gender and age (Iachini et al., 2016), the digital version taps more into automatic approach – avoidance motivational preferences (Cohen, Perry, Mayseless, Kleinmintz, & Shamay-Tsoory, 2018; Perry, Mankuta, & Shamay-Tsoory, 2014) than the paper and pencil version.

Methods

Subjects

Two experiments were conducted using two independent student samples but involving similar task protocols. In both experiments, subjects first performed the interpersonal distance task, then played the repeated trust game, and then—immediately after the trust game—completed the interpersonal distance task again (see Figure 1). The experiments differed in the implementation of the interpersonal distance task (paper and pencil version used in experiment 1 and a digital task used in experiment 2). In experiment 1, 54 students participated (34 female; m_{age} = 25.02, SD = 7.55, range = 18 - 70) who were recruited through the university study recruitment website. In experiment 2, 55 students participated (35 female; m_{age} = 27.43, SD = 8.83, range = 19 - 68) who were all recruited through the same university study recruitment website. The large age range is due to outliers in both samples. Removing the outliers did not change the results (data not shown). Therefore, no subjects were excluded from analyses. Subjects received a flat-fee reimbursement plus the money earned during the repeated trust game (exchange rate points to euro: 1:0.007). We collected data in a group laboratory where two to nine students participated simultaneously. A-priori sample size requirements were based on practical considerations of a minimum of 50 subjects during 7 group test sessions. Data analyses were performed after finishing data collection and thus did not influence the number of subjects. In the lab, dividers between the computers prevented subjects from seeing each other during testing. Verbal or non-verbal communication during testing was not allowed and—subjects were warned—would lead to exclusion from the study. All subjects adhered to this rule and none had to be excluded during the test sessions. Before the start of the experiment, all subjects gave written informed consent. The study was conducted according to the declaration of Helsinki and was approved by the local university ethics committee. The tasks described in the present study were part of a larger test battery, aiming to improve

the characterization of trust development between interacting people. The test battery consisted of questionnaires (experiment 1 and 2: general trust, social value orientation; experiment 2 only: mood, behavioural motivation), implicit association tests (experiment 1: sequential priming task; experiment 2: affect misattribution procedure), and a measure of cue-controlled behaviour (only in experiment 2: pavlovian to instrumental transfer task). Results of these tasks are not reported, as these measures address different aspects of trust development than the one described in this paper. All measures, manipulations, and exclusions in the study are disclosed.

Tasks

Repeated Trust Game

The repeated trust game was programmed in z-Tree (version 3.3.7 (Fischbacher, 2007)) that allows for an easy implementation of multiplayer behavioural economic tasks. The task design and implementation was exactly the same in experiment 1 and experiment 2. The script is deposited online (Anonymous, 2019). Subjects were instructed on paper and completed profit calculation questions as a comprehension check. In addition to the paper instructions, subjects played five practice rounds to familiarize themselves with the layout of the task. After the practice rounds, the experimenter ostensibly made a phone call to a laboratory in another building where the same study was thought to be taking place. During the phone call they audibly told the "other experimenter" that the subjects were ready to start the task. This belief induction was preceded by an explanation that the interaction partners for the task were seated in the other laboratory. The initial study invitation also stated that the experiments would take place in two separate laboratories simultaneously.

In the repeated trust game two players entrust each other money over several rounds. Subjects always played in the role of investor with two pre-programmed trustees who ostensibly were fellow students participating in the same study in another laboratory. We chose ostensible partners in another room, so that subjects had no specific prior beliefs about them except that they were fellow students in a similar situation. All players were referred to with letters (subjects were player A, trustees were player B and C) and were represented with neutral avatars (see Figure 1A), with either horizontal or vertical stripes allowing to visually distinguish between them. Subjects played 52 rounds of the task, randomly alternating between the two trustees (but never more than two consecutive

rounds with the same trustee). Subjects were unaware of the exact length of the task to prevent end-game effects. At the beginning of a round, both players were endowed with 10 points. The subject started the round by making a variable investment (between 1 and 10 points of their endowment) to the trustee, see Figure 1A. This investment got tripled by the experimenter and was then sent to the trustee. Next, the trustee made a variable back-transfer (between 1 and (endowment + 3x investment) points) to the investor. This concluded a round and both players saw how many points they earned in this round.

The back-transfers of the trustees were pre-programmed (Rosenberger et al., 2019). The generous trustee behaved trustworthy by making back-transfers that were either 100%, 150%, or 200% of the investment. At the start of the task, there was an equal probability of these three back-transfers, but the probability of a back-transfer of 200% of the investment increased with 10% every time the subject increased her investment to the generous trustee in consecutive interactions. Thus, generous investments were rewarded with a higher probability of generous back-transfers. The selfish trustee behaved untrustworthy by making back-transfers that were either 100%, 75%, or 50% of the investment. At the start of the task there was an equal probability of these three back-transfers. The probability of a back-transfer of 50% of the investment increased with 10% every time the subject increased their investment in consecutive interactions. Thus the subject´s generous investments got punished with a higher probability of selfish back-transfers. We fixed the back-transfers in the first four rounds to 100% of the investments (irrespective of trustee type) to induce the same prior beliefs about the back-transfers across subjects. The conceptualization of trustworthy and untrustworthy behaviour as respectively generous and selfish back-transfers is based on neuro-economic definitions of trust and reciprocity. Here, trust is defined as sharing an exclusive source with a second person with the expectation that this will lead to a higher profit than not sharing this source. A trustee behaves trustworthy when they reciprocate this trust and thus increases the investor's profit (Fehr & Camerer, 2007). In the context of a trust game this means that the investor is placing trust in the trustee by making an investment, with the expectation that the back-transfer from the trustee is profitable, thus higher than the amount invested (Berg et al., 1995).

Every ten rounds subjects got prompted to rate the trustees. This prompt happened after the subjects' investments, and before they saw the back-transfers. In these prompts,

subjects had to rate how much they trust the trustee in this round on a visual analogue scale (VAS) ranging from 0 to 100, how high they expect the back-transfer to be (ranging from 1 to (10 + 3x the investment) in this round), and how certain they are about their back-transfer expectations (on a VAS from 0 to 100). Subjects were instructed beforehand that their ratings were not shared with the trustees and would therefore have no influence on the actual back-transfers.

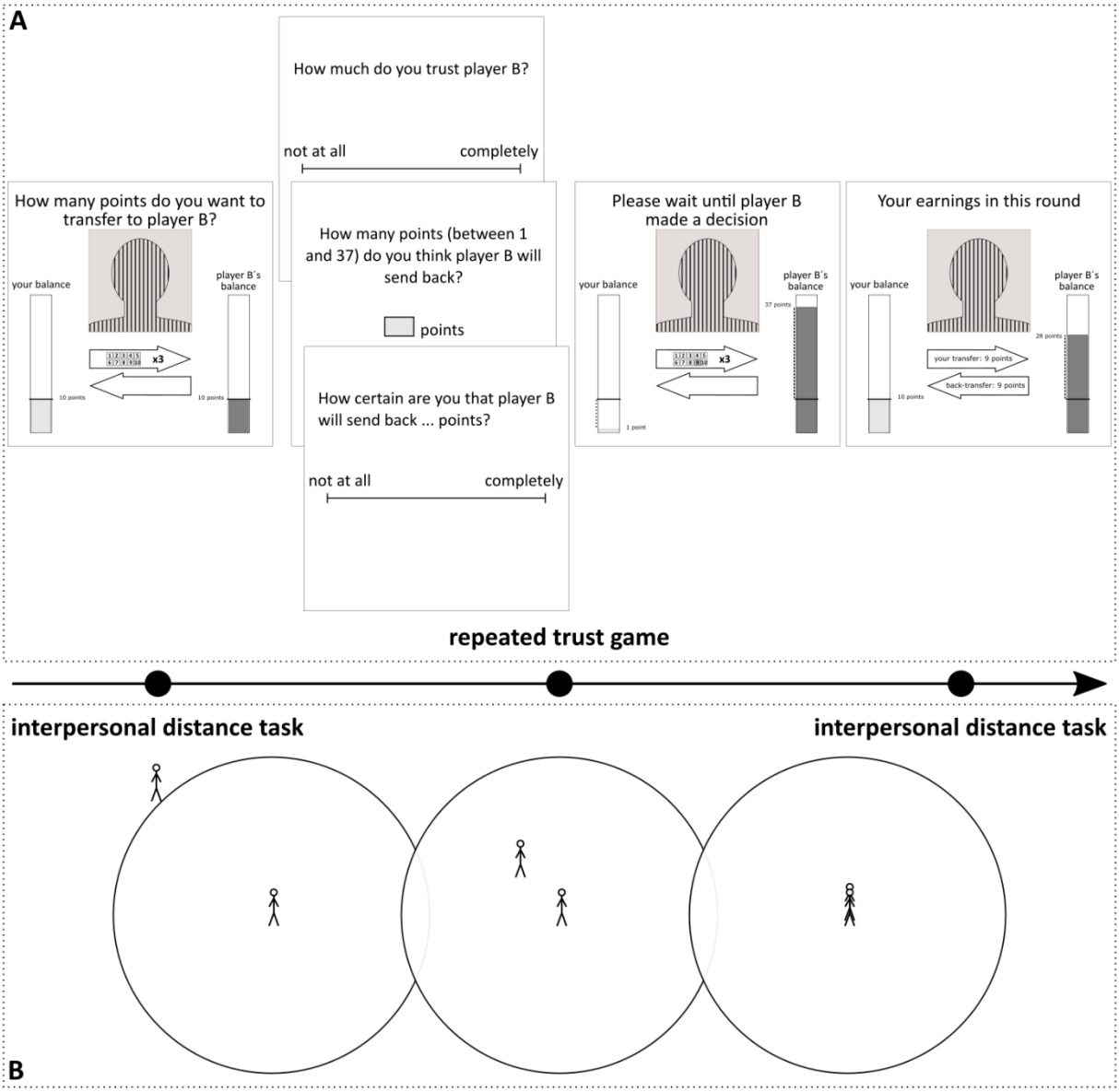

Figure 1. Task progression in experiment 1 and 2: interpersonal distance task, followed by a repeated trust game, which was followed by a repetition of the interpersonal distance task. A) Trial progression of repeated trust game. Subjects played for 52 rounds alternating between player B and player C (depicted with horizontally- and vertically-striped avatars). Every 10 rounds, subjects were prompted about their trust in the trustee (screen 2), the

back-transfer expectations (screen 3), and the certainty about the back-transfer expectations (screen 4). B) Trial progression of digital interpersonal distance task. The figure in the middle represented the subject, and the other figure (player B, player C, mother, father, experimenter, best friend, unknown person) approached from the edge of the room. Distance between the figures is expressed in percentages ranging from 100% (approaching figure stands at the edge – left frame) to 0% (two figures colliding – right frame).

Interpersonal distance task

Subjects had to imagine they were standing in the middle of a round room, and a person would approach them from the side of the room (see Figure 1B). Subjects indicated where the approaching person should stand in the room (experiment 1), or stop (experiment 2) for a comfortable conversation. Every trial, subjects indicated their comfortable interpersonal distance for a different approaching figure, with a total of 7 trials. Subjects were told that they were to imagine the approaching figures were—across the different trials—player B, player C, their mother, their father, the experimenter, their best friend, and an unknown person. The order of the approaching figures was randomized between subjects. The principle of the task was the same in experiment 1 and experiment 2, but the administration of the task differed. In experiment 1, a paper and pencil version of the task was administered (Duke & Nowicki, 1972). In this version, every trial was printed on a separate A4-sheet, where a round circle represented a round room (similar to left panel in Figure 1B). The figure in the middle of the room represented the subject, and the figure on the edge of the room the approaching person for whom the comfortable interpersonal distance had to be evaluated. A title identified the approaching figure. Subjects had to draw a cross where the approaching figure should stand for a comfortable distance. The sheets were stapled so that subjects could not lay them next to each other and use their distance from previous sheets as reference points. Distance from the figure in the middle of the room to the cross was measured in mm by two independent raters. Inter-rater correlation was high ($rho = 0.98$, $p < .001$).

In experiment 2, a digital version of the task was administered (Perry et al., 2013) in E-Prime (version 2.0 (Psychology Software Tools, 2015)). The script is deposited online (Anonymous, 2019). Here, subjects received three practice trials before the start of the task to familiarize themselves with the task procedure. The layout of the trials was similar to

experiment 1, except that the figure at the edge of the room was animated and thus actually approached the figure in the middle. The subject could stop the approaching figure with a button click. If the subject failed to do so, the approaching figure would collide with the figure in the middle and a new trial would begin. The animation consisted of 49 frames, transitioning from the approaching figure standing at the edge of the room to colliding with the figure in the middle of the room. Each frame was displayed for 90 milliseconds. In this digital version, we measured the distance between the figure standing in the middle (i.e. the subject) and the approaching figure in number of frames.

Statistical analyses

We analysed the raw investment data and interpersonal distances with linear mixed models in R (version 3.5.0 (R Core Team, 2017)), with the *lme4* package (version 1.1-21 (Bates, Mächler, Bolker, & Walker, 2015)). Linear mixed models are an extension of linear regressions. For this analysis individual subject data is not aggregated and individual variation can be specified in the model through the specification of subject specific (and possibly task item specific) intercepts and slopes. This improves the fit of the statistical model to the individual subject data, and reduces error variance in the data due to, for example, testing different individuals, or using different task items, and takes into account time effects (e.g. fatigue) due to repeated observations from the same individual. This increases the statistical test´s power, as well as the accuracy of the test results (e.g. Baayen, Davidson, & Bates, 2008).

The test statistics (from Wald chi-square tests) for the main effects and interactions were calculated with orthogonal sum contrasts, and type 3 sum of squares from the *car* package (version 3.0-3 (Fox & Weisberg, 2011)). To decompose interactions with factorial variables, we performed *post-hoc* t-tests with the *emmeans* package with a multivariate correction for multiple comparisons (version 1.3.5.1 (Lenth, 2019)). Degrees of freedom for these post-hoc tests were approximated with the default Kenward-Roger method of the *emmeans* package. To decompose interactions with continuous variables, we interpreted the regression tables generated with the *sjPlot* package (version 2.6.3 (Lüdecke, 2018)). For this we switched to a treatment contrast of the factorial variables and changed their reference levels to obtain the appropriate slope statistics. The reported p-values for these beta statistics were obtained through the default setting in the *sjPlot* package which treats

the t-statistics as Wald z-statistics. Standardized beta-statistics for all post-hoc results were also obtained with a treatment contrast from the same regression tables from the *sjPlot* package. They serve as effect size estimates. Alpha for all analyses was set to 0.05. To compare the distances from the paper and pencil version with the digital version, we normalized data of each experiment by computing relative distances, which was done by dividing the measured distance by the maximum possible distance. The transformed interpersonal distance is expressed in percentage of the maximum distance. All the analysis steps described below were performed separately for the datasets of experiment 1 and 2. We performed a sensitivity power analysis in G*Power (version 3.1.9.4) for our main hypothesis that the interpersonal distance before compared to after the trust game differs between the two trustees. Based on a within-subject repeated measures ANOVA with 2 groups, 2 measurements, two-tailed α = 0.05, power = 0.80, N = 55, repeated-measure correlation = 0.5, and nonsphericity correction =1, the minimum expected effect size is f = 0.19. The data sets and analysis scripts are deposited online (Anonymous, 2019). Inter-variable correlations of the mixed models are reported in the supplementary results Tables 6 - 21.

First, we evaluated the change in interpersonal distance resulting from the interactions in the trust game with the following linear mixed model: $relative\ distance = \beta_0 + \beta_1 approaching\ people + \beta_2 time\ point + \beta_3 approaching\ people * time\ point + \varepsilon$ with individual intercepts per subject. Approaching people was a factorial variable with the levels: generous trustee, selfish trustee, mother, father, experimenter, best friend, unknown person. Time point was also a factor with the levels: before trust game, after trust game. With *post hoc* t-tests we compared the relative distance change for each imagined approaching person (thus before vs. after the trust game), as well as the relative distance change between the generous and selfish trustee.

Second, we analysed how well the subjects learned during the trust game, through their change in investments, trust ratings, back-transfer expectations, and certainty ratings. For this we ran four mixed models with the following structure: $outcome\ variable = \beta_0 + \beta_1 trustee\ type + \beta_2 round\ number + \beta_3 trustee\ type * round\ number + \varepsilon$. The outcome variables for the four models were investments, trust ratings, back-transfer expectations, and certainty ratings. All models included a separate intercept per subject, as

well as two slopes for the trustee types per subject. Trustee type was a factor with the levels generous and selfish, and round number was a continuous variable ranging from 1 to 52. We report the round number beta statistics of the two trustees for an interpretation of the interactions.

Third, to quantify the difference in learning for the two trustee types, we analysed absolute change in the trust game measures (investment, trust ratings, back-transfer expectations, certainty about back-transfer expectations) across the task. For this we calculated difference scores, subtracting the value of the measures in the first trust game round from those in the last round, separately for generous and selfish trustees. We compared these difference scores between trustees with paired t-tests. We also tested for too high initial back-transfer expectations by comparing the actual back-transfer and the back-transfer expectation in the first round with a one-sample t-test. Finally, we tested whether the total earnings at the end of the task differed between the trustees with a paired t-test.

Fourth, to analyse associations between individual performance during the trust game and the change in interpersonal distance, we tested whether total earnings were associated with the change in interpersonal distance (subtracting pre trust game distance from post trust game distance) with the following linear mixed model: $distance\ change = \beta_0 + \beta_1 total\ earnings + \beta_2 trustee\ type + \beta_3 total\ earnings * trustee\ type + \varepsilon$, which included a separate intercept for each subject. To increase interpretability of the beta coefficient we changed the scale of total earnings (original range: 173 to 468 points, new range 1.73 to 4.68 points) to be closer to the scale to the distance change variable (range: -0.36 to 0.80), by dividing total earning by 100. In addition, we explored whether the subject´s investment and beliefs about the interaction partner during the final interaction was associated with the distance after the trust game with the following linear mixed model: $distance_{post\ trust\ game} = \beta_0 + \beta_1 trustee\ type + \beta_2 investment_{final\ interaction} + \beta_3 back-transfer\ expectation_{final\ interaction} + \beta_4 trust\ rating_{final\ interaction} + \beta_5 trustee\ type * investment_{final\ interaction} + \beta_6 trustee\ type * back-transfer\ expectation_{final\ interaction} + \beta_7 trustee\ type * trust\ rating_{final\ interaction} + \varepsilon$, which included a separate intercept for each subject. Finally, to explore whether the generosity/ selfishness of the trustees, or the trust ratings of

the trustees were associated with the distance after the trust game, we ran the following linear mixed model: $distance_{post\ trust\ game} = \beta_0 + \beta_1 trustee\ type + \beta_2 back - transfer_{final\ interaction} + \beta_3 trust\ rating_{final\ interaction} + \beta_4 trustee\ type * back - transfer_{final\ interaction} + \beta_5 trustee\ type * trust\ rating_{final\ interaction} + \varepsilon$, which included a separate intercept for each subject.

Results

Experiment 1 - reflective interpersonal distance task

Subjects adjusted the distance to the approaching people after (compared to before) the repeated trust game (approaching people x time point interaction: χ^2 (6) = 23.32, p < .001), see Figure 2A. Decomposing this interaction with *post-hoc* t-tests, we found that before the trust game interpersonal distance was not different for the two trustees, t(667.02) = 0.132, p > .99, std.b = 0.01 (95% CI = (-0.09, 0.11)), but it was different afterwards, t(667.02) = 6.405, p < .001, std.b = 0.31 (95% CI = (0.22, 0.41)). As hypothesized, the distance to the selfish trustee increased from an average of 25% (SE = 2%) before the trust game to an average of 37% (SE = 4%) after the trust game, t(667.93) = -4.376, p < .001, std.b = 0.31 (95% CI = (0.17, 0.45)). The post-game distance was largest from the selfish trustee compared to the other approaching people (see supplementary results Table 1). The post-game distance from the selfish trustee differed significantly from the post-game distance of all the other approaching people, except the unknown person (t(667) = 1.683, p = .860, std.b = -0.08, see also supplementary Table 2).

The distance to the generous trustee did not decrease significantly, t(667.93) = 1.792, p = .413, std.b = -0.13 (95% CI = (-0.27, 0.01)), from an average of 24% (SE = 2%) to an average of 19% (SE = 1%) after the trust game, and thus did not confirm our hypothesis. The post-game distance from the generous trustee was not different from the post-game distance from the mother (t(667) = 1.511, p = .931, std.b = -0.07), father (t(667) = -0.188, p > .999, std.b = 0.01), and the experimenter (t(667) = -0.365, p > .999, std.b = 0.02). However, it was larger than the distance from the friend (t(667) = -3.627, p < .011, std.b = -0.18), and smaller than the distance from the unknown person (t(667) = -4.722, p < .001, std.b = 0.23), see also supplementary results Tables 1 and 2. Importantly, for all the other approaching

people, the interpersonal distances did not change when comparing before and after trust game measurements (see supplementary results Table 1).

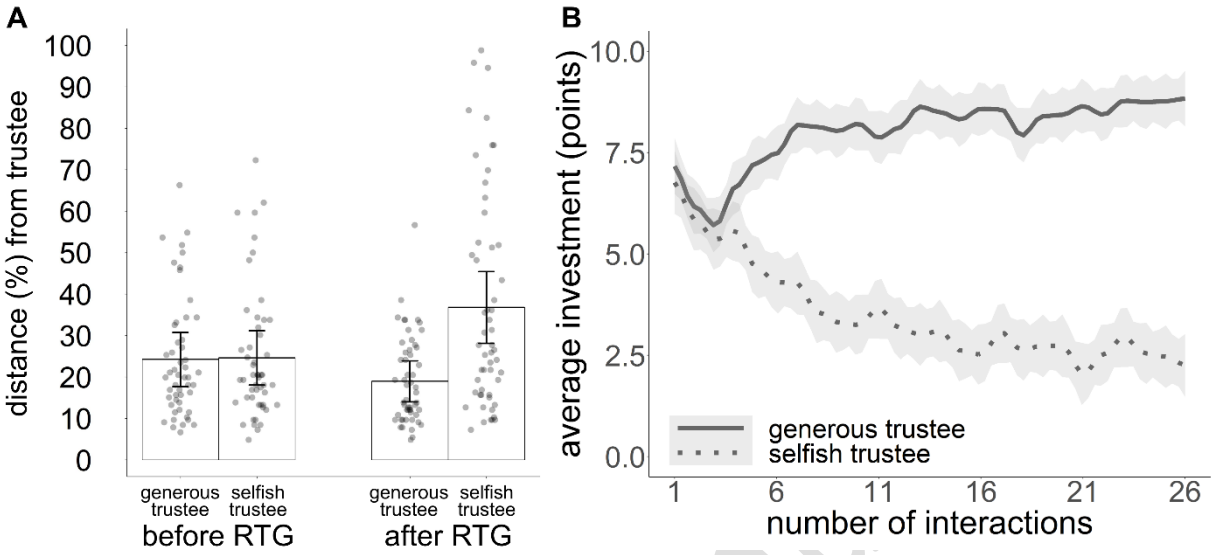

Figure 2. Trust and reflective interpersonal distance adaptation in experiment 1. A) Subjects increased their distance from the selfish trustee after the repeated trust game (RTG) in the interpersonal distance task. Dots represent individual data points, error bars are 95% confidence intervals (CI) adjusted for within-subject comparisons. B) Subjects learned to (dis-)trust the trustees. They increased their investments to the generous trustee (solid line) and decreased them to the selfish trustee (dashed line) during 26 interactions with each trustee in the repeated trust game. Group data are smoothed with local regression (LOESS). Shaded areas around lines represent 95% CI.

Experiment 2 – reflexive interpersonal distance task

In experiment 2, interpersonal distance also changed after the repeated trust game, as indicated by an approaching people x time point interaction: $\chi^2(6) = 51.43$, $p < .001$, see supplementary results Figure 1A. Decomposing this interaction, we found that before the trust game, the interpersonal distance did not differ between the selfish and generous trustee, $t(707) = -0.720$, $p > .999$, std.b = 0.03 (95% CI = (-0.06, 0.13)), but afterwards it did, $t(707) = 7.831$, $p < .001$, std.b = 0.37 (95% CI = (0.28, 0.47)). The distance from the selfish trustee increased significantly from 20% (SE = 2%) to 38% (SE = 4%), $t(708) = -7.663$, $p < .001$,

std.b = 0.52 (95% CI = (0.39, 0.66)). As in experiment 1, the post-game distance was largest from the selfish trustee compared to the other approaching people (see supplementary results Table 3). The post-game distance from the selfish trustee differed significantly with all of the other approaching figures (see supplementary results Table 4).

The distance decrease from the generous trustee was very small (from 22% (SE = 2%) to 19% (SE = 2%)) and not significant, t(708) = 0.841, p = .972, std.b = -0.06 (95% CI = (-0.19, 0.08)). Similar to experiment 1, the post-game distance from the generous did not differ from the distance from the mother (t(707) = 2.244, p = .471, std.b = -0.11), the father (t(707) = 2.838, p = .134, std.b = -0.13), and the experimenter (t(707) = -0.30, p > .999, std.b = 0.00). However it was larger than the distance from the friend (t(707) = -4.651,p < .001, std.b = -0.22), and smaller than the distance from the unknown person (t(707) = -3.774, p = .007, std.b = 0.18). As in experiment 1, the interpersonal distance did not change for the other approaching people when comparing before and after trust game interactions, see supplementary results Table 3.

Even though the increase in interpersonal distance from the selfish trustee was larger in the 2nd experiment than in the 1st experiment, this difference was not significant, t(102.61) = -1.444, p = 0.152, std.b = 0.14 (95% CI = (-0.05, 0.33)).

Experiment 1 - Repeated trust game

At the beginning of the trust game, subjects overestimated the trustees back-transfers, see Table 1: their back-transfer expectations were significantly more positive than the actual back-transfers they received from the two trustees, $t_{generous}(59) = -7.57$, $p < .001$, $d = -0.98$, $t_{selfish}(59) = -6.87$, $p < .001$, $d = -0.89$. In line with that, the first investments to both trustees were higher than the median endowment (= 5 points), and subjects expected higher back-transfers than their investments from both trustees.

Table 1.

Descriptive statistics of measures in the repeated trust game in experiment 1

	first interaction		last interaction	
	generous trustee	selfish trustee	generous trustee	selfish trustee

	m (SD)	m (SD)	m (SD)	m (SD)
investment in points	7.01 (2.88)	6.87 (3.08)	8.63 (2.57)	2.33 (2.83)
trust rating in %	52.7 (25.43)	52.18 (25.77)	70.05 (26.99)	14.79 (27.34)
back-transfer expectation in %	12.09 (6.95)	11.84 (7.17)	15.38 (5.98)	2 (2.89)
difference (BT exp. – BT) in %	-5.08 (4.93)	-4.97 (4.89)	0.5 (4.47)	-0.3 (2.26)
certainty about BT exp. in %	32.19 (25.89)	32.92 (27.05)	63.67 (31.84)	69.79 (39.21)
total earnings in points			408.53 (37.19)	238.37 (18.09)

Note on abbreviations: m = mean, SD = standard deviation, BT = back-transfer, BT exp. = back-transfer expectations

Over the rounds, subjects changed their investments to the generous trustee in a different manner than to the selfish trustee, trustee x round number interaction: χ^2 (1) = 444.48, p < .001, see Figure 2B. Decomposing this interaction, we found that the investments to the generous trustee increased over the rounds, b = 0.04 (95% CI = (0.04, 0.05)), p < .001, std.b = 0.17 (95% CI = (0.14, 0.20)), and decreased to the selfish trustee, b = -0.07 (95% CI = (-0.08, -0.06)), p < .001, std.b = -0.28 (95% CI = (-0.31, -0.25)). The investment decrease with the selfish trustee was larger than the investment increase with the generous trustee, t(59) = -11.675, p < .001, std.b = 0.64 (95% CI = (0.53, 0.75)).

Subjects also changed their back-transfer expectations about the generous trustee differently than about the selfish trustee over the rounds, trustee x round number interaction: χ^2 (1) = 158.06, p < .001. *Post-hoc* tests revealed that they increased their back-transfer expectations about the generous trustee (b = 0.10 (95% CI = (0.07, 0.12)), p < .001, std.b = 0.21 (95% CI = (0.15, 0.27))) and decreased them about the selfish trustee (b = - 0.16 (95% CI =(-0.19, -0.13)), p < .001, std.b = -0.34 (95% CI = (-0.40, -0.28))) over the rounds. The back-transfer expectations decreased more for the selfish trustee than they increased for the generous trustee, t(59) = - 12.875, p < .001, std.b = 0.66 (95% CI = (0.56, 0.76)). This back-transfer expectation change was accompanied by an increase in certainty about the back-transfer expectations over the rounds, round number main effect: χ^2 (1) = 118.62, p < .001. The certainty did not change differently for the two trustees over the rounds, trustee x round number interaction: χ^2 (1) = 0.02, p = .879.

Trust ratings about the generous trustee changed differently than about the selfish trustee over the rounds, trustee x round number interaction: χ^2 (1) = 147.80, p < .001. *Post-hoc* tests revealed that they increased for the generous trustee (b = 0.44 (95%CI = (0.33, 0.56)), p < .001, std.b = 0.23 (95% CI = (0.17, 0.28))), and decreased for the selfish trustee (b

= -0.58 (95% CI = (-0.70, -0.47)), p < .001, std.b = -0.30 (95% CI = (-0.35, -0.24))) over the rounds. The decrease in trust ratings was larger for the selfish trustee than the increase in trust ratings for the generous trustee, t(59) = -10.998, p < .001, std.b = 0.64 (95% CI = (0.53, 0.76)).

Total earnings at the end of the trust game were larger with the generous trustee than with the selfish trustee, t(59) = 29.187, p < .001, std.b = 0.95 (95% CI = (0.89, 1.00)), see Table 1. The behavior and beliefs in the repeated trust game confirmed our hypothesis that subjects learned to trust the generous trustee more than the selfish trustee. Interestingly, the change in investments and beliefs was larger for the selfish trustee than the generous trustee, which can be partly attributed to biased back-transfer expectations at the beginning of the repeated trust game.

Experiment 1 – Repeated trust game and interpersonal distance task associations

To quantify the differences in interpersonal distance changes between the generous and selfish trustee, we explored whether individual variation in learning during the trust game was related to distance changes. First we explored whether total earnings, as a crude measure of learning in the trust game, was associated with the change in interpersonal distance (= after trust game – before trust game): indeed the association between distance change and total earnings differed significantly between the trustees (trustee x total earnings interaction: χ^2 (1) = 7.912, p = .005). *Post-hoc* tests revealed that higher total earnings with the selfish trustee were significantly associated with larger distance changes from the selfish trustee (b = 0.33 (95% CI = (0.08, 0.59)), p = 0.01, std.b = 1.53 (95% CI = (0.36, 2.69))). Total earnings with the generous trustee were not associated with distance change from the generous trustee (b = -0.08 (95% CI = (-0. 20, 0.05)), p = .233, std.b = -0.34 (95% CI = (-0.91, 0.22))).

Second, we explored whether the investment, back-transfer expectation, or trust rating in the final interaction with the two trustees were associated with their post-game distance. There was no main effect, other than a trust rating main effect (χ^2 (1) = 6.103, p = .014. There were no significant trustee type x investment interaction (χ^2 (1) = 2.75, p = .097) or trustee type x back-transfer expectation interaction (χ^2 (1) = 0.872, p = .350). However, the trustee type x trust rating interaction was significant, χ^2 (1) = 5.495, p = .019. *Post-hoc* tests revealed that higher trust ratings of the selfish trustee were associated with a smaller

post-game distance from the selfish trustee, b = -0.33 (95% CI = (-0.59, -0.07), p = .013, std.b = -0.59 (95% CI = (-1.05, -0.12)). The association between the trust rating of the generous trustee and the post-game distance from the generous trustee was not significant, b = 0.05 (95% CI = (-0.13, 0.24)), p = .578, std.b = 0.10 (95% CI = (-0.24, 0.43)).

As a final step, we explored whether the selfishness/ generosity of the trustees (and thus their back-transfers) or the trust rating of the two trustees in the final interaction were associated with their post-game distance. There was only a significant trustee type x trust rating interaction (χ^2 (1) = 5.226, p = .022), and no trustee type x back-transfer interaction (χ^2 (1) = 1.289, p = .256) or back-transfer main effect (χ^2 (1) = 0.348, p = .555). *Post-hoc* tests revealed, that higher trust ratings of the selfish trustee were associated with smaller post-game distances from the selfish trustee, b = -0.32 (95% CI = (-0.57, -0.06), p = . 014, std.b = -0.57 (95% CI = (-1.02, -0.12)). The trust rating of the generous trustee was not associated with the post-game distance from the generous trustee, b = 0.04 (95% CI = (-0.14, 0.22), p = . 646, std.b = 0.08 (95% CI = (-0.25, 0.40)).

Experiment 2 - Repeated trust game

Learning in the repeated trust game was similar as in experiment 1 and is described in the supplementary results, the supplementary results Table 5, as well as the supplementary results Figure 1B. Here we only highlight the different findings. First, the certainty about the back-transfer expectations changed differently for the two trustees over the rounds (trustee x round number interaction: $\chi^2(1) = 5.51$, p = .019). *Post-hoc* tests revealed that the increase in certainty was marginally steeper for the selfish trustee (b = 0.73, 95% CI = (0.55, 0.91), p < .001, std.b = 0.35 (95% CI = (0.27, 0.44))) than for the generous trustee (b = 0.43, 95% CI = (0.25, 0.61), p < .001, std.b = 0.21 (95% CI = (0.12, 0.29))), t(56) = 1.908, p = .06, std.b = -0.17 (95% CI = (-0.34, 0.00)). Second, the association between total earnings and distance change did not significantly differ for the two trustees (earnings x trustee interaction: $\chi^2(1) = 0.10$, p = .756). As in experiment 1, there was also no main effect of earnings on distance change, $\chi^2(1) = 0.73$, p = .393. Third, when exploring whether the investment, back-transfer expectation, or trust rating in the final interaction with the two trustees were associated with their post-game distance, there was only a significant main effect of trust ratings ($\chi^2(1) = 6.795$, p = .009), but no significant interactions

(all other $p > .37$). Here, post-game distances decreased with increasing trust ratings, independent of trustee type. Finally, when exploring whether the generosity/ selfishness of the trustees or the trust ratings during the final interaction were associated with the post-game distance, there was only a trust rating main effect ($\chi^2(1) = 8.924$, $p = .003$), but no interactions (all other $p > .53$). Here, higher trust ratings were associated with a smaller distance from the trustees.

Discussion

In the present study, we demonstrate that trust in interaction partners—developed during a repeated trust game—modulates both reflective and reflexive interpersonal distance preferences. While interactions with a selfish trustee increased interpersonal distance, those with a generous trustee did not significantly decrease distance preferences. These preferences are not caused by learning differences in the repeated trust game, as subjects correctly adapted their behavior and beliefs by increasing their investments, back-transfer expectations, and experienced trust to the generous trustee, and decreasing them to the selfish trustee as the task progressed. Rather, the distances after the trust game were associated with how much the subjects trusted the interaction partners during their final interaction in the trust game. For the reflective interpersonal distance this was specific to the selfish trustee, whereas for the reflexive interpersonal distance there was a general association for both trustees. Interestingly, in both experiments, subjects were biased at the beginning of the repeated trust game as they made high investments and were expecting high back-transfers of both trustees. These overly optimistic expectations were violated by the selfish trustee which resulted in larger changes in investments and beliefs for the selfish than the generous trustee. These expectation violations might have put more attention on the selfish than the generous trustee and might have brought about the greater change in interpersonal distance to the selfish trustee.

Another reason the change in interpersonal distance might have been more pronounced for the selfish than for the generous trustee may be because the selfish (vs generous) trustee's behavior was more salient in the repeated trust game. Negative feedback, but specifically non-cooperative behavior (e.g., low back-transfers), draw more attention than positive feedback (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) or

cooperative behavior (e.g., high back-transfers) (Rankin & Eggimann, 2009; Vanneste, Verplaetse, Vanhiel, & Braeckman, 2007). While high expectations at the beginning of a decision-making task are a general phenomenon (Branas-Garza, Rodriguez-Lara, & Sanchez, 2017), the selfish trustee violated them continuously by making low back-transfers. The non-cooperative behavior and expectation violations might have made more salient the selfish (vs generous) trustee's behavior, resulting in a more pronounced adjustment in interpersonal distance preferences.

The salience of the selfish trustee mirrors saliency of negative decision-makers when inferring their moral character (Siegel, Mathys, Rutledge, & Crockett, 2018). Interestingly, belief formation about bad moral behavior is characterized by a higher level of uncertainty than good moral behavior. This finding contrasts with our results where certainty about back-transfer expectations were similar for the generous and selfish trustee in experiment 1, and higher for the selfish than the generous trustee in experiment 2. A reason for these different results might lie in differences in the decision outcome about which subjects had to form beliefs: while subjects in our study actually received the back-transfers about which they formed beliefs, subjects in Siegel et al.´s study formed beliefs about a behavior that did not affect them (i.e. the moral character of a decision-maker giving electric shocks to a third person). Thus, while we both show that negatively perceived people appear to be more salient than positively perceived people during belief formation, the certainty about these beliefs might depend on whether these people's behavior can directly impact the subject.

At the beginning of the trust game in both experiments, subjects displayed overly optimistic expectations about the interaction partners' back-transfers. These expectations might indicate that the subjects started out the task in a trust mindset. With a trust mindset, specific mental representations that are in that moment highly accessible can influence behaviour and decisions, such as priming effects (Kleiman, Sher, Elster, & Mayo, 2015; Mayo, 2015). With this trust mindset, subjects in the present study might have been receptive to the trust game manipulation and therefore adjusted their subsequent interpersonal distance. In contrast, with a distrust mindset, alternatives are considered to specific mental representations, which decreases, or even blocks the influence of the highly accessible mental representations on the current behaviour and decisions (Kleiman et al., 2015; Mayo, 2015). Curiously, interactions with the selfish trustee did not appear to change their mindset

to distrust. Specifically, we found that interactions with the selfish trustee increased distance preferences. However, with a distrust mindset, the influence of interacting with a selfish trustee on distance preferences should have been diminished. This discrepancy between our findings and the distrust mindset´s prediction might indicate that the subjects had a trust mindset throughout the experiment.

We demonstrate that the trust learned during the repeated trust game generalizes beyond monetary exchanges and influences subsequent imagined interactions in a different context with the same partner. Specifically, the experienced trust—but not the monetary aspects of the trust game (i.e., the investments, the back-transfers from the trustee, nor the back-transfer expectations)—were associated with distance preferences after the trust game. Our study validates findings from Hale, Payne, Taylor, Paoletti, and Hamilton (2018) who have suggested, but could not unequivocally demonstrate, that interactions with a fair and unfair trustee during a repeated trust game impacted how much of their advice was followed in navigating a subsequent virtual maze task. In their virtual reality study, almost half of the subjects based their decision to follow advice on the character of the voice of the trustee. The other half of the subjects reported that they based their decision to follow advice on the perceived fairness of the trustee during the trust game. This second half of the subjects followed the advice of the fair (vs unfair) trustee more. However, this effect was not present in the group that was guided by the character of the trustee´s voice. By limiting the source of information to one (i.e., the back-transfer behavior during the trust game), we validated Hale et al.´s finding in a larger sample. In addition, our study suggests that Hale et al.´s findings might be attributable to the subjectively experienced fairness of the trustees, and not solely the monetary interactions during the trust game.

The trust learned during the repeated trust game only changed interpersonal distance to the trustees, and did not affect distance preferences to imagined approaching people unrelated to the trust game. Negative social experiences with the selfish trustee did not generalize to affect interpersonal distance preferences with other approaching people. For example, it neither made subjects more cautious—by increasing interpersonal distance to all of the approaching people—nor did it increase affiliative behavior with close others (Loseth, Ellingsen, & Leknes, 2014)—by decreasing interpersonal distance after the trust game with an approaching friend or parents. Our reported effects are thus specific to the

interaction partners of the trust game. These are important notions for the specificity of our manipulation as well as for the external validity of our study, as trusting a person in everyday life is not confined to a specific situation and typically does not extend to unrelated others.

We have demonstrated that both reflective and reflexive interpersonal distance preferences change when we distrust an interaction partner. This finding is in line with work on peripersonal, as well as reflective and reflexive interpersonal distance adaptations to interaction partners of different age and gender (Iachini et al., 2016). Interestingly, in our reflective interpersonal distance task, total earnings and experienced trust were specifically associated with the change in interpersonal distance to the selfish trustee. Opposite to that, in the reflexive interpersonal distance task, experienced trust was generally associated with the distance after the trust game in both trustees, and not at all with total earnings. These effects hint at possible differential mechanisms underlying the reflective and reflexive measures. Future studies with a well-matched non-social trust game control task are needed to exclude the possibility that our findings are driven by changes in risk-aversion instead of trust. For now, we can only conclude that the distrust in the selfish trustee was so strong that it not only affected the conscious deliberative aspect of interpersonal distance, but also the more automatic, reflexive aspect.

The increase in interpersonal distance to the selfish trustee might be due to a change in the subject's personal space caused by the interactions with the selfish trustee. Personal space is theorized to serve as a buffer-zone protecting against harms or threats (Dosey & Meisels, 1969), and extends when interacting with unfavourable others (Iachini et al., 2015; Pellencin et al., 2018; Teneggi, Canzoneri, di Pellegrino, & Serino, 2013). As the permeability of this personal space is thought to depend on the trustworthiness of the interaction partner (Scott, 1993), the selfish trustee might have intruded the subject's extending personal space. Such an intrusion is associated with physiological arousal (Sawada, 2003), which might be related to increased stress (Dosey & Meisels, 1969) and anxiety (Perry et al., 2013; Rogers, Rearden, & Hillner, 1981). Because an intrusion of personal space triggers a withdrawal reaction (Hayduk, 1983; Sundstrom & Altman, 1976), the increase in interpersonal distance from the selfish trustee might be a way to relieve this physiological and emotional discomfort. Future research has yet to establish whether a change in trust affects the size of a subject's personal space.

A consequence of an increased physical distance from negative interaction partners might be that the psychological distance increases as well, as communication becomes more impersonal (Jourard & Friedman, 1970; Skotko & Langmeyer, 1977), and empathising behaviour potentially decreases (Perry et al., 2014; Strayer & Roberts, 1997). Relatedly, increasing spatial distance might have a similar function to decreasing similarity, which has a negative impact on empathy and prosocial behaviour as well (e.g. Majdandzic, Amashaufer, Hummer, Windischberger, & Lamm, 2016). An increased distance might be necessary for successful outcomes with a negative interaction partner (Burgoon, Stacks, & Woodall, 1979), potentially preventing a break-down of the interaction (King-Casas et al., 2008). Future research has to establish whether the success of an interaction with a distrusted interaction partner in different contexts (such as collaboration, or competition) depend on the interpersonal distances from them.

In conclusion, we have established that developing distrust in a person behaving in a consistently selfish manner during a repeated trust game affects subsequent reflective, as well as reflexive interpersonal distance towards them. These findings extend our current understanding of trust and interpersonal distance, such that interpersonal distance does not only influence levels of trust (Bryan et al., 2012), but trust also impacts interpersonal distance. Furthermore, our results are a starting point to deepen our understanding of how we successfully navigate interactions with distrusted others without a breakdown or escalation of an interaction.

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References

Anonymous. (2019). *Scripts for: Interpersonal distance adjustments after interactions with a generous and selfish trustee during a repeated trust game*. Retrieved from: https://osf.io/4r8sd/?view_only=6dcee7fdfeb3473e99d42ce4e82b7148

Baayen, R. H., Davidson, D. J., & Bates, D. M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language, 59*(4), 390-412. doi:10.1016/j.jml.2007.12.005

Bates, D. M., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67*(1), 1 - 48.

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5*(4), 323-370. doi:10.1037/1089-2680.5.4.323

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity, and social history. *GEB, 10*, 122 - 142.

Branas-Garza, P., Rodriguez-Lara, I., & Sanchez, A. (2017). Humans expect generosity. *Sci Rep, 7*, 42446. doi:10.1038/srep42446

Bryan, R., Perona, P., & Adolphs, R. (2012). Perspective distortion from interpersonal distance is an implicit visual cue for social judgments of faces. *PLoS One, 7*(9), e45301. doi:10.1371/journal.pone.0045301

Burgoon, J., Stacks, D., & Woodall, W. G. (1979). A communicative model of violations of distancig expectations. *The Western Journal of Speech Communication, 43*, 153 - 167.

Candini, M., Giuberti, V., Manattini, A., Grittani, S., di Pellegrino, G., & Frassinetti, F. (2017). Personal space regulation in childhood autism: Effects of social interaction and person's perspective. *Autism Res, 10*(1), 144-154. doi:10.1002/aur.1637

Cartaud, A., Ruggiero, G., Ott, L., Iachini, T., & Coello, Y. (2018). Physiological Response to Facial Expressions in Peripersonal Space Determines Interpersonal Distance in a Social Interaction Context. *Front Psychol, 9*, 657. doi:10.3389/fpsyg.2018.00657

Chang, L. J., Doll, B. B., van 't Wout, M., Frank, M. J., & Sanfey, A. G. (2010). Seeing is believing: trustworthiness as a dynamic belief. *Cogn Psychol, 61*(2), 87-105. doi:10.1016/j.cogpsych.2010.03.001

Cohen, D., Perry, A., Mayseless, N., Kleinmintz, O., & Shamay-Tsoory, S. G. (2018). The role of oxytocin in implicit personal space regulation: An fMRI study. *Psychoneuroendocrinology, 91*, 206-215. doi:10.1016/j.psyneuen.2018.02.036

Dosey, M., & Meisels, M. (1969). Personal space and self-protection. *Journal of Personality and Social Psychology, 11*(2), 93 - 97.

Duke, M. P., & Nowicki, S. (1972). A new measure and social-learning model for interpersonal distance. *Journal of Experimental Research in Personality*.

Fehr, E., & Camerer, C. F. (2007). Social neuroeconomics: the neural circuitry of social preferences. *Trends in Cognitive Sciences, 11*(10), 419-427. doi:10.1016/j.tics.2007.09.002

Fett, A. K., Gromann, P. M., Giampietro, V., Shergill, S. S., & Krabbendam, L. (2012). Default distrust? An fMRI investigation of the neural development of trust and cooperation. *Soc Cogn Affect Neurosci, 9*(4), 395-402. doi:10.1093/scan/nss144

Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics, 10*(2), 171-178.

Fox, J., & Weisberg, S. (2011). *An {R} Companion to Applied Regression*. Thousand Oaks CA: Sage.

Gessaroli, E., Santelli, E., di Pellegrino, G., & Frassinetti, F. (2013). Personal space regulation in childhood autism spectrum disorders. *PLoS One, 8*(9), e74959. doi:10.1371/journal.pone.0074959

Hale, J., Payne, M. E., Taylor, K. M., Paoletti, D., & Hamilton, A. F. (2018). The virtual maze: A behavioural tool for measuring trust. *Q J Exp Psychol (Hove), 71*(4), 989-1008. doi:10.1080/17470218.2017.1307865

Hall, E. T. (1966). *The hidden dimension* (Vol. 609): Garden City, NY: Doubleday.

Hayduk, L. A. (1983). Personal-Space - Where We Now Stand. *Psychological Bulletin, 94*(2), 293-335. doi:Doi 10.1037/0033-2909.94.2.293

Iachini, T., Coello, Y., Frassinetti, F., Senese, V. P., Galante, F., & Ruggiero, G. (2016). Peripersonal and interpersonal space in virtual and real environments: Effects of gender and age. *Journal of Environmental Psychology, 45*, 154-164. doi:10.1016/j.jenvp.2016.01.004

Iachini, T., Pagliaro, S., & Ruggiero, G. (2015). Near or far? It depends on my impression: moral information and spatial behavior in virtual interactions. *Acta Psychologica, 161*, 131-136. doi:10.1016/j.actpsy.2015.09.003

Jourard, S. M., & Friedman, R. (1970). Experimenter-subject "distance" and self-disclosure. *Journal of Personality and Social Psychology, 15*(3), 278-282.

King-Casas, B., Sharp, C., Lomax-Bream, L., Lohrenz, T., Fonagy, P., & Montague, P. R. (2008). The rupture and repair of cooperation in borderline personality disorder. *Science, 321*(5890), 806-810. doi:10.1126/science.1156902

Kleiman, T., Sher, N., Elster, A., & Mayo, R. (2015). Accessibility is a matter of trust: Dispositional and contextual distrust blocks accessibility effects. *Cognition, 142*, 333-344. doi:10.1016/j.cognition.2015.06.001

Lenth, R. V. (2019). emmeans: Estimated Marginal Means, aka Least-Squares Means. (Version R package version 1.3.5.1). Retrieved from https://CRAN.R-project.org/package=emmeans

Lloyd, D. M. (2009). The space between us: a neurophilosophical framework for the investigation of human interpersonal space. *Neuroscience and Biobehavioral Reviews, 33*(3), 297-304. doi:10.1016/j.neubiorev.2008.09.007

Loseth, G. E., Ellingsen, D. M., & Leknes, S. (2014). State-dependent mu-opioid modulation of social motivation. *Front Behav Neurosci, 8*, 430. doi:10.3389/fnbeh.2014.00430

Lüdecke, D. (2018). sjPlot: Data Visualization for Statistics in Social Science. Retrieved from https://CRAN.R-project.org/package=sjPlot

Majdandzic, J., Amashaufer, S., Hummer, A., Windischberger, C., & Lamm, C. (2016). The selfless mind: How prefrontal involvement in mentalizing with similar and dissimilar others shapes empathy and prosocial behavior. *Cognition, 157*, 24-38. doi:10.1016/j.cognition.2016.08.003

Mayo, R. (2015). Cognition is a matter of trust: Distrust tunes cognitive processes. *European Review of Social Psychology, 26*(1), 283-327. doi:10.1080/10463283.2015.1117249

Pellencin, E., Paladino, M. P., Herbelin, B., & Serino, A. (2018). Social perception of others shapes one's own multisensory peripersonal space. *Cortex, 104*, 163-179. doi:10.1016/j.cortex.2017.08.033

Perry, A., Mankuta, D., & Shamay-Tsoory, S. G. (2014). OT promotes closer interpersonal distance among highly empathic individuals. *Soc Cogn Affect Neurosci*. doi:10.1093/scan/nsu017

Perry, A., Rubinsten, O., Peled, L., & Shamay-Tsoory, S. G. (2013). Don't stand so close to me: a behavioral and ERP study of preferred interpersonal distance. *NeuroImage, 83*, 761-769. doi:10.1016/j.neuroimage.2013.07.042

Psychology Software Tools, I. (2015). E-Prime 2.0. Pittsburgh, PA. Retrieved from http://www.pstnet.com
R Core Team. (2017). R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing.
Rankin, D. J., & Eggimann, F. (2009). The evolution of judgement bias in indirect reciprocity. *Proc Biol Sci, 276*(1660), 1339-1345. doi:10.1098/rspb.2008.1715
Rogers, P., Rearden, J., & Hillner, W. (1981). Effects of distance from interviewer and intimacy of topic on verbal productivity and anxiety. *Psychological Reports, 49*, 303 - 307.
Rosenberger, L. A., Eisenegger, C., Naef, M., Terburg, D., Fourie, J., Stein, D. J., & Van Honk, J. (2019). The human basolateral amygdala is indispensable for social experiential learning. *Current Biology*.
Ruggiero, G., Frassinetti, F., Coello, Y., Rapuano, M., di Cola, A. S., & Iachini, T. (2017). The effect of facial expressions on peripersonal and interpersonal spaces. *Psychol Res, 81*(6), 1232-1240. doi:10.1007/s00426-016-0806-x
Sawada, Y. (2003). Blood pressure and heart rate responses to an intrusion on personal space. *Japanese Psychological Research, 45*(2), 115 - 121.
Scott, A. (1993). A beginning theory of personal space boundaries. *Perspectives in Psychiatric Care, 29*(2).
Shao, M., Yin, J., Ji, H., Yang, Y., & Song, F. (2020). Distance perception warped by social relations: Social interaction information compresses distance. *Acta Psychologica, 202*, 102948. doi:10.1016/j.actpsy.2019.102948
Siegel, J. Z., Mathys, C., Rutledge, R. B., & Crockett, M. J. (2018). Beliefs about bad people are volatile. *Nature Human Behaviour, 2*(10), 750-756. doi:10.1038/s41562-018-0425-1
Skotko, V. P., & Langmeyer, D. (1977). The effects of interaction distance and gender on self-disclosure in the dyad. *Sociometry, 40*(2), 178-182.
Strayer, J., & Roberts, W. (1997). Children's personal distance and their empathy: indices of interpersonal closeness. *International Journal of behavioural Development, 20*(3), 385 - 403.
Sundstrom, E., & Altman, I. (1976). Interpersonal relationships and personal space: research review and theoretical model. *Human Ecology, 4*(1).
Teneggi, C., Canzoneri, E., di Pellegrino, G., & Serino, A. (2013). Social modulation of peripersonal space boundaries. *Current Biology, 23*(5), 406-411. doi:10.1016/j.cub.2013.01.043
Vagnoni, E., Lewis, J., Tajadura-Jimenez, A., & Cardini, F. (2018). Listening to a conversation with aggressive content expands the interpersonal space. *PLoS One, 13*(3), e0192753. doi:10.1371/journal.pone.0192753
Vanneste, S., Verplaetse, J., Vanhiel, A., & Braeckman, J. (2007). Attention bias toward noncooperative people. A dot probe classification study in cheating detection. *Evolution and Human Behavior, 28*(4), 272-276. doi:10.1016/j.evolhumbehav.2007.02.005
Wheeless, L. R., & Grotz, J. (1977). The measurement of trust and its relationship to self-disclosure. *Human Communication Research, 3*(3), 250-257.

Supplementary Results

Experiment 1

Supplementary Table 1.

Descriptives of distance measured during paper & pencil interpersonal distance task and test statistics of distance change due to trust game

	Before trust game Mean (SD)	After trust game Mean (SD)	t-statistic	p-value (corrected)	std. b
Friend	0.09 (0.05)	0.09 (0.05)	0.012	> .999	-0.00
Mother	0.15 (0.20)	0.15 (0.20)	0.160	> .999	-0.01
Unknown person	0.29 (0.18)	0.32 (0.22)	-1.037	.917	0.07
Father	0.21 (0.27)	0.19 (0.26)	0.424	.999	-0.03
Experimenter	0.22 (0.15)	0.20 (0.14)	0.640	.994	-0.05
Selfish trustee	0.25 (0.16)	0.37 (0.26)	-4.376	<.001	0.31
Generous trustee	0.24 (0.14)	0.19 (0.10)	1.792	.413	-0.13

Supplementary Table 2.

Test statistics of distance measured during paper & pencil interpersonal distance task comparing distances between trustees and other approaching people before and after trust game

Comparison	Estimated marginal means (SE)	Degrees of freedom	t-statistic	p-value (corrected)	std. b
Before trust game					
Selfish trustee -					
Generous trustee	0.004 (0.029)	667	0.132	1.0000	-0.01
Friend	0.155 (0.029)	667	5.415	<.0001	-0.27
Mother	0.092 (0.029)	667	3.213	0.0458	-0.16
Father	0.037 (0.029)	667	1.291	0.9790	-0.07
Unknown person	-0.048 (0.029)	667	-1.662	0.8706	0.08
Experimenter	0.026 (0.029)	667	0.916	0.9991	-0.05
Generous trustee -					
Friend	-0.151 (0.029)	667	-5.283	<.0001	-0.27
Mother	0.088 (0.029)	667	3.081	0.0681	-0.16
Father	0.033 (0.029)	667	1.160	0.9916	-0.06
Unknown person	-0.051 (0.029)	667	-1.794	0.7987	0.09
Experimenter	0.022 (0.029)	667	0.784	0.9998	-0.04
After trust game					
Selfish trustee -					
Generous trustee	0.178 (0.028)	667	6.405	<.0001	-0.31
Friend	0.279 (0.028)	667	10.033	<.0001	-0.49
Mother	0.220 (0.028)	667	7.916	<.0001	-0.39
Father	0.173 (0.028)	667	6.217	<.0001	-0.30
Unknown person	0.047 (0.028)	667	1.683	0.8602	-0.08
Experimenter	0.168 (0.028)	667	6.040	<.0001	-0.30
Generous trustee -					

Friend	-0.101 (0.028)	667	-3.627	0.0114	-0.18
Mother	0.042 (0.028)	667	1.511	0.9308	-0.07
Father	-0.005 (0.028)	667	-0.188	1.0000	0.01
Unknown person	-0.131 (0.028)	667	-4.722	0.0001	0.23
Experimenter	-0.010 (0.028)	667	-0.365	1.0000	0.02

Experiment 2

Supplementary Table 3.

Descriptives of distance measured during digital interpersonal distance task and test statistics of distance change due to trust game

	Before trust game Mean (SD)	After trust game Mean (SD)	t-statistic	p-value (corrected)	Std. b
Friend	0.10 (0.12)	0.08 (0.06)	0.652	.994	-0.04
Mother	0.13 (0.17)	0.14 (0.18)	-0.417	.999	0.03
Unknown person	0.27 (0.19)	0.29 (0.20)	-0.774	.982	0.05
Father	0.12 (0.12)	0.12 (0.15)	-0.353	.999	0.02
Experimenter	0.19 (0.12)	0.19 (0.12)	-0.586	.997	0.04
Selfish trustee	0.20 (0.19)	0.38 (0.29)	-7.663	<.001	0.52
Generous trustee	0.22 (0.16)	0.19 (0.15)	0.841	.972	-0.06

Supplementary Table 4.

Test statistics of distance measured during digital interpersonal distance task comparing distances between trustees and other approaching people before and after trust game

Comparison	Estimated marginal means (SE)	Degrees of freedom	t-statistic	p-value (corrected)	std. b
Before trust game					
Selfish trustee -					
Generous trustee	-0.018 (0.025)	707	-0.720	0.9999	0.03
Friend	0.101 (0.025)	707	4.078	0.0021	-0.20
Mother	0.068 (0.025)	707	2.759	0.1641	-0.13
Father	0.081 (0.025)	707	3.284	0.0370	-0.16
Unknown person	-0.071 (0.025)	707	-2.849	0.1297	0.14
Experimenter	0.017 (0.025)	707	0.675	1.0000	-0.03
Generous trustee -					
Friend	-0.119 (0.025)	707	-4.798	0.0001	-0.23
Mother	0.086 (0.025)	707	3.479	0.0195	-0.17
Father	0.099 (0.025)	707	4.003	0.0027	-0.19

Unknown person	-0.053 (0.025)	707	-2.129	0.5586	0.10
Experimenter	0.035 (0.025)	707	1.394	0.9615	-0.07
<u>After trust game</u>					
Selfish trustee -					
Generous trustee	0.192 (0.025)	707	7.831	<.0001	-0.37
Friend	0.306 (0.025)	707	12.482	<.0001	-0.59
Mother	0.247 (0.025)	707	10.075	<.0001	-0.48
Father	0.262 (0.025)	707	10.669	<.0001	-0.51
Unknown person	0.099 (0.025)	707	4.057	0.0021	-0.19
Experimenter	0.191 (0.025)	707	7.801	<.0001	-0.37
Generous trustee -					
Friend	-0.114 (0.025)	707	-4.651	0.0001	-0.22
Mother	0.055 (0.025)	707	2.244	0.4713	-0.11
Father	0.070 (0.025)	707	2.838	0.1337	-0.13
Unknown person	-0.093 (0.025)	707	-3.774	0.0066	0.18
Experimenter	-0.001 (0.025)	707	-0.030	1.0000	0.00

<u>Repeated Trust Game</u>

In experiment 2, subjects learned successfully to differentiate between the generous and selfish trustee during the repeated trust game. They changed their investments in a different manner for the two trustees over the rounds, interaction trustee x period: $\chi^2(1) = 665.272$, $p < .001$. Decomposing this interaction, the investments to the generous trustee increased over the rounds, b = 0.05 (95% CI = (0.04, 0.06)), $p < .001$, std.b = 0.19 (95% CI = (0.17, 0.22)), and decreased to the selfish trustee, b = -0.08 (95% CI = (-0.09, -0.07)), $p < .001$, std.b = -0.31 (95% CI = (-0.34, -0.28)). In addition, subjects changed their trust ratings about the two trustees in a different manner of the rounds, interaction trustee x period: $\chi^2 (1) = 107.948$, $p < .001$. Decomposing this interaction, trust ratings about the generous trustee increased over the rounds, b = 0.36 (95%CI = (0.24, 0.49)), $p < .001$, std.b = 0.17 (95% CI = (0.11, 0.23)), and decreased with the selfish trustee, b = -0.57 (95% CI = (-0.69, -0.44)), $p < .001$, std.b = -0.27 (95% CI = (-0.33, -0.21)). Back-transfer expectations about the two trustees also changed in a different manner over the rounds, trustee x period interaction: $\chi^2(1) = 135.665$, $p < 0.001$. *Post-hoc* tests revealed that the back-transfer expectations about the generous trustee increased over the rounds (b = 0.08, (95% CI = (0.05, 0.11)), $p < .001$, std.b = 0.18 (95% CI = (0.11, 0.24))), while they decreased for the selfish trustee over the rounds (b = -0.17 (95% CI = (-0.20, -0.14)), $p < .001$, std.b = -0.38 (95% CI = (-0.44, -0.31))).

Supplementary Table 5.

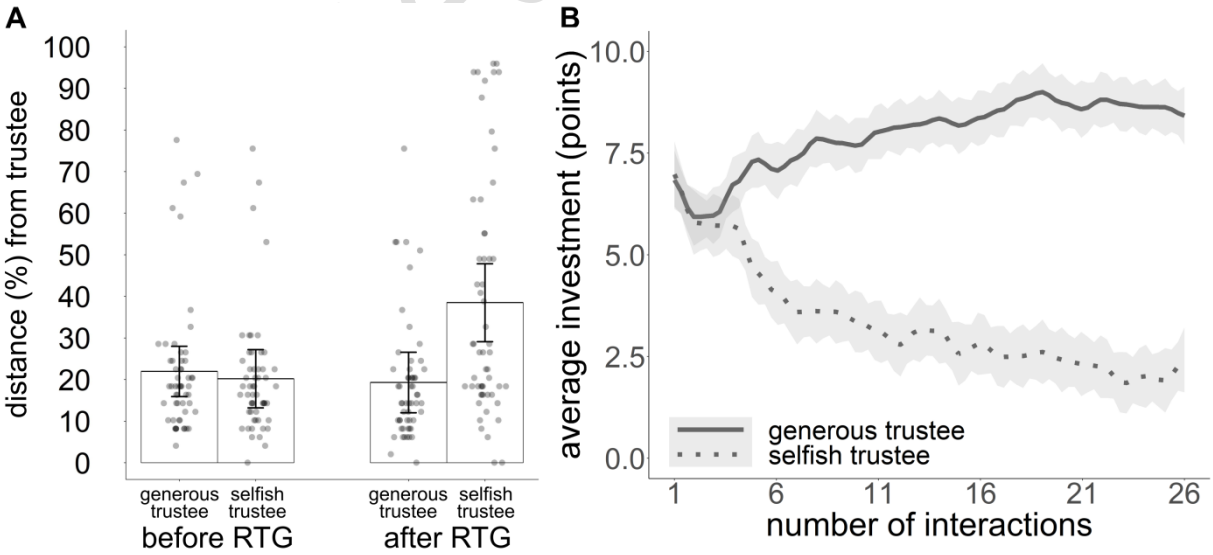
Descriptive statistics of measures in the repeated trust game in experiment 2

	first interaction	last interaction

	generous trustee	selfish trustee	generous trustee	selfish trustee
	m (SD)	m (SD)	m (SD)	m (SD)
Investment in points	6.84 (3.02)	6.98 (3.16)	8.42 (2.59)	2.42 (2.90)
trust rating in %	54.46 (26.21)	53.11 (26.26)	70.07 (27.07)	15.82 (28.46)
back-transfer expectation in %	12.28 (7.42)	12.51 (7.37)	14.89 (5.61)	2.09 (3.07)
difference (BT exp. – BT) in %	5.44 (5.03)	5.53 (4.76)	-0.11 (4.83)	0.23 (2.56)
certainty about BT exp. in %	36.56 (26.35)	32.79 (26.35)	62.67 (30.77)	71.89 (38.34)
total earnings in points			405.28 (37.47)	242.93 (15.07)

Note on abbreviations: m = mean, SD = standard deviation, BT = back-transfer, BT exp. = back-transfer expectations

As in the first experiment, subjects displayed a bias in their trust game behavior. During the first interaction with the generous and selfish trustee, their back-transfer expectations did not match the actual back-transfers from the two trustees ($t_{selfish}(56) = -8.77$, $p < .001$, $d = -1.082$; $t_{generous}(56) = -8.16$, $p < .001$, $d = -1.162$). As can be seen in the supplementary Table 3, the decrease in investments with the selfish trustee was larger than the increase in investments with the generous trustee, $t(56) = -12.58$, $p < .001$, std.b = 0.66 (95% CI = (0.55, 0.76)). In addition, the decrease in back-transfer expectations was larger with the selfish trustee than the increase with the generous trustee, $t(56) = -13.94$, $p < .001$, std.b = 0.62 (95% CI = (0.54, 0.71)). Finally, the decrease in trust ratings was also larger in the selfish trustee, than the increase with the generous trustee, $t(56) = -11.66$, $p < .001$, std.b = 0.66 (95% CI = (0.55, 0.77)). Total earnings were larger for the generous trustee than the selfish trustee, $t(56) = 29.85$, $p < .001$, std.b = -0.94 (95% CI = (-1.01, -0.88)).



Supplementary Figure 1. Trust and static interpersonal distance adaptation in experiment 2. A) Subjects increased their distance to the selfish trustee after the repeated trust game (RTG) in the interpersonal distance task. Dots represent individual data points, error bars are 95% confidence intervals (CI) adjusted for within-subject comparisons. B) Subjects learned to trust the trustees. They

increased their investments to the generous trustee (solid line) and decreased them to the selfish trustee (dashed line) during 26 interactions with each trustee in the repeated trust game. Group data are smoothed with local regression (LOESS). Shaded areas around lines represent 95% CI.

Supplementary Table 6.

Inter-variable correlation matrix of mixed model regressing relative distance in experiment 1 on approaching people (trustee), time point (session), and their interaction.

	intercept	trustee 1	trustee 2	trustee 3	trustee 4	trustee 5	trustee 6	session 1	t1:s1	t2:s1	t3:s1	t4:s1	t5:s1
trustee 1	0												
trustee 2	0	-0.166											
trustee 3	0	-0.166	-0.166										
trustee 4	0	-0.166	-0.166	-0.166									
trustee 5	0	-0.166	-0.166	-0.166	-0.166								
trustee 6	0.001	-0.167	-0.167	-0.167	-0.167	-0.167							
session 1	-0.017	0.001	0.001	0.001	0.001	0.001	-0.004						
t1:s1	0	-0.029	0.004	0.004	0.004	0.004	0.006	-0.001					
t2:s1	0	0.004	-0.029	0.004	0.004	0.004	0.006	-0.001	-0.166				
t3:s1	0	0.004	0.004	-0.029	0.004	0.004	0.006	-0.001	-0.166	-0.166			
t4:s1	0	0.004	0.004	0.004	-0.029	0.004	0.006	-0.001	-0.166	-0.166	-0.166		
t5:s1	0	0.004	0.004	0.004	0.004	-0.029	0.006	-0.001	-0.166	-0.166	-0.166	-0.166	
t6:s1	-0.001	0.006	0.006	0.006	0.006	0.006	-0.038	0.004	-0.167	-0.167	-0.167	-0.167	-0.167

Supplementary Table 7.

Inter-variable correlation matrix of mixed model regressing relative distance in experiment 2 on approaching people (trustee), time point (session), and their interaction.

	intercept	trustee 1	trustee 2	trustee 3	trustee 4	trustee 5	trustee 6	session 1	t1:s1	t2:s1	t3:s1	t4:s1	t5:s1
trustee 1	0												
trustee 2	0	-0.167											
trustee 3	0	-0.167	-0.167										
trustee 4	0	-0.167	-0.167	-0.167									
trustee 5	0	-0.167	-0.167	-0.167	-0.167								
trustee 6	0	-0.167	-0.167	-0.167	-0.167	-0.167							
session 1	-0.005	0	0	0	0	0	0						
t1:s1	0	-0.009	0.002	0.002	0.002	0.002	0.002	0					
t2:s1	0	0.002	-0.009	0.002	0.002	0.002	0.002	0	-0.167				
t3:s1	0	0.002	0.002	-0.009	0.002	0.002	0.002	0	-0.167	-0.167			
t4:s1	0	0.002	0.002	0.002	-0.009	0.002	0.002	0	-0.167	-0.167	-0.167		
t5:s1	0	0.002	0.002	0.002	0.002	-0.009	0.002	0	-0.167	-0.167	-0.167	-0.167	
t6:s1	0	0.002	0.002	0.002	0.002	0.002	-0.009	0	-0.167	-0.167	-0.167	-0.167	-0.167

Supplementary Table 8.

Inter-variable correlation matrix of mixed model regressing investment in experiment 1 on trustee type, round number, and their interaction.

	intercept	trustee 1	round nr
trustee 1	0.057		
round nr	-0.332	0	
t1:round nr	0	-0.463	-0.001

Supplementary Table 9.

Inter-variable correlation matrix of mixed model regressing back-transfer expectation in experiment 1 on trustee type, round number, and their interaction.

	intercept	round nr	trustee 1
round nr	-0.497		
trustee 1	-0.259	0.001	
round nr:t1	0	-0.001	-0.687

Supplementary Table 10.

Inter-variable correlation matrix of mixed model regressing certainty about back-transfer expectation in experiment 1 on trustee type, round number, and their interaction.

	intercept	round nr	trustee 1
round nr	-0.538		
trustee 1	0.124	0.001	
round nr:t1	0	-0.001	-0.793

Supplementary Table 11.

Inter-variable correlation matrix of mixed model regressing trust ratings in experiment 1 on trustee type, round number, and their interaction.

	intercept	round nr	trustee 1
round nr	-0.502		
trustee 1	-0.05	0	
round nr:t1	0	-0.001	-0.63

Supplementary Table 12.

Inter-variable correlation matrix of mixed model regressing change in interpersonal distance in experiment 1 on trustee type, total earnings, and their interaction.

	intercept	total earnings	trustee 1
total earnings	-0.967		
trustee 1	0.186	-0.417	
te:t1	-0.41	0.619	-0.969

Supplementary Table 13.

Inter-variable correlation matrix of linear mixed model regressing post trust game interpersonal distance in experiment 1 on trustee type, investment, trust rating, back-transfer expectation, and their interactions of the final two rounds of the trust game.

	intercept	trustee	investment	back-transfer expectation	trust rating	trustee1: investment	trustee1: back-transfer expectation
trustee1	-0.764						
investment	-0.422	0.319					
back-transfer expectation	0.063	-0.113	-0.725				
trust rating	-0.162	0.192	-0.452	0.159			
trustee1: investment	0.223	-0.379	0.156	-0.265	-0.373		
trustee1: back-transfer expectation	-0.056	0	-0.337	0.663	0.268	-0.677	
trustee1: trust rating	0.225	-0.204	-0.348	0.201	0.312	-0.505	0.157

Supplementary Table 14.

Inter-variable correlation matrix of mixed model regressing post trust game interpersonal distance in experiment 1 on trustee type, back-transfer, trust rating, and their interaction of the final two rounds of the trust game.

	intercept	trustee	back-transfer	trust rating	trustee1: back-transfer
trustee1	-0.61				
back-transfer	-0.426	-0.179			
trust rating	-0.089	0.322	-0.611		
trustee1: back-transfer	-0.247	-0.381	0.942	-0.53	
trustee1: trust rating	0.358	-0.127	-0.582	0.319	-0.649

Supplementary Table 15.

Inter-variable correlation matrix of mixed model regressing investment in experiment 2 on trustee type, round number, and their interaction.

	intercept	trustee 1	round nr
trustee 1	0.162		
round nr	-0.259	-0.001	
t1:round nr	-0.001	-0.415	0.002

Supplementary Table 16.

Inter-variable correlation matrix of mixed model regressing back-transfer expectation in experiment 2 on trustee type, round number, and their interaction.

	intercept	round nr	trustee 1
round nr	-0.548		

trustee 1	-0.05	-0.004	
round nr:t1	-0.003	0.004	-0.697

Supplementary Table 17.

Inter-variable correlation matrix of mixed model regressing certainty about back-transfer expectation in experiment 2 on trustee type, round number, and their interaction.

	intercept	round nr	trustee 1
round nr	-0.573		
trustee 1	0.195	-0.004	
round nr:t1	-0.003	0.004	-0.764

Supplementary Table 18.

Inter-variable correlation matrix of mixed model regressing trust ratings in experiment 2 on trustee type, round number, and their interaction.

	intercept	round nr	trustee 1
round nr	-0.44		
trustee 1	0.003	-0.003	
round nr:t1	-0.002	0.004	-0.594

Supplementary Table 19.

Inter-variable correlation matrix of mixed model regressing change in interpersonal distance in experiment 2 on trustee type, total earnings, and their interaction.

	intercept	total earnings	trustee 1
total earnings	-0.973		
trustee 1	0.35	-0.543	
te:t1	-0.539	0.708	-0.976

Supplementary Table 20.

Inter-variable correlation matrix of linear mixed model regressing post trust game interpersonal distance in experiment 2 on trustee type, investment, trust rating, back-transfer expectation, and their interactions of the final two rounds of the trust game.

	intercept	trustee	investment	back-transfer expectation	trust rating	trustee1: investment	trustee1: back-transfer expectation
trustee1	-0.749						
investment	-0.473	0.353					
back-transfer expectation	0.103	-0.117	-0.679				
trust rating	-0.293	0.216	0.101	-0.456			
trustee1: investment	0.269	-0.444	-0.28	0.213	-0.165		

trustee1: back-transfer expectation	0.044	-0.138	-0.109	0.396	-0.026	-0.408	
trustee1: trust rating	0.182	-0.248	0.062	-0.222	0.03	-0.137	-0.377

Supplementary Table 21.

Inter-variable correlation matrix of mixed model regressing post trust game interpersonal distance in experiment 2 on trustee type, back-transfer, trust rating, and their interaction of the final two rounds of the trust game.

	intercept	trustee	back-transfer	trust rating	trustee1: back-transfer
trustee1	-0.666				
back-transfer	-0.3	-0.023			
trust rating	-0.347	0.251	-0.371		
trustee1: back-transfer	0.018	-0.419	0.735	-0.094	
trustee1: trust rating	0.252	-0.343	-0.188	-0.062	-0.376