Believing in Hidden Plots is Associated with Decreased Behavioral Trust: Conspiracy Belief as Greater Sensitivity to Social Threat or Insensitivity Towards its Absence?

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Abstract

Past research has demonstrated that conspiracy belief is linked to a low level of self-reported general trust. In four experimental online studies (total $N = 1105$) we examined whether this relationship translated into actual behavior. Specifically, since the decision to trust relies on the ability to detect potential social threat, we tested whether conspiracy believers are better at detecting *actual* threat, worse at detecting the *absence* of threat, or simply trust less, irrespective of any social cue. To this end, participants played multiple, independent rounds of the trust game, a behavioral measure for interpersonal trust. We manipulated social threat by presenting photographs of their alleged trustees with varying intensity of facial anger. In three of the four studies, trustors' conspiracy beliefs predicted a more cautious investment behavior in the trust game. This association, however, was not contingent on the social threat posed by the trustee. The present research thus joins a number of studies demonstrating that conspiracy beliefs can – under certain circumstances - influence everyday behavior.

Keywords: conspiracy theories, conspiracy belief, trust, social threat, trust game

Highlights

- Conspiracy beliefs were related to less investments (and outcomes) in trust games.
- Participants invested less points if co-players exhibited social threat (angry expression)
- We found no support that conspiracy beliefs were related to social threat perception.

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Emperor Nero orders to set Rome on fire. The Jews cause the Plague by poisoning well water. Witches, as allies of the devil, are responsible for natural disasters and diseases. The Illuminati initiate the French Revolution. Conspiracy theories have been documented since ancient times. A recurring pattern in trying to understand these allegations about secret plots of others is their apparent association with decreased trust. Recent findings suggest that conspiracy beliefs come along with low trust in authorities (Einstein & Glick, 2015) and in individuals (Leman & Cinnirella, 2013), although political trust seems to be more strongly related than interpersonal trust (Imhoff & Lamberty, 2018). Virtually all of these findings, however, rely on self-reported trust, not actual behavior indicative of trust. Theoretically, even more relevant, trust behavior may be seen as a nuanced reaction to detected cues of social threat in a given situation (Thielmann & Hilbig, 2015), and it is unclear whether conspiracy beliefs are associated with an increased sensitivity to actual threat cues, a decreased ability to detect cues speaking against threat or just a general propensity to trust less, irrespective of the given social cues. This is important as it may inform our theorizing about the functionality of conspiracy beliefs in a world that does entail threat and reasons to distrust. Ultimately, this may also inform discussion to what extent humans evolved to endorse conspiracy beliefs (or suspicions about the malintent of others; Van Prooijen & Van Vugt, 2018).

Conspiracy Beliefs and Interpersonal Trust

Conspiracy theories are commonly defined as alternative explanations of past or current phenomena, which accuse a group of powerful individuals of acting in secret to achieve selfish, malevolent goals (Imhoff & Lamberty, 2020; Swami & Furnham, 2014). Such theories are widespread (Graumann & Moscovici, 1987; Grebe & Nattrass, 2012;

Kuzio, 2011; Oliver & Wood, 2014; Swami, 2012), can be highly persuasive (Douglas & Sutton, 2015; Stojanov, 2015) and cover a wide range of topics (e.g., politics, economy, science, extraterrestrial life; Cairns, 2016; Jolley & Douglas, 2014a; Lewis & Kahn, 2005; Swami et al., 2010). Moreover, the belief in different conspiracy theories is highly correlated (Bruder et al., 2013; Goertzel, 1994), hence suggesting that there are stable, interindividual differences in the tendency to see conspiracies behind social phenomena (Dagnall et al., 2015; Imhoff & Bruder, 2014). Most importantly, such conspiracy beliefs are consequential, that is, they are associated with several negative health-related, political and social attitudes and behaviors (e.g., reduced willingness to be vaccinated or to vote, increased willingness to use political violence; Imhoff et al., 2020; Jolley & Douglas, 2014a, b; Lamberty & Imhoff, 2018).

A common denominator of these behaviors seems to be trust: One has to trust the medical recommendations to allow one's child to be vaccinated, and one has to trust politicians to represent the will of the electorate in order to see any meaning behind voting and not trusting the basic functioning of a pluralistic system does leave little alternatives to aim at overthrowing it. Trust thus is the glue that binds societies together, but also on a personal level we place our trust in often unknown others countless times every day (Golembiewski & McConkie, 1975; Rotter, 1971). Importantly, the decision to trust determines our subsequent behavior towards the person in question. For instance, trust is a positive predictor for cooperation (Balliet & Van Lange, 2013). Interpersonal trust can be defined as "a risky choice of making oneself dependent on the actions of another in a situation of uncertainty, based upon some expectation of whether the other will act in a benevolent fashion despite an opportunity to betray" (Thielmann & Hilbig, 2015, p. 251). Broadly speaking, trust depends on both the individual, stable characteristics of the trusting person (e.g., Evans & Revelle, 2008) and the features of the specific trust situation, including,

for instance, the trustworthiness of the trustee in question (e.g., Snijders & Keren, 2001; also see Fleenon & Leicht, 2006 for an integrative account on the person-situation perspectives of trust).

With regard to stable characteristics of the trustor, several studies suggested that intra-individual tendencies to trust and to believe in conspiracy theories are negatively correlated (see Lamberty, 2016 for a meta-analysis). This association has been shown with both trust in authorities (i.e., the government; Abalakina-Paap et al., 1999; Einstein & Glick, 2015; Van Prooijen & Acker, 2015) and in individuals (Brotherton, French, & Pickering, 2013; Goertzel, 1994; Leman & Cinnirella, 2013). The former relationship comes as little surprise, since the belief in a conspiracy theory already implies that one does not believe the official narrative of the authorities, hence mistrusting those (Imhoff & Bruder, 2014). The latter, however, seems less intuitive, as it states little *general* trust in others, irrespective of any power structure.

Yet, on closer examination, conspiracy beliefs and interpersonal (mis-)trust share a few preconditions that may explain their interrelation. First, based on the finding that beliefs in different conspiracy theories are oftentimes highly correlated (e.g., Bruder et al., 2013; Goertzel, 1994), several authors suggested that conspiracy beliefs are grounded on corresponding higher-order beliefs (e.g., Wood et al., 2012). Higher-order beliefs such as “nothing is as it seems” and “in general, people are selfish” could be the foundation for both conspiracy beliefs and general mistrust. In fact, common scales of interpersonal trust capture the notion that “other people are (not) trustworthy” (e.g., T. Yamagishi & Yamagishi, 1994), which might even be considered as such a higher-order belief itself. Second, conspiracy beliefs are related to several negative emotions, such as chronic feelings of powerlessness, lack of personal control (Abalakina-Paap et al., 1999), death-related anxiety (Newheiser et al., 2011) and fear (Grzesiak-Feldman, 2013). Such emotions tend to cause avoidance-oriented reactions (e.g., Elliot & McGregor, 1999; Green & Phillips, 2004), hence rendering a

cautious atmosphere of mistrust likely. In fact, some authors argue that conspiracy beliefs are manifestations of an evolutionary adaptive strategy to be suspicious and distrustful about others' intentions (Van Prooijen & Van Vugt, 2018).

Taken together, conspiracy believers may have lower a priori trustworthiness expectations that restrain the trust they place in any given trustee (i.e., regardless of his/her characteristics). However, previous studies on the relationship of conspiracy beliefs and trust have almost exclusively operationalized trust with questionnaire-based scales. These are limited to measuring general trust *attitudes* which, as the above definition suggests, are only one determinant of trust *behavior* (Thielmann & Hilbig, 2015). In fact, as early as 1934, LaPiere demonstrated in a classic of social psychological research that a person's attitude and behavior can diverge (also see Ajzen & Fishbein, 1977 for a review). Yet, to our knowledge, even though trust is highly relevant to everyday behavior, only two studies on conspiracy beliefs have used a behavioral operationalization of trust (Libman & Vollan, 2019; Wood & Douglas, 2013). In Wood and Douglas (2013), an analysis of online comments on news sites showed that conspiracy-supporting statements expressed distrust more often than conspiracy-denying statements. Thus, lack of trust manifested itself in the form of real behavior on the internet. However, the analysis of online comments poses certain limitations with regard to validity (e.g., due to self-presentation tendencies and persuasion strategies). In Libman and Vollan (2019), participants of a Chinese and a Russian sample reported their conspiracy beliefs and then played several rounds of an economic game that was designed to assess whether participants expected two other players to collude against them. In both samples, they found no association of general conspiracy beliefs and the expectation of collusion¹.

¹ Note that Libman and Vollan (2019) assessed two measures of conspiracy belief: the belief in conspiracy theories in general and the specific belief in *anti-Western* conspiracy theories. Assuming that anti-Western propaganda leads to a strong in-group cohesion, the authors had proposed a negative correlation between conspiracy beliefs and the expectation of collusion exclusively for the specific subcategory of anti-Western conspiracy theories, which they observed in the Chinese but not in the Russian sample.

However, since this operationalization of trust behavior relates to the specific context of a collusion of two persons, the study does not allow any clear conclusion as to whether conspiracy beliefs come along with more cautious trust behavior towards other individuals in general, as the robust, questionnaire-based findings elaborated above suggest.

In the present research, we therefore set out to test this assumption and made use of the trust game paradigm, the standard measure of behavioral trust (Berg et al., 1995; Johnson & Mislin, 2011). Here, individuals are endowed with a certain amount of money and they are free to send any amount to a co-player. This sent amount is tripled and transferred to the co-player who can then again send any amount back. In an ideal, fair situation, thus each player receives double the initial amount, but in order for that to happen the initial player needs to trust the co-player and the co-player has to send back the appropriate amount, i.e., be trustworthy. Arguably, however, not all persons are trustworthy and not trusting could be an accurate decision (so to speak, a correct rejection). Not trusting, however, could also lead to missed chances of increasing one's outcomes (so to speak, a miss). We will revisit this connection between conspiracy beliefs and the two possibilities (or the combination of both) in the following.

Conspiracy Beliefs and Social Threat Detection

As mentioned above, the decision to trust depends not only on stable dispositions of the trustor, but also on the specific trust situation, that is, particularly on the perceived trustworthiness of the trustee in question (Thielmann & Hilbig, 2015). To decide whether to trust or not, people rely on other people's reputation or overt signals, but arguably in most situations they lack such meta-information. When interacting with strangers, people thus have to infer their interaction partners' trustworthiness from appearance-based attributes (Bonnefon et al., 2013; Van't Wout & Sanfey, 2008), such as facial features (Todorov et al., 2009) and facial expressions (Scharlemann et al., 2001). Concretely, an angry facial

expression signals potential social threat, thereby diminishing the trustworthiness judgments about the respective person (Oosterhof & Todorov, 2008), which, in turn, decreases investments in the trust game (Campellone & Kring, 2013). Interestingly, conspiracy beliefs are associated with certain dispositions that may influence such trustworthiness assessments, which we would now like to elaborate on in more detail.

Generally speaking, the assessment of trustworthiness is a basal psychological mechanism (Posten & Mussweiler, 2013). People can automatically infer ones' trustworthiness from facial expressions within a very short time (Todorov et al., 2009). In fact, from an evolutionary perspective, human perception is designed to be extra sensitive to cues of potential threat (Fox et al., 2002). According to *error management theory*, natural selection fostered the emergence of several cognitive and behavioral biases in order to maximize fitness (Haselton & Buss, 2000). More specifically, when being confronted with a consequential decision, such as whether a stranger poses a threat, people can make two errors with varying costs: They can either erroneously perceive a harmless situation as threat (false-positive) or they can miss a real threat (false-negative). While detecting a threat where in fact none existed may, for instance, entail damage to reputation and missing out a valuable interaction, overlooking a real threat may have life-threatening consequences. Thus, in the same way as smoke alarms are designed to go off once too much rather than once too little (Nesse, 2001), human perception is biased in that ambiguous situations tend to be perceived as threatening, following the principle "better safe than sorry" (Johnson et al., 2013).

Importantly, despite the general propensity to detect threats, there are individual differences in the magnitude of this biased processing. Specifically, people who chronically tend to feel vulnerable have an even lower perceptual threshold for potential social threats (Ohman et al., 2001). Similarly, people who hold a negative worldview (e.g., that the world, in general, is a threatening place), more often perceive specific situations as threatening

(Schaller et al., 2003). Conspiracy believers, in turn, are characterized by chronic feelings of vulnerability (Abalakina-Paap et al., 1999; Imhoff & Bruder, 2014) and hold the negative view that powerful people are willing to engage in malicious conspiracies (Wood et al., 2012). Consequently, their perceived probability of social threat might be significantly increased and the expected costs of missing such a threat might be enormous. Thus, according to error management theory, conspiracy believers might be extra alert to threat cues – an ultimately functional behavior.

Correspondingly, from a proximate point of view, there are several findings from cognitive psychology supporting this notion. Specifically, conspiracy beliefs have been associated with certain cognitive biases, which may also imply a pronounced sensitivity to social threats. First, conspiratorial thinking is related to a particularly strong tendency to perceive patterns in both visual stimuli and event sequences (Van der Wal et al., 2018). Hence, when confronted with an ambiguous, potentially threatening situation, conspiracy believers may be extra sensitive to “connecting the dots”, thereby detecting real threats. Second, conspiracy beliefs are predicted by both anthropomorphism (i.e., the tendency to attribute human qualities to anything non-human; Imhoff & Bruder, 2014) and intentionality bias (i.e., the tendency to perceive events as caused by intentional agents; Brotherton & French, 2015; Douglas et al., 2016). Such a predisposition to detect agency may likewise help to identify true threats in ambiguous situations. Finally, the ability to infer other peoples’ emotional state from viewing their eyes predicts belief in conspiracy theories (Van Prooijen & Van Dijk, 2014). Particularly for the specific case of deciding to trust someone based on facial trustworthiness cues, this is an advantageous property. Taken together, it is reasonable to assume that conspiracy beliefs may be functional in better identifying and, in turn, avoiding social threats.

Interestingly, the literature also allows to derive a rather dysfunctional relationship between conspiracy beliefs and social threat detection. Since, according to error management theory, human perception in general is already biased to see threats in ambiguous situations, people might detect the vast majority of real threats. Hence, there would hardly be room for a benefitting effect of conspiracy beliefs. On the contrary, in this case, if conspiracy believers are extra biased towards detecting threats, that is, if they apply an even more liberal decision criterion to classify an ambiguous situation as threat, a high rate of false-positive decisions is likely (see signal detection theory, Green & Swets, 1966). In line with this reasoning, Van Prooijen et al. (2018) found that conspiracy beliefs are not predicted by pattern perception in general but by *illusory* pattern perception (i.e., erroneously detecting patterns in random stimuli). Thus, it is conceivable that the main difference between people who do and do not endorse conspiracy belief is that the former distrust in situations which are actually void of any threat and where trusting would be more beneficial.

Finally, a third possibility could be that conspiracy believers are both good at detecting threat and bad at detecting trustworthiness, thus merely exhibiting lower trust overall. This would, of course be indistinguishable from a situation where they are neither particularly good at detecting threat, nor particularly bad at detecting trustworthiness, but simply trust less – independent of any social cues. For the remainder of the paper, we will thus refrain from differentiating inattentiveness to either cues or biased attentiveness to both. Empirically, this would translate to less trust towards anyone which would be a straightforward connection to the observed correlational findings cited above.

The Present Research

In four experimental online studies, we examined whether conspiracy beliefs are associated with a more cautious interpersonal trust behavior (H1) and whether such beliefs may be functional (high sensitivity for threat; H2) or dysfunctional (low sensitivity for the

absence of threat; H3) for detecting cues of social threat. The general procedure of all studies was that participants played multiple independent rounds of the trust game with simulated players. To be able to make an informed decision, participants received photographs of their trustees' faces. We manipulated social threat by displaying faces with varying anger intensity. This allowed us to test whether conspiracy beliefs are generally related to a more cautious trust behavior (i.e., independent of social threat cues), and whether conspiracy beliefs predict trust behavior predominantly in the presence or in the absence of social threat.

Across the first three studies, we systematically varied the information the participants received after each round of the game. In Study 1, participants did not receive any feedback on their trustees' behavior. Hence, they had to make their trust decisions based on the displayed faces alone. In Study 2, however, they received feedback after each round of the trust game, thereby making potential loss salient and enabling learning effects. Since the first two studies yielded divergent results, we included feedback as an experimental factor in Study 3 and additionally assessed participants' victim sensitivity and cognitive abilities as potential covariates. In Study 4, we tested for the robustness of our results by controlling for order effects and participants' risk preferences and altruism, two other motives that may determine investment behavior in the trust game. All preregistrations, materials and data are disclosed and accessible (see <https://osf.io/guqn5>).

Study 1

In the first study, we tested the relationship between conspiracy beliefs, behavioral trust and social threat detection without providing any game feedback. The participants thus had to base their decision solely on their general trust attitude and the evolutionarily grounded interpretation of their trustees' angry facial expressions as a cue for social threat.

Method

Participants

Via social networks and a mailing list of local students, we invited participants to take part in an online study on gaming behavior. Since the analyses relied on correlation coefficients, we preregistered to assess a minimum of 150 participants in order to achieve stable estimates (Schönbrodt & Perugini, 2013). Two hundred and eight participants started the German-language online study in exchange for course credits and a chance to win the money they had earned during the game. As preregistered, we excluded participants who did not complete the study ($n = 12$) or indicated that we should not use their data ($n = 2$), leading to a final sample size of $N = 194$ (125 female, 69 male; $M_{age} = 26.55$, $SD = 5.81$). The majority of the sample had a relatively high level of education (A-Level: $n = 95$, university degree: $n = 81$).

Trust Game

Participants played a series of trust games in which each of two players received 10 points to start with. In each game, the trustor (who was referred to as Player A) sent any amount (0-10 points) to the trustee (who was referred to as Player B). This amount was tripled and given to the trustee who then (allegedly) decided how many points shall be returned to the trustor. The goal of the game was to collect as many points as possible (see <https://osf.io/guqn5> for a literal translation of the game instructions). In reality, all study participants played as Player A, and thus consistently took the role of the trustor in multiple, independent rounds of the game. Critically, as the experiment was realized as a pre-programmed online survey, we had to introduce a plausible cover story to convince the participants that the trustees were nevertheless real persons. They were therefore informed that the behavior of the trustees had already been assessed in a comprehensive preliminary study, in which each participant had indicated how many points they would return for any given amount of points sent by the trustor. In addition, a standardized portrayal photograph had been taken of each trustee so that the participants of the present study could get an

impression of their trustees, hence constituting potentially valuable information for their game decision. These photographs entailed our manipulation of social threat cues.

All participants played a total of 36 independent trust games. Each model was only presented once, and their order was fully random. For each trustee, we randomly displayed one of four morphed images with varying anger intensity (with the restriction that each level of anger was evenly presented). Each round was immediately followed by the next without presenting the outcome of the round. In the background, however, the software recorded the points collected in each round based on pre-programmed return factors of the simulated trustees, which depended on the anger intensity of the displayed face: The more facial anger, the more unfair the behavior of the trustee ($M_{00\%anger} = 2.0$; $M_{17\%} = 1.5$, $M_{33\%} = 1.0$, $M_{50\%} = 0.5$ times the amount of points sent by the participant). The points of all rounds were summed up and converted into an amount of money (collected points divided by ten). After completion of data collection, three participants were randomly drawn who actually received this money (possible range of win: 31.50 - 49.50 euros).

Manipulation of Social Threat

To manipulate social threat, we presented frontal close-ups of 39 Caucasian models from the Radboud Faces Database (20 male, 19 female; Langner et al., 2010). For each of the models, we created four versions with varying intensity of facial anger (0%, 17%, 33%, 50%; image processing program: Fantamorph, version 5.4.7, Abrosoft, 2016)² by morphing images with neutral and angry expressions. This led to a total stimulus set of 156 images (39 models x 4 anger intensities; see <https://osf.io/guqn5/> for all morphed images).

Self-Report Measures

² Since the stimulus set was intended to resemble social threat in *ambiguous* situations, the maximum anger intensity was set to 50%.

General Trust. To assess participants general inclination to trust others, we presented the general trust scale by T. Yamagashi & Yamagashi (1994). In 6 items, participants indicated their general belief that others are trustworthy and honest (5-point scale from *strongly disagree* to *strongly agree*, e.g., ‘Most people are trustworthy.’, Cronbach’s $\alpha = .81$).

Trust in Authorities. We included a self-designed scale to measure trust in authorities. Here, participants reported, how much confidence they have in a total of 10 different German institutions (5-point scale from *no confidence at all* to *complete confidence*, e.g., ‘police’, Cronbach’s $\alpha = .79$).

Conspiracy Beliefs. We assessed conspiracy beliefs with the 12-item conspiracy mentality scale (7-point scale from *do not agree at all* to *fully agree*, e.g., ‘A few powerful groups of people determine the destiny of millions.’, Cronbach’s $\alpha = .87$, Imhoff & Bruder, 2014).³

Procedure

To start the online experiment, participants first had to read legal and ethical information and provide informed consent. They were then familiarized with the rules of the game they were about to play (i.e., the trust game, but we did not mention this name). Subsequently, to illustrate the dynamic of the game, players saw five sample game rounds, before playing three rehearsal rounds in which they – contrary to the actual game rounds – were informed about the return of the alleged trustee. We decided to provide the outcome of the rehearsals to make it salient that their game decisions were consequential⁴.

After playing 36 independent rounds of the trust game, participants responded to several self-report scales in the order they are presented above. Subsequently, they provided

³ Additional measures for exploratory purposes may be extracted from the survey export (see https://osf.io/guqn5/?view_only=8e2227b6b4164530a9fbf9473c41bf42).

⁴ To avoid learning effects, we solely presented neutral faces and balanced the pre-defined return rates for gender, the most salient feature of the rehearsal trustees.

demographic information and were asked whether they had seriously participated in the study and allowed to use their data. Finally, participants received their total score of collected game points and the corresponding amount of money they may win. They were then thanked and debriefed.

Results

Preregistered Analyses

First, we tested whether facial anger was interpreted as a cue for social threat and, in turn, decreased participants' average investment in the trust game. A linear contrast analysis supported this assumption, $F(1, 193) = 93.03, p < .001, \eta^2 = .33$. The higher the anger intensity of their trustees faces, the lower the investments in the respective rounds of the trust game, $M_{0\%anger} = 5.76, SD = 2.25, M_{17\%} = 5.58, SD = 2.31, M_{33\%} = 5.32, SD = 2.37, M_{50\%} = 5.00, SD = 2.51$. Therefore, the social threat manipulation proved suitable to test our hypotheses.

To examine how conspiracy beliefs affected investment behavior in the trust game, we computed a preregistered repeated measures analysis of covariance with facial anger intensity as independent variable (0%, 17%, 33%, 50%), the average game investments as dependent variable and conspiracy mentality ($M = 4.06, SD = 0.92$) as covariate. If conspiracy beliefs were associated with an overall more cautious trust behavior (H1), we should obtain a significant main effect of conspiracy mentality, irrespective of the presented photographs. If conspiracy beliefs affected social threat detection (H2 & H3), the analysis should yield a significant interaction of conspiracy mentality and facial anger intensity⁵. Since Mauchly's

⁵ There exists no consensus on how to estimate the sensitivity of a repeated measures analysis of covariance. We thus report substitutional sensitivity analysis for effects that constitute the pattern. For H1, the main effect of conspiracy mentality corresponds to a correlation of conspiracy mentality and the overall investment in the trust game. According to sensitivity analysis with G*Power (Faul et al., 2007), the sample size thus allows to detect small effects, $|r| > .20, \alpha = .05, 1-\beta = .80$, two-tailed, which equals an $\eta^2 > .04$. For H2 and H3, we approximated the achieved sensitivity with a 4 (anger intensity) x 2 (conspiracy mentality) mixed design, hence substituting the continuous structure of the covariate with a between-subjects factor. According to

test indicated that the assumption of sphericity had been violated, $\chi^2(5) = 55.48, p < .001$, we adjusted the degrees of freedom with Greenhouse-Geisser correction, $\varepsilon = .82$. The analysis yielded neither a main effect of conspiracy mentality, $F(1, 192) = 0.55, p = .458, \eta^2 < .01$, nor an interaction of conspiracy mentality and anger intensity, $F(2.47, 474.58) = 0.82, p = .464, \eta^2 < .01$. Hence, conspiracy beliefs did not affect trust behavior or social threat detection.

Table 1

Descriptive Statistics and Correlation Analysis for Study 1

	<i>M</i>	<i>SD</i>	CM	TG	GT	TA
Conspiracy Mentality (CM)	4.06	0.92				
Trust Game Investment (TG)	5.41	2.29	-.054			
General Trust (GT)	3.40	0.61	-.193	.27		
Trust in Authorities (TA)	3.35	0.52	-.296	.137	.315	
Total Points in TG (TP)	418.27	19.65	-.075	.907	.317	.168

Note. $N = 194$

$|r| > .141$ significant at $p < .05$, $|r| > .185$ significant at $p < .01$, $|r| > .234$ significant at $p < .001$

Exploratory Analyses

We additionally performed correlation analyses of the main variables (see Table 1). First, investments in the trust game were connected to participants' self-reported general trust in others, validating that the trust game indeed assesses behavior associated with trust. Next, replicating previous findings, conspiracy mentality was associated with reduced *self-reported* trust, particularly in authorities. Finally, consistent with the main analyses, there was no

this conservative proxy, the sample size allows to detect moderate interaction effects, Cohen's $f > .25$, $\alpha = .05$. $1 - \beta = .80$, which equals an $\eta^2 > .06$.

significant correlation between conspiracy mentality and the total points earned in all rounds of the trust game, signifying that conspiracy beliefs were neither functional nor dysfunctional for participants' performance.

Discussion

In the present study, we did not find support for an association of conspiracy beliefs with an increased sensitivity to detect social threat (as evolutionarily posed by angry faces), a decreased sensitivity to detect the absence of such threat or an overall more cautious trust behavior. Particularly the latter finding seems to suggest that prior research, which had repeatedly stated a negative association between conspiracy beliefs and interpersonal trust (Lamberty, 2016), does not translate into actual trust behavior in an incentivized economic game. However, as stated above, the decision to trust depends not only on characteristics of the trustor (i.e., general attitudes) but also on the specific context of the trust situation (Thielmann & Hilbig, 2015). Just as conspiracy believers do not suspect a conspiracy behind *any* given situation, it is equally unlikely that they distrust *every* unknown person. Instead, there have to be some kind of situational cues to initiate suspicion (Grzesiak-Feldman, 2013; Hardin, 2002). In the context of another, related economic game, for instance, people accused players who engaged in unfair game behavior of intending more harm than fair players (Raihani & Bell, 2017). Although participants in the present study used the facial expressions as evolutionary cues to trust, they did not receive any feedback on their trustees' return behavior and the situation therefore hardly offered any information that validated the facial expressions as relevant cues. In Study 2, we therefore slightly changed the procedure of the present study and included feedback after each round of the trust game.

Study 2

Study 2 was an exact replication of Study 1 with only one major adaption: By providing an outcome evaluation after each round of the trust game, we made potential loss

salient and enabled learning effects. Beside the presented photographs (i.e., facial anger as evolutionary cue for social threat), participants now could additionally infer their trustees' trustworthiness from trust experiences of prior rounds. Under these new circumstances, we once again examined whether conspiracy beliefs are associated with a generally more cautious trust behavior (H1) and whether conspiracy beliefs are functional or dysfunctional for the detection of social threats (H2 & H3).

Method

Participants

As preregistered, we again aimed for a minimum sample size of 150 participants. Two hundred and sixty-three participants started the German-language online study in exchange for course credits and a chance to win the money they had earned during the game. As preregistered, we excluded participants who did not complete the study ($n = 21$) or indicated that we should not use their data ($n = 5$). In addition, we excluded 13 participants who had already taken part in Study 1⁶, leading to a final sample size of $N = 224$ (175 female, 48 male, 1 non-binary; $M_{age} = 25.29$, $SD = 7.46$). The majority of the sample had a relatively high level of education (A-Level: $n = 118$, university degree: $n = 99$).

Materials and Procedure

The procedure was almost identical to Study 1, but this time participants received a game evaluation after each round. Specifically, we displayed how many points they sent to the trustee, how many of these points the trustee returned and how many points both players finally possessed. The pre-programmed return factor of the simulated trustees depended on the anger intensity of the displayed face: The more facial anger, the more unfair the behavior of the trustee (return factors: $M_{00\%anger} = 2.0$; $M_{17\%} = 1.5$, $M_{33\%} = 1.0$, $M_{50\%} = 0.5$ times the

⁶ Unfortunately, although we had planned to exclude such participants and accordingly incorporated a question asking for prior Study 1 participation, we missed to list this criterion in the preregistration. We did, however, conduct the main analyses both with and without the participants in question, yielding consistent results, see Footnote 9.

amount of points sent by the participant; $SD = 0.28$)⁷. After completing all 36 game rounds, they responded to the general trust scale (Cronbach's $\alpha = .83$), the self-designed scale measuring trust in authorities ($\alpha = .85$), the conspiracy mentality scale ($\alpha = .90$), a question asking whether they felt that they had been deceived during the study (*yes* vs. *no*), demographic variables and several further exploratory measures. Finally, they were thanked and debriefed.

Results

Preregistered Analyses

First, a linear contrast analysis supported the success of the social threat manipulation, $F(1, 223) = 119.54, p < .001, \eta^2 = .35$. The higher the anger intensity of their trustees faces, the lower the investments in the respective rounds of the trust game, $M_{00\%anger} = 5.42, SD = 2.34, M_{17\%} = 5.41, SD = 2.35, M_{33\%} = 4.96, SD = 2.37, M_{50\%} = 4.39, SD = 2.49$.

As in Study 1, to test our hypotheses, we computed a repeated measures analysis of covariance with anger intensity as independent variable (0%, 17%, 33%, 50%), the average game investments as dependent variable and conspiracy mentality ($M = 3.71, SD = 1.06$) as covariate⁸. Due to a violation of the sphericity assumption, $\chi^2(5) = 151.78, p < .001$, degrees of freedom were Greenhouse-Geisser adjusted, $\varepsilon = .68$. The analysis revealed a significant main effect of conspiracy mentality, $F(1, 222) = 7.71, p = .006, \eta^2 = .03$. Even though descriptively this was particularly pronounced on the lower end of the facial anger distribution, the interaction effect of conspiracy mentality and anger intensity did not reach

⁷ Note that we did not set fixed return factors for each anger intensity but added some variance around the intended mean. With this, we aimed to avoid the contingencies being too obvious, so that the trust situation was still characterized by uncertainty and ambiguity.

⁸ As in Study 1, we report substitutional sensitivity analyses for effects that constitute the pattern of the rmANCOVA. For H1, the sample size allows to detect small effects, $|r| > .18, \alpha = .05, 1-\beta = .80$, two-tailed, which equals an $\eta^2 > .03$. For H2 and H3, we conservatively approximated the achieved sensitivity with a 4 (anger intensity) x 2 (conspiracy mentality) mixed design, for which the sample size allows to detect moderate interaction effects, Cohen's $f > .25, \alpha = .05, 1-\beta = .80$, which equals an $\eta^2 > .06$.

statistical significance, $F(2.03, 449.45) = 2.98, p = .051, \eta^2 = .01^9$. Hence, the higher participants' conspiracy mentality, the lower their average investments in the trust game without support for the notion that social threat emanated from the trustee had a moderating influence (see Figure 1 for average investments of persons with ± 1 SD conspiracy mentality).

Figure 1

Trust Game Investments in Study 2

Note. Estimates of the average amount of points sent in the Trust Games for each level of facial anger are plotted for persons with low (-1 standard deviation, SD) and high ($+1$ SD) conspiracy mentality (CM).

Exploratory Analyses

⁹ As stated above, we repeated the main analyses including all participants who had participated in Study 1, which yielded comparable results with a significant main effect of conspiracy mentality, $F(1, 235) = 7.22, p = .008, \eta^2 = .03$, and no significant interaction of conspiracy mentality and anger intensity, $F(2.01, 437.40) = 2.01, p = .135, \eta^2 = .01$.

To rule out the alternative explanation that participants high in conspiracy mentality engaged in more careful game behavior because they were more skeptical about the information provided in the instructions (i.e., the cover story), we computed another repeated measures analysis of covariance but additionally controlled for participants' answer to a question asking whether they felt they had been deceived during the study. Here, participants' perception of deception did not impact their investment in the trust games, $F(1, 221) = 0.74$, $p = .392$, and the main effect of conspiracy mentality remained significant, $F(1, 221) = 8.26$, $p = .004$, $\eta^2 = .04$. In addition, the interaction of conspiracy mentality and anger intensity reached statistical significance, $F(2.03, 447.49) = 3.39$, $p = .034$, $\eta^2 = .02$. Therefore, whether participants believed that they had been deceived during the study did not significantly impact their game behavior.

Table 2

Descriptive Statistics and Correlation Analysis for Study 2

	<i>M</i>	<i>SD</i>	CM	TG	GT	TA
Conspiracy Mentality (CM)	3.71	1.06				
Trust Game Investment (TG)	5.04	2.29	-.183			
General Trust (GT)	3.56	0.61	-.280	.213		
Trust in Authorities (TA)	3.35	0.56	-.416	.003	.407	
Total Points in TG (TP)	415.57	22.91	-.231	.861	.294	.078

Note. $N = 224$

$|r| > .131$ significant at $p < .05$, $|r| > .172$ significant at $p < .01$, $|r| > .218$ significant at $p < .001$

Additionally, as in Study 1, we computed correlation analyses for the main variables (see Table 2). Here, general self-reported trust was again associated with the trust game behavior and conspiracy mentality was negatively correlated with self-reported trust. In

addition, there was a significant correlation between conspiracy mentality and the total points earned in all rounds of the trust game, signifying that conspiracy beliefs not only were connected to lower investments but also to a worse outcome.

Discussion

In contrast to Study 1, participants of the present study received outcome feedback after each round of the trust game, thereby making their trustees' behavior salient. Now, conspiracy beliefs did indeed predict an overall more cautious trust behavior. Hence, conspiracy believers placed less behavioral trust in their trustees after being exposed to cues of injustice. They may be particularly prone to react to injustice cues with defensive, more cautious behavior. In other words, conspiracy believers may be sensitive to victimization. That is, in the presence of such cues, they become suspicious and fear to be exploited by their interaction partner and, in turn, withdraw their overall willingness to cooperate (Baumert & Schmitt, 2009; Gollwitzer & Rothmund, 2011; Gollwitzer et al., 2013). In Study 3, we addressed this potential link between conspiracy beliefs, victim sensitivity and trust behavior.

In line with the findings of Study 1, applying the conventional threshold of significance ($\alpha = .05$), conspiracy beliefs and social threat detection were not associated. Nevertheless, we decided to retain the manipulation of social threat in Study 3 for two reasons. First, we have to admit that apart from the three rehearsal rounds, we did not provide a sufficient learning phase, but included all 36 game rounds in the analysis. Consequently, participants needed to establish reliable contingencies *during* the game. During the first couple of rounds, the game dynamics thus were almost the same as in Study 1: Participants could only infer from the angry facial expression itself, but not from prior game behavior of angry trustees (i.e., the anger-threat-contingency) whether they should trust a person. Therefore, the threat manipulation may have not been as strong as intended. In Study 3, we thus addressed this issue by integrating more learning rounds. Second, although we did not

find an effect of social threat when applying the conventional threshold of significance, the descriptive pattern of results suggested that conspiracy belief may be more relevant in predicting game behavior in non-threatening than in threatening rounds (see Figure 1)¹⁰. Rather than speculating based on this non-significant result, we sought to revisit the hypotheses on social threat in Study 3, taking into account an adequate learning phase. Beyond that, since the success of learning contingencies depends on the cognitive abilities of the learner (Tamez et al., 2008; Williams & Pearlberg, 2006), we additionally considered these in the next study.

Study 3

In this study, we elaborate on the diverging results of the first two studies. Specifically, we replicated the design of the former studies, but this time we additionally manipulated, whether participants received feedback, thus merging the approaches of both studies. Based on the combined findings of the first two studies, we expected conspiracy beliefs to be associated with a more cautious trust behavior, but only for participants who received game feedback (H1). In addition, there was some (descriptive) indication that conspiracy beliefs are linked to a diminished sensitivity to detect the *absence* of social threat when feedback is provided (H3). Since we did not obtain any support for an association of conspiracy beliefs with a higher sensitivity to detect actual threat (H2), we omitted this hypothesis for the present study. To get a better grasp of the potential mechanism underlying the proposed associations, we additionally assessed participants' victim sensitivity and cognitive abilities to include them as covariates.

Method

Participants

¹⁰ In addition, when exploratorily considering an adequate learning phase by only including the second half of the trust game rounds, the interaction of conspiracy mentality and anger intensity turned out to be significant, $F(2.25, 449.43) = 4.38, p = .01, \eta^2 = .02$.

We preregistered to recruit at least 300 participants. Four hundred and thirty participants started the German-language online study in exchange for course credits and a chance to win the money they had earned during the game. As preregistered, we excluded participants who did not complete the study ($n = 58$), indicated that we should not use their data ($n = 9$) or had already taken part in Study 1 or Study 2 ($n = 16$), leading to a final sample size of $N = 347$ (268 female, 79 male; $M_{age} = 27.58$, $SD = 8.58$). The majority of the sample had a relatively high level of education (A-Level: $n = 181$, university degree: $n = 159$).

Materials and Procedure

The procedure was again very similar to the former studies. Participants first were prepared to play the game by receiving the rules and going through sample rounds. This time, to ensure that all participants fully understood the rules and the dynamics of the game, we optimized the procedure and added test questions to the sample rounds. Participants could only proceed if they filled in the correct final scores of each sample round (we did not record wrong answers). They then played 36 rounds of the trust game (i.e., 9 rounds per anger intensity). As preregistered, we considered the first four rounds of each anger intensity as learning session, the remaining five as test session (we decided to split the 36 rounds roughly equally into test and learning rounds in order to provide both a fair chance to learn contingencies and enough rounds for a reliable measurement of trust behavior). The faces and anger intensities were again presented in random order with the exception that we made sure that the learning rounds and the test rounds were provided en bloc and anger intensities were evenly presented in both sessions (i.e., 4x4 anger intensities for the learning rounds, followed by 5x4 anger intensities for the test rounds). Participants, however, completed all game rounds in one go and were not informed about this differentiation. As in Study 2, the pre-programmed return factor of the simulated trustees was contingent on the anger intensity of the displayed face ($M_{00\%anger} = 2.0$; $M_{17\%} = 1.5$, $M_{33\%} = 1.0$, $M_{50\%} = 0.5$ times the amount of

points sent by the participant; $SD = 0.28$). Importantly, during the game, half of the participants received feedback after each round ($n = 173$), the other half did not ($n = 174$).

After completing all game rounds, they responded to the general trust scale (Cronbach's $\alpha = .83$), the self-designed scale measuring trust in authorities ($\alpha = .89$) and the conspiracy mentality scale ($\alpha = .90$). Additionally, we presented a German scale to assess victim sensitivity (Schmitt et al., 1995). In 10 items, participants indicated their tendency to experience strong emotional reactions after perceiving injustices to one's own disadvantage (6-point scale from *strongly disagree* to *strongly agree*, e.g., 'I ruminate a long time when other people are being treated better than me.', Cronbach's $\alpha = .81$). Next, we incorporated a measure for cognitive abilities, the mini-q (Baudson & Preckel, 2016). This intelligence screening consists of 64 configurations of three geometric figures (circle, triangle, square), whose spatial relationship to each other is described by one statement per configuration (e.g., 'the triangle prefers the circle'). Within three minutes, participants needed to judge the veracity of as many statements as possible (*true* vs. *false*; odd-even reliability $r = .98$). Finally, after retrieving several additional exploratory measures and demographic variables, we thanked and debriefed the participants.

Results

Preregistered Analyses

First, a linear contrast analysis supported the success of the social threat manipulation, $F(1, 345) = 139.58, p < .001, \eta_p^2 = .29$. The higher the anger intensity of their trustees faces, the lower the investments in the respective rounds of the trust game. Another contrast analysis indicated that participants of the feedback condition were able to establish an anger-threat-contingency, $F(1, 345) = 7.53, p = .006, \eta_p^2 = .02$. The decrease of investments across the anger intensities was stronger when feedback was presented, $M_{00\%anger} = 5.28, SD = 2.49, M_{17\%} = 5.19, SD = 2.54, M_{33\%} = 4.72, SD = 2.46, M_{50\%} = 4.05, SD = 2.62, F(1, 172) = 77.34, p$

$< .001$, $\eta_p^2 = .31$, than when not presented, $M_{00\%anger} = 5.58$, $SD = 2.25$, $M_{17\%} = 5.49$, $SD = 2.25$, $M_{33\%} = 5.21$, $SD = 2.33$, $M_{50\%} = 4.81$, $SD = 2.44$, $F(1, 173) = 64.88$, $p < .001$, $\eta_p^2 = .27$.

To test our hypotheses, we conducted a mixed analysis of covariance with feedback as between-subjects factor (feedback vs. no feedback), anger intensity as within-subjects factor (0%, 17%, 33%, 50%), the average game investments as dependent variable and conspiracy mentality ($M = 3.81$, $SD = 0.98$) as covariate¹¹. Due to a violation of the sphericity assumption, $\chi^2(5) = 155.80$, $p < .001$, degrees of freedom were Greenhouse-Geisser adjusted, $\varepsilon = .76$. If conspiracy beliefs were exclusively associated with a more cautious trust behavior when feedback was provided (H1), we should obtain a significant two-way interaction effect of conspiracy mentality and feedback. If conspiracy beliefs came along with a lower sensitivity for the absence of social threat exclusively when feedback was provided (H3), the analysis should yield a significant three-way interaction of conspiracy mentality, feedback and anger intensity.

However, the analysis did neither reveal a significant interaction of conspiracy mentality and feedback, $F(1, 343) = 0.15$, $p = .696$, $\eta_p^2 < .01$, nor a three-way interaction of conspiracy mentality, feedback and anger intensity, $F(2.27, 778.59) = 0.48$, $p = .644$, $\eta_p^2 < .01$. Instead, there was a significant main effect of conspiracy mentality, $F(1, 343) = 11.23$, $p = .001$, $\eta_p^2 = .03$. The higher participants' conspiracy mentality, the lower their average investments in the trust game, without support for the notion that the provision of feedback or

¹¹ As in Study 1 and 2, we report substitutional sensitivity analyses for effects that constitute the pattern of the rmANCOVA. For H1, we conservatively approximated the achieved sensitivity with a 2 (feedback) x 2 (conspiracy mentality) between-subjects design, for which the sample size allows to detect small interaction effects, $f > .15$, $\alpha = .05$. $1-\beta = .80$, which equals an $\eta^2 > .02$. For H2, we calculated the sensitivity for a 2(feedback) x 2 (conspiracy mentality) x 4 (anger intensity) mixed design, $f > .23$, $\alpha = .05$. $1-\beta = .80$, which equals an $\eta^2 > .05$.

the social threat emanated from the trustee had a moderating influence (see Figure 2 for average investments of persons with $+1$ *SD* conspiracy mentality)¹².

Figure 2

Trust Game Investments in Study 3

Note. Estimates of the average amount of points sent in the Trust Games for each level of facial anger are plotted for persons with low (-1 standard deviation, *SD*) and high ($+1$ *SD*) conspiracy mentality (*CM*) who either received feedback (*FB*) or not (*No FB*).

Exploratory Analyses

As in Study 2, we repeated the main analysis and additionally controlled for participants' perception of deception to rule out the alternative explanation that participants

¹² Further analyses with the additional covariates victim sensitivity and cognitive abilities would have only been relevant if we had found support for the proposed interactions in the main analysis. Hence, in line with our preregistration, we omitted this analysis.

high in conspiracy mentality invested less points just because they were more skeptical about the cover story. Again, participants' perception of deception did not impact their investment in the trust games, $F(1, 329) = 0.18, p = .894$, and the main effect of conspiracy mentality remained significant, $F(1, 329) = 10.61, p = .001, \eta^2 = .03$. Thus, whether participants believed that they had been deceived during the study did not significantly impact their game behavior.

Table 3

Descriptive Statistics and Correlation Analysis for Study 3

	<i>M</i>	<i>SD</i>	CM	TG	GT	TA	TP	VS
Conspiracy Mentality (CM)	3.81	0.98						
Trust Game Investment (TG)	5.04	2.30	-.183					
General Trust (GT)	3.46	0.62	-.262	.269				
Trust in Authorities (TA)	3.28	0.65	-.543	.182	.418			
Total Points in TG (TP)	210.49	13.81	-.135	.802	.249	.167		
Victim Sensitivity (VS)	3.66	0.78	.209	-.168	-.256	-.079	-.174	
Cognitive Abilities (CA)	24.29	11.70	.059	.143	-.105	-.024	.047	.199

Note. $N = 347$, TG and TP statistics are based on the 20 test sessions of the trust game.

$|r| > .105$ significant at $p < .05$, $|r| > .138$ significant at $p < .01$, $|r| > .176$ significant at $p < .001$

Additional correlational analyses can be extracted from Table 3. Consistent with Study 1 and 2, general self-reported trust was associated with the trust game behavior and conspiracy mentality was negatively correlated with general trust and trust in authorities. Furthermore, there was a significant correlation between conspiracy mentality and the total points earned in all test sessions of the trust game, $p = .012$, signifying that conspiracy beliefs not only were connected to lower investments but also to a worse overall game performance.

Discussion

Findings of Study 1 and Study 2 had suggested that conspiracy beliefs may be linked to behavioral trust in the trust game, but only when the behavior of their alleged trustee was made salient. The present study, however, did not support this notion. Instead, conspiracy beliefs predicted an overall more cautious behavior in the trust games, no matter whether game feedback was provided or not. This finding conflicts with the results of Study 1, where we did not obtain an effect of conspiracy beliefs on trust behavior. Since the procedure of both studies was almost identical, the diverging results are rather difficult to explain. There is, however, one adaption in the present study that might account for these differences. In contrast to Study 1, we incorporated several test questions during the sample rounds, thereby forcing the participants to thoroughly work through the presented game dynamics. We added these questions to be extra sure that the participants understood the dynamics of the game. Effectively, this led to more time participants spent with the instructions and they could only pass if the test questions were answered correctly, thus guaranteeing that they had understood the game. Although it is post-hoc reasoning, this deeper elaboration may have sufficed to make the dependency and vulnerability towards the trustee extra salient. Since the participants of Study 1 neither received game feedback, they may simply not have been entirely aware of the potential loss they could suffer. From this standpoint, conspiracy believers may have lacked a situational cue to raise suspicion.

Study 4

The final study was designed to account for two other motives that may impact investment behavior in the trust game beside trust. Specifically, people may decide to send money to the other players due to altruism (i.e., increasing other people's welfare; Cox, 2004) or a low risk aversion (i.e., willingness to take a gamble; Schechter, 2007). Therefore, we once again replicated the design of the former studies but included two additional economic

games to control for altruism and risk preferences. In addition, since the three former studies all first implemented the trust games and then assessed conspiracy mentality, we included a factor varying the order of presentation to control potential order effects. Based on the findings of the previous studies, we expected conspiracy beliefs to be associated with a more cautious investment behavior in the trust game while controlling for altruism and risk preferences and that the order of presentation does not significantly moderate this effect.

Method

Participants

We preregistered to recruit at least 300 participants. Four hundred and nineteen participants started the German-language online study in exchange for course credits and a chance to win the money they had earned during the game. As preregistered, we excluded participants who did not complete the study ($n = 68$), indicated that we should not use their data ($n = 2$) or had already taken part in one of the former studies ($n = 9$), leading to a final sample size of $N = 340$ (270 female, 68 male, 2 non-binary; $M_{age} = 28.47$, $SD = 8.79$). The majority of the sample had a relatively high level of education (A-Level: $n = 178$, university degree: $n = 128$).

Materials and Procedure

The procedure again closely resembled the former studies. Participants were randomly assigned to either start the survey with the economic games and then answer the questionnaires or vice versa. In the games part, participants played three different economic games. First, participants were prepared to play the trust game by receiving the rules and going through the sample rounds and test questions as implemented in Study 3 (they again could only proceed if they filled in the correct final scores of each sample round). They then

played 36 rounds of the trust game (i.e., 9 rounds per anger intensity)¹³. As preregistered, we considered the first 16 rounds as learning session, the remaining 20 as test session (while assuring that each anger intensity was equally presented). The pre-programmed return factor of the simulated trustees was again contingent on the anger intensity of the displayed face ($M_{00\%anger} = 2.0$; $M_{17\%} = 1.5$, $M_{33\%} = 1.0$, $M_{50\%} = 0.5$ times the amount of points sent by the participant; $SD = 0.28$). Participants received feedback about the game outcome after each round of the game. The second game was a dictator game (Engel, 2011; Forsythe et al., 1994). Participants received 10 points and were asked to decide how many points they would like to send to another, randomly selected participant of the study. The final game was a gamble game (Schechter, 2007), in which participants again received 10 points and needed to decide how many points they would like to invest in a lottery that randomly returned zero to three times the invested amount of points. The game basically resembles the trust game but, instead of another person, a computer will decide about the points returned.

In the questionnaire part, participants responded to the general trust scale (Cronbach's $\alpha = .81$), the self-designed scale measuring trust in authorities ($\alpha = .85$), the conspiracy mentality scale ($\alpha = .90$) and a question asking whether they felt that they had been deceived during the study. Finally, we retrieved demographic information and thanked and debriefed the participants.

Results

Preregistered Analyses

Since we omitted to analyze the relationship of conspiracy mentality and social threat perception due to the non-significant findings in the former studies, the analyses in the present study did not consider the factor social threat and were thus based on regression

¹³ Although we did not expect an association of conspiracy mentality with social threat perception after the lacking effects in the former studies, we decided to ensure comparability by sticking to the design of these studies and therefore included the four levels of social threat.

logic¹⁴. First, we computed a linear regression of the mean investment in the 20 test rounds of the trust game on conspiracy mentality. The analysis yielded a significant prediction model, $F(1, 338) = 4.82, p = .029, R^2_{adj} = .01$, and conspiracy mentality thus significantly predicted investments in the trust game, $\beta = -.12, p = .029$, replicating the main effect of conspiracy mentality found in Study 2 and 3¹⁵. Next, to control order effects, we computed another linear regression with centered conspiracy mentality, the order of presentation and the interaction term of conspiracy mentality and order as predictors. Overall, the model did not reach conventional levels of statistical significance, $F(1, 336) = 2.22, p = .085, R^2_{adj} = .01$, and adding order and the interaction term to the model did thus not significantly add to the explained variance. Hence, we obtained no evidence that the relation between conspiracy mentality and trust behavior was contingent on the order in which the two were measured. Finally, to account for alternative motives beside trust to invest in the trust game, we regressed the game investments onto participants' conspiracy mentality, altruism (points sent in the dictator game) and risk preferences (points invested in the gamble game). Overall, the model was significant, $F(1, 336) = 37.10, p < .001, R^2_{adj} = .24$. As expected, altruism, $\beta = .10, p = .036$, and risk preferences, $\beta = .46, p < .001$, were significant predictors of investments in the trust game. Most importantly, conspiracy mentality remained a significant predictor, $\beta = -.11, p = .018$, and therefore uniquely contributed to the decision in the trust game above and beyond altruism and risk preferences.

Exploratory Analyses

¹⁴ According to sensitivity analysis with G*Power (Faul et al., 2007), the sample size allows to detect small effects, $f^2 > .02, \alpha = .05, 1-\beta = .80$, two-tailed, linear multiple regression, single regression coefficient.

¹⁵ When exploratorily replicating the analyses of the previous studies and including anger intensity as a within-subjects factor, the analyses yielded findings consistent with Studies 1-3: First, there was a significant negative linear trend of trust game investments across the four levels of facial anger, $F(1, 339) = 146.47, p < .001, \eta^2 = .30, M_{00\%anger} = 5.28, SD = 2.78, M_{17\%} = 5.12, SD = 2.75, M_{33\%} = 4.63, SD = 2.80, M_{50\%} = 4.20, SD = 2.93$. More importantly, there was no significant interaction of anger intensity and conspiracy mentality, $F(2.41, 815.05) = 0.52, p = .626, \eta^2 < .01$.

To again rule out the alternative explanation that participants high in conspiracy mentality were more skeptical about the cover story and, in turn, invested less points, we regressed trust game investments onto participants' conspiracy mentality and perception of deception. Participants' perception of deception did not predict their investment in the trust games, $\beta = -.04$, $p = .480$, and conspiracy mentality remained significant, $\beta = -.12$, $p = .035$. Thus, whether participants believed that they had been deceived during the study did not significantly impact their game behavior.

Table 4

Descriptive Statistics and Correlation Analysis for Study 4

	<i>M</i>	<i>SD</i>	CM	TG	GT	TA	TP	A
Conspiracy Mentality (CM)	3.43	1.09						
Trust Game Investment (TG)	4.81	2.68	-.119					
General Trust (GT)	3.42	0.62	-.151	.137				
Trust in Authorities (TA)	3.44	0.62	-.396	.037	.394			
Total Points in TG (TP)	228.85	14.47	-.106	.813	.113	.065		
Altruism (A)	4.02	2.40	.043	.164	.105	-.016	.201	
Risk Preference (RP)	6.17	2.81	-.022	.477	.097	-.034	.379	.148

Note. $N = 340$, TG and TP statistics are based on the 20 test sessions of the trust game.

$|r| > .106$ significant at $p < .05$, $|r| > .140$ significant at $p < .01$, $|r| > .178$ significant at $p < .001$

Table 4 depicts additional correlational analyses. Again, general self-reported trust was associated with the trust game behavior and conspiracy mentality was negatively correlated with general trust and trust in authorities. However, in line with the rather weak association of the trust game investment and conspiracy mentality in this study, the

correlation between conspiracy mentality and the total points earned in all test sessions of the trust game did not reach conventional levels of statistical significance, $p = .051$.

Discussion

In this study, we obtained further support for an association of conspiracy beliefs and a more cautious trust behavior. Importantly, we found conspiracy beliefs to predict trust game investments even after controlling for participants' altruism and risk preference, two alternative motives to invest in the trust game (Cox, 2004; Schechter, 2007). This supports the assumption that conspiracy believers particularly invested fewer points in the game due to low trust in others (i.e., lower trustworthiness expectations). Furthermore, whether participants' first played the games and then answered the questionnaires or took part in opposite order did not significantly moderate the association of conspiracy mentality and trust game investments, hence overcoming the limitation that order effects may have led to the findings of the former studies.

General Discussion

Past research consistently demonstrated that conspiracy beliefs are associated with a low level of self-reported interpersonal trust (Lamberty, 2016). Up to now, however, it has not yet been shown whether this connection manifests itself in actual behavior indicative of trust. Since trust behavior may be seen as a nuanced reaction to cues of (un)trustworthiness in a trustee in question, we conducted four experimental online studies to examine whether conspiracy believers are more sensitive to valid indicators of *un*trustworthiness, particularly blind to sign of actual trustworthiness or more distrustful in general, irrespective of the given social cues. In three of the four studies, conspiracy beliefs were related to more cautious trust behavior in the trust game, an incentivized economic game. Concretely, conspiracy believers met every trustee, whether threatening or not, with equally less trust (meta-analytic

correlation coefficient across the four studies according to Hunter-Schmidt random-effects technique, $r = -.14$, $p < .001$; Hunter & Schmidt, 1990).

As argued above, however, this pattern of results does not allow for a clear conclusion regarding conspiracy believers' ability to detect social threat. More specifically, conspiracy believers may either simply trust less – irrespective of any threat cue, or, alternatively, they may in fact be better at detecting actual threats, but at the same time more often raise false alarms in harmless situations. Interestingly, a recent study on the connection between social threat perception and paranoia, a trait that shares several central features with conspiracy beliefs (Imhoff & Lamberty, 2018), provided tentative support for the latter interpretation (Greenburgh et al., 2019). In this study, participants played the trust game in a situation that either offered a social threat cue or not. In contrast to the present research, however, participants directly reported their perception of social threat (i.e., the extent to which the trustee had harmful intentions). Here, paranoid patients generally perceived more social threat, irrespective of whether the trustee was threatening or not. However, since conspiracy beliefs and paranoia, beside their similarities, are clearly distinct phenomena (Imhoff & Lamberty, 2018), further research is needed to clarify the connection of conspiracy beliefs and social threat detection.

Moreover, since trust behavior is highly context-sensitive, the relationship of conspiracy beliefs and social threat detection may depend on the concrete threat cue available in a given situation. In the present research, following numerous past works, we operationalized social threat by presenting angry facial expressions of the alleged trustees (Oosterhof & Todorov, 2008). However, the perception of emotions, particularly in facial expressions, is a highly sophisticated human ability, as it is essential for successful social interaction (Adolphs, 2003; Rossion et al., 2012; Vuilleumier & Pourtois, 2007). The human mind might therefore be exceptionally accurate in detecting facial anger, so that individual

traits such as conspiracy beliefs hardly constitute an additional benefit. Yet, beside the social threat posed by a *single* angry person, another source of threat emanates from hostile coalitions of *several* individuals (Bowles, 2009; Walker & Bailey, 2013). Already by definition, hostile coalitions are a necessary characteristic of conspiracy theories (Imhoff & Lamberty, 2020), hence, conspiracy believers may be particularly prone to cues for such threats (Van Prooijen & Van Vugt, 2018). Similarly, in a real-world context, the association of conspiracy beliefs and pattern perception should particularly apply to the detection of patterns in more complex stimuli such as causal relations between people and events (Van der Wal et al., 2018), which may rather result in an increased detection of hostile coalitions (vs. individual facial anger). Although there already is one study that did not find a relationship between general conspiracy beliefs and the expectation of hostile coalitions per se (i.e., in the absence of threat cues; Libman & Vollan, 2019), it would certainly be interesting to examine whether conspiracy beliefs are functional or dysfunctional for the detection of hostile coalitions when specific threat cues are provided.

Overall, however, regardless of whether the detection of social threat played a role or not, conspiracy beliefs predicted more cautious behavior in the trust game, and controlling for altruism and risk preferences in Study 4 allows the conclusion that this relationship is due to less trust. This result extends previous findings that have linked conspiracy beliefs merely with the self-reported general attitude to trust others (Lamberty, 2016). Importantly, the decision to trust less and invest less points also led conspiracy believers to perform overall worse as demonstrated by the explorative correlation analyses of the total points earned in the trust games (meta-analytic correlation coefficient across the four studies according to Hunter-Schmidt random-effects technique, $r = -.14$, $p < .001$; Hunter & Schmidt, 1990). Therefore, in the specific game context realized in the present research, conspiracy beliefs were ultimately dysfunctional for participants' game outcome (i.e., the money they entered the lottery with).

Although this is arguably contingent on the payoff matrix, the rulers of the game were transparently described, and it was made sure that all participants understood these rules. Moreover, outside the experimental setting, the investment we make in the trust game has been shown to correlate with everyday trust behavior such as lending someone money or intentionally leaving the front door unlocked (Fehr et al., 2002; Glaeser et al., 2000). Thus, the present research provides first tentative support that conspiracy beliefs may affect ordinary social interactions.

Interestingly, conspiracy believers placed less trust in other people even though there has been no reliable cue that they are powerful. In the logic of conspiracy theorists, however, one would expect them to be particularly distrustful of *powerful* people (e.g., the government; Imhoff & Bruder, 2014). While the powerful outgroup is accused of evil intentions, people of the ingroup (i.e., fellow citizens) should be just as much victims of the conspiracies as they are themselves. Correspondingly, the correlation analyses of the present research indicated that conspiracy beliefs were substantially more associated with self-reported distrust of authorities than general trust. This implies two conclusions. First, since conspiracy beliefs were linked to more cautious behavior in the trust game in the *absence* of power cues emanated from the trustee, the present findings may be particularly relevant for everyday interaction where we place our trust in other (ordinary) people several times a day (Golembiewski & McConkie, 1975). Second, the association of conspiracy beliefs and more cautious trust behavior is likely to be even stronger when the interaction partner is perceived to be powerful (Saalfeld et al., 2018).

Nevertheless, we do not want to draw premature conclusions about the applicability of this finding to predict real trust behavior in the field. In fact, the trust game may have been a rather convenient context to test for a relationship of conspiracy beliefs with behavioral trust. That is, even if uncertainty and vulnerability, by definition, are part of a trust situation

(Thielmann & Hilbig, 2015), such feelings are extremely salient in the trust game compared to many everyday trust situations. It is precisely this situational context of uncertainty and vulnerability, in which conspiracy theories flourish (Sullivan et al., 2010; Van Prooijen and Jostmann, 2013). That feelings of uncertainty and vulnerability may promote the association of conspiracy beliefs and trust behavior might also be reflected by the deviating results of Study 1, where the game dynamics, in contrast to the other three studies, may not have been salient enough to evoke such feelings (as argued in the Discussion of Study 3; also see Johnson & Mislin, 2011 for a meta-analysis on the context-sensitivity of the trust game). We thus argue that the present research demonstrated initial support for an association between conspiracy beliefs and more cautious trust behavior, but further studies will need to explore the specific preconditions under which this finding can be applied to everyday trust situations.

Limitations

Unfortunately, we had to use direct deception in all four studies to examine the association of conspiracy beliefs and social threat perception. Specifically, we had claimed that they would play against real persons of a prior study but in fact they received alleged faces of their co-players whose pre-programmed return factors determined the outcome of each game round. This cover story was necessary to manipulate social threat (posed by varying degrees of facial anger) with high experimental control while providing a situational context that supports to draw conclusions regarding the association of conspiracy beliefs and *actual* trust behavior, which was the main purpose of this research. Regrettably, we did not see any nondeceptive alternative but taking into account the immense negative health-related, political and social consequences of conspiracy beliefs (e.g., Imhoff et al., 2020; Imhoff & Lamberty, 2020b; Jolley & Douglas, 2014a, b; Lamberty & Imhoff, 2018), we considered the deception a defensible cost to improve our understanding of what constitutes conspiracy

beliefs. We believe that the induced assumption of having played with real persons did not cause significant harm or emotional distress to participants and endeavored to mitigate potential negative effects by providing a comprehensive debriefing and apologizing for the necessary deception. Aside from ethical issues, deception might also bias results if participants have suspicions about being deceived. Based on the exploratory analysis of a control item assessing skepticism regarding the information provided in the study, however, we consider it unlikely that the deception confounded our findings.

Conclusion

The extent to which people are attracted to conspiracy theories predicted how little trust they put in unknown others in a concrete trust situation. Importantly, we found this relationship in a context, where the given trustees were not presented as particularly powerful. The present research thus joins a number of studies demonstrating that conspiracy beliefs can influence everyday behavior. Under which specific circumstances this relationship applies, and whether social threat detection plays a role in such a more cautious trust behavior remains open for future research.

Open Practices

All preregistrations, materials and data are openly accessible on the Open Science Framework (see <https://osf.io/guqn5>).

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