Malevolent intentions and secret coordination. Dissecting cognitive processes in conspiracy beliefs via diffusion modeling

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The manuscript has been accepted for publication in *Journal of Experimental Social Psychology* (July 2022):

Frenken, M., Imhoff, R. (2022). Malevolent intentions and secret coordination. Dissecting cognitive processes in conspiracy beliefs via diffusion modeling. *Journal of Experimental Social Psychology* (Preprint).

Abstract

There has been an increasing scholarly interest in the psychology behind conspiracy theories, the belief that events in the world are brought about by the secret coordination of others with negative intentions. Typically, people differ systematically in the degree to which they endorse a wide range of such theories, suggesting a general suspicious attitude, i.e., a conspiracy mentality. The present research investigated how conspiracy mentality is related to the interpretation of mundane and societal events as being based on secret coordination, respectively malevolent intentions. Specifically, we tapped into the cognitive architecture of such decisions via drift diffusion modeling to test three conceivable mechanisms: a-priori tendencies to assume more often secret agreements and negative intent, enhanced informational processing into the direction of these conspiracy-related outcomes, and cognitive shortcuts. In four experiments (total N = 1083), participants made fast and intuitive decisions about the existence of secret agreements or negative intentions behind numerous events, each described in one short phrase. The results indicate that conspiracy mentality is associated with a propensity to perceive secrecy and negative intent in big societal as well as small every-day events. Cognitively, conspiracy mentality refers in these intuitive decisions primarily to presuppositions and prior attitudes before considering further information, but also to motivated processing, whereas there was no evidence for decisional shortcuts. We discuss that the general suspicious attitude behind the endorsement of conspiracy theories includes a cognitive style predisposing to intuitively assume—even independent of content—more secrecy and negative intentionality.

Keywords: conspiracy mentality, conspiracy theories, diffusion model, cognitive processes, secret agreements, negative intentions

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Some people tend to explain events in the world with conspiracy theories while others do not. Even the same evidence is often assimilated in support of previous assumptions leading to attitude polarization (McHoskey, 1995). Terms like conspiracy mindset or conspiracy mentality summarize these inter-individual differences in conspiracy beliefs conceptually within a single framework as the extent of the endorsement across many conspiracy theories. Often, this tendency is considered to be inter-individually stable (e.g., Frenken & Imhoff, 2021; Imhoff & Bruder, 2014). Even beyond specific conspiracy theories, recent research suggests that this tendency to endorse conspiracy theories might play a broader role of suspicion in interpersonal situations without strong societal implications (van Prooijen et al., 2021). Thus, the endorsement of specific conspiracy beliefs may just be an expression of a much more general latent trait that already influences early informational processing steps (van Prooijen et al., 2020) across a multitude of events. Although ascribing secrecy and negative intent are core elements behind conspiracy theories, it is at present less clear whether individual differences in conspiracy mentality pan out exactly in suspecting these two for events of varying social relevance. The present research sought to test this in four experiments utilizing drift diffusion modelling to dissect the cognitive architecture underlying such rapid decisions.

Across a series of experiments, participants decide intuitively if different events are brought about by secret coordination, respectively negative intentions and their responses will be analyzed as raw responses, as well as subjected to cognitive modelling (together with the latency of the responses). This will clarify three questions: Is conspiracy mentality related to increased perceptions of specific events as based on secret agreements or negative intent? Is this increase restricted to abstract political or societal levels as in typical conspiracy theories (e.g., about 9/11) or does it

generalize to broader contexts like mundane and every-day events? And which cognitive processes are associated with conspiracy mentality when modeling these decisions for or against secrecy and intent in drift diffusion models (Ratcliff & McKoon, 2008)? It is conceivable that people accepting conspiratory worldviews hold an a-priori assumption that the world is governed by malevolent plots – relatively independent of the concrete case at hand. Alternatively, it may be that they do process the specific case, but underlie a biased processing towards reaching a certain decision. Finally, it could be that they just process overall less information so that the "jump-to-conclusions" (Pytlik et al., 2020) creates reduced discriminations between suspecting innocence versus secrecy or bad intentions. Before introducing the diffusion model and the role of its parameters for the research question, we describe the concept of conspiracy mentality and its cognitive underpinnings in more detail.

Systematic pattern behind conspiracy beliefs

Definitions of conspiracy theories share the core feature of assuming acts in secrecy by malevolent and powerful agents (Douglas et al., 2019; Uscinski, 2020). Accordingly, conspiracy beliefs are related to increased attributions of intentionality and agency (Brotherton & French, 2015; Douglas et al., 2016; van der Tempel & Alcock, 2015). As other cognitive mechanisms, the detection of intentionality is a basic human skill and a cognitive system (Baldwin & Baird, 2001) that is in principle evolutionary advantageous, but shows increased expressions among people who tend to believe in conspiracy theories (van Prooijen & van Vugt, 2018). Besides such systematic cognitive pattern, substantial intercorrelations of the endorsement of different—even contradictory—conspiracy theories (e.g., Goertzel, 1994; Lukić et al., 2019; Wood et al., 2012) have led to the conclusion that this pattern reflects a general mindset referred to as conspiracy mentality (Imhoff & Bruder, 2014; Stojanov & Halberstadt, 2019), conspiracist ideation (Swami et al., 2011), or conspiracy thinking (Uscinski & Olivella, 2017). Theoretically, people who score high on conspiracy mentality are more likely to

attribute events to the secret coordination of a small group of conspirators than to randomness or situational constraints.

Although conspiracy mentality has been characterized as a deeply political generalized attitude (Imhoff & Bruder, 2014), it also radiates into the personal sphere (see van Prooijen et al., 2021) as conspiracy beliefs show robust associations with expressions of general interpersonal mistrust (Goertzel, 1994), and conspiracy mentality a greater tendency to perceive faces as untrustworthy (Frenken & Imhoff, 2022) and less behavioral trust towards unacquainted co-players (Meuer & Imhoff, 2021). From this perspective, endorsing conspiracy beliefs is much less about a specific conspiracy theory and a specific (political) context, but much more about a general suspicious style of how to perceive and explain the world. This style might explain interindividual differences in the general perception and interpretation of the same (sometimes ambiguous) information and should be of particular significance for the defined components of conspiracy theories (i.e., secrecy and negative intentionality). Conspiracy mentality is, therefore, expected to be accompanied by an enhanced tendency to see intent and secrecy in big societal, but also in smaller domains like behind mundane events. While these behavioral outcomes might relate to a domain-general attributional style, it is unclear if the cognitive pathways leading to this judgmental behavior also mirror general patterns in the early informational processing.

Informational processing in conspiracy theory contexts

The human cognitive system enables different forms of decision processes from early fast and intuitive decisions to slower and deliberative processing (see Kruglanski & Gigerenzer, 2011). Although intuitive thinking appears to be of most importance for conspiracy beliefs by covering many of the cognitive mechanisms and biases ascribed to conspiracy thinking, deliberative thinking can also be involved to justify the decision for or against conspiracy theories articulated in early processing steps by selectively collecting supportive arguments in a later stage (van Prooijen et al., 2020).

Following this perspective, the first contact with information is particularly important for the overall impression and judgement about events and interpretations in conspiracy-related contexts. We will thus concentrate on this early informational processing stages for the remainder (without necessarily implying that later stages are irrelevant).

The processing style behind conspiracy theories has been predominantly connected to cognitive biases and heuristics (e.g., Moulding et al., 2016; Brotherton & French, 2014; Leman & Cinnirella, 2007). People scoring higher on conspiracy beliefs also perceive more illusory pattern where are actually none (van Prooijen et al., 2018) and preferably infer from global over local features in visual processing (van Elk, 2015). Furthermore, they seem to favor simple solutions for complex problems (van Prooijen, 2017) making it easier to blame malevolent agents than to ascribe events to coincidence or complex interplays. Accordingly, conspiracy believers tend to think more intuitive and less analytic or deliberative (Swami et al., 2014; van Prooijen, 2017). As a facet of intuitive thinking, conspiracy beliefs are related to the jumping-to-conclusion bias signifying that decision-making tends to be faster and based on less evidence (Pytlik et al., 2020).

Another biased processing path could be the motivated guidance of attention and perception pointing to an inclination to enhanced processing of information and topics that are more easily interpretable in terms of conspiracy-(un)related outcomes. Empirical evidence supports the relevance of motivated processing (Taber et al., 2009) and motivated attention (Luo & Zhao, 2019) in the context of socio-political information. For example, prior attitudes and ideologies led to differences between liberals and conservatives in the visual attention on contents about climate change (Luo & Zhao, 2019).

There is thus ample reason to suspect conspiracy-prone thinking to play out at the level of reduced or biased information processing—a reduction of presented information or assimilation to one's own worldview. There is, however, a conceivable alternative of a more or less direct bias:

presuming conspiracies at play before actually evaluating the evidence. In that sense, marked conspiracy mentality may be characterized not by specifically biased information processing, but by an *a-priori* assumption of a certain extent of agency and secrecy in general before processing informational content in detail. In support of this, Leman and Cinnirella (2007) found that conspiracy beliefs did not affect inference and processing, but a general level of skepticism in the evaluation of information independent of content.

In sum, conspiracy beliefs have been connected to decision biases prior to the processing of information, to the processing of less information, as well as to a biased processing of information. Although, these seem closely connected at first sight, modeling procedures can provide powerful tools to tear these apart and estimate separate parameters for a-priori attitudes as well as for a motivated and a reduced processing of information.

Cognitive processes in the diffusion model

To explore the cognitive processes behind participants' decisions whether an event resulted from secret coordination or not, respectively from negative intentions or not, we employed drift diffusion modelling. The drift diffusion model describes hypothesized cognitive processes behind two alternative forced choice decisions and is an established procedure in cognitive sciences (Ratcliff & McKoon, 2008). The model assumes that participants accumulate information over time within a few seconds until they reach one of the two decision thresholds (i.e., presence of secret agreements/negative intentionality vs. not) and make their decision (see Figure 1). It conjointly uses responses and response times to estimate parameters for each participant. The parameters are informative to dissect the components of informational processing and we introduce the most important ones in the following (see Table 1).

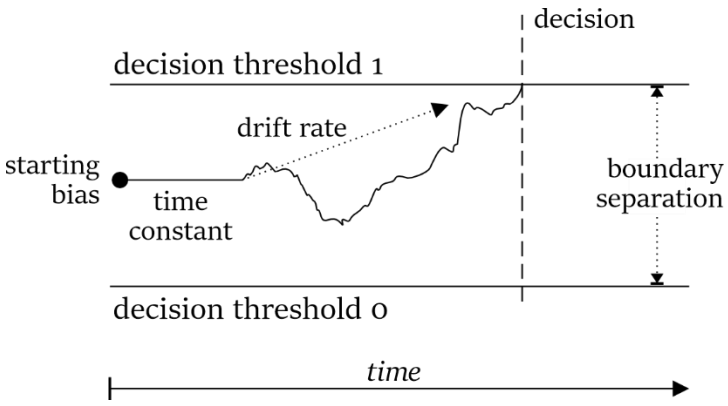

Figure 1. Accumulation process in the drift diffusion model. Participants start at an individual point ("starting bias") to accumulate information over time ("drift rate") until reaching one of the two decision thresholds (0 or 1). The depiction is simplified and non-decisional processes ("time constant") can happen at any time. In the present experiments, threshold 1 was either the decision to assume negative intentions or secret agreements behind events (and threshold 0 to assume neither of both).

The *starting bias* parameter represents the relative start of the decision process between the decision thresholds and specifies a-priori preferences for a decision (e.g., secret coordination involved vs. not) *before* considering any information. The values range between 0 and 1 for each participant and the value of 0.5 indicates a neutral start without any a-priori preferences for one of the decision thresholds whereas values above 0.5 suggest a preference for the upper and below 0.5 for the lower threshold. It is conceivable that people accepting conspiratory worldviews hold an a-priori assumption that the world is governed by malevolent plots and thus exhibit a general response bias of expressing this worldview before processing any information. If the starting bias is statistically correlated with conspiracy mentality, this would speak for the role of a-priori assumptions in the direction of seeing more or less often negative intent or agency behind events - relatively independent of the concrete case at hand (*presupposition hypothesis*; see Table 1). For example, people with higher values on conspiracy mentality might assume negative intentions in the world and in actions of the government already before processing a comment on social media that vaccines are a form of government control and might, therefore, more often endorse such a comment even before reading it.

The *drift rate* parameter stands for the speed and direction of information accumulation. Higher absolute values point to accelerated information accumulations and the according sign points to the decision threshold that the information tend to support (positive sign: upper threshold; negative sign: lower threshold). Information could be catchier and more fluent for uptakes in the direction of the decision threshold that is more in accordance with one's worldview (perceptual sensitivity, see Voss et al., 2004). This parameter suits to the idea of motivated processing to preferably consider information in support of and in congruence with the favored outcome or prior beliefs (Luo & Zhao, 2019; Taber et al., 2009). The drift rate mirrors early stages like processing of visual input influenced by prior beliefs and its matching with memory contents rather than deliberative reasoning or quests for arguments (motivated reasoning, see Kunda, 1990). In the current context, a heightened conspiracy mentality might be associated with a biased (or motivated) processing of information. Correlations with conspiracy mentality would suggest that—rather than forestalling the decisional outcome—conspiracy mentality might be associated with such belief-consistent information processing (see Oeberst & Imhoff, 2022). One would expect an accelerated uptake of information and topics into the direction of conspiracy-related decisions for participants scoring high on conspiracy mentality because they could be more sensitive to information that tend to be ambivalent or conspiracy-related and effortlessly combined in a way that is compatible with their attributional style to see more secrecy and negative intent (*accumulation hypothesis*). Following the previous example, the perceptual input of seeing a social media comment including the words vaccines and government might more easily activate conceptual cluster or speak to already existing memory contents that are related to the perception of conspiracy-related outcomes among people showing high expressions of conspiracy mentality. Thus, drawing an intuitive connection from the vaccine topic to the decision in favor of secret plots and negative intention could be facilitated.

The *boundary separation* is the parameter of the model that quantifies the distance between the decision thresholds. The larger the distance, the more conservative is the decisional style and the more information is necessary to distinguish between the response options. Higher scores in conspiracy mentality are expected to be accompanied by a lower informational discrimination between the two options (i.e., a lower boundary separation) consistent with the jumping-to-conclusion bias and heuristic thinking (*distinction hypothesis*). Admittedly, one would need to make an additional assumption in order for this to provide an explanation for conspiracy believers suspecting more secrecy and intentions. One would need to assume that more extended information accumulation would typically lead to negative responses (i.e., denying secrecy and intentionality), but that—due to the oscillating nature of information accumulation (Figure 1)—a pre-mature decision as a result of lower boundary separations makes it more likely to suspect exactly such secrecy and intentionality. Transferring the logic of a shallow information integration to the Internet comment example suggests that people with higher conspiracy mentality values might rely their spontaneous decision on a condensed processing of the specific setup about vaccines and government control to get to a decision. They would thus discriminate less clearly within their first impression if the government has negative intentions or not.

Finally, the *response time constant* (also referred to as *non-decision time*) covers the duration of all other processes that are unrelated to the decision, e.g., encoding/reading time or motoric execution. This parameter has no theoretically-identified conceptual meaning for conspiracy beliefs.

Parameter	Hypothesis	Interpretation
Starting bias	Presupposition	Prior suspicious beliefs before further processing
Drift rate	Accumulation	Collection and processing of information; fluency, catchiness and congruency effects of preferred information and topics; motivated processing
Boundary separation	Distinction	Amount of information; jumping-to-conclusion, shortcuts, and heuristics

Table 1. Overview of the model parameters and their interpretation.

The present research

In the present research, we examined in four experiments how the individual differences in conspiracy mentality map onto response behavior as well as on cognitive modelling parameters for intuitive first interpretations of specific events. Specifically, participants decided in a multitude of short one-sentence descriptions of daily or societal events if they are likely based on negative intent or secret agreements. The aims of the experiments were threefold: First, the experiments were designed to investigate if conspiracy mentality is related to seeing intuitively more often negative intentions and secret agreements behind events. Secrecy and negative intent are per definition considered as core ingredients of conspiracy theories and we meant to test the perception of these components separately. Second, the suspicious view behind conspiracy mentality seems to be rooted in a broader framework and to radiate on other areas than mere conspiracy theories. If this results from a general cognitive style, then we expect people with a higher conspiracy mentality to see more intent and secrecy behind societal *and* personal events, albeit with smaller correlations for personal every-day events (due to smaller impact, see Leman & Cinnirella, 2007). Third, we intended to clarify via diffusion modeling the cognitive processes behind evaluating specific events. We tested three hypotheses how conspiracy mentality maps onto those parameters: whether it influences a-priori

assumptions and hence correlates with the starting bias (*presupposition hypothesis*), whether it is associated with motivated processing and an enhanced information accumulation in the direction of secrecy and intent (*accumulation hypothesis*), and/or whether it relates to fast decision-making in line with the jumping-to-conclusion bias (*distinction hypothesis*).

The first experiment examines how conspiracy mentality is related to the interpretation of secret agreements behind conspiracy theory-related topics. In the second experiment, we expanded the subject area by manipulating within-subjects whether the event to be judged for negative intent was a mundane every-day or a big societal. We used a mix of societal but mainly every-day events in a third study with more power to bolster the results of the second experiment. The fourth experiment was fully preregistered and clarified the underlying processes behind judgements about societal events by manipulating within-subjects whether participants decided about secret agreements or negative intent.

All studies were pre-registered but the exact modeling procedures were adapted over the course of the research line due to model fit reasons. To enhance stringency and comparability, we applied the pre-registered settings of the last study to all studies. As this constitutes small deviations from the exact pre-registrations for the Experiments 2 and 3 (i.e., additional response time window restriction; changing the model estimation criterion in Exp. 3) but more substantial ones for the first experiment, we treat the first study as exploratory. All measures, manipulations, methods to determine the final sample size, and exclusions in the study are disclosed. Ethical approval for the study design was given by the local Ethics Committee of the Psychological Institute and participants provided informed consent on the basis of information about the upcoming task and recorded data, but not specifically about the conspiracy mentality topic.

Experiment 1

The first exploratory experiment dealt with a multitude of conspiracy theory-related topics about societal, political, and historical events and required to decide about secret agreements behind them. The aim was to test if conspiracy mentality covaries with the average perception of secret agreements and to examine the cognitive underpinnings of these decisions in the diffusion model.

Method

Participants

The sample with a size of N = 133 (female = 83, male = 49, non-binary = 1; M_{age} = 31.41, SD_{age} = 14.22) consisted predominantly of German students receiving course credit for their participation. Regarding the pre-registered criteria, there were no exclusions due to missing trials, self-reported random clicking, or severe technical problems. But the datasets of seven participants had to be excluded because they did not make enough use of both response options (at least a ratio of 10/90 %) which is especially important for diffusion modeling but also to ensure that participants were cognitively involved in the study design.

The sensitivity power analysis in G*Power (version 3.1, Faul et al., 2007) revealed that a sample of N = 126 has 80% power to detect a correlation of .244 when assuming an alpha level of .05 and a two-tailed test. The sample size was differently from the original plan (about 200) because the experiment was part of student theses and we had to terminate data collection at a certain time point, but not contingent on the data. We also collected additional exploratory measures in this project (Need for Cognitive Closure, Bullshit Receptivity Scale) that are not part of this research line and never published elsewhere (full dataset on OSF: a6m39).

Procedure

After the general instructions, participants were tasked to decide in a binary forced choice paradigm whether the upcoming events each described in one short sentence per trial in the center of the screen are based on secret agreements or not, using the “f” and “j” keys. The response key

assignment was counterbalanced across participants. Participants were encouraged to respond as fast as possible without thinking twice, and the response window was limited to 8 seconds. Two training trials were followed by 242 experimental trials in random order with one sentence per trial in the center of the screen. Participants started the next trial by pressing a button. Finally, participants completed the conspiracy mentality scale and were thanked. The experiment was conducted in *Inquisit* (version 4, Millisecond Software, LLC).

Measures

Conspiracy mentality

The 12-items scale by Imhoff and Bruder (2014) served as the measure for conspiracy mentality and was internally consistent ($\alpha = .91$). One of the items was "Most people do not see how much our lives are determined by plots hatched in secret.", each rated on a seven-point Likert scale from "strongly disagree" to "strongly agree". The scale is relatively stable, shows high predictive validity for beliefs in specific conspiracy theories (often as the strongest predictor in multiple regressions) and discriminant validity to other political constructs like right-wing authoritarianism or social dominance orientation (Dyrendal et al., 2021; Imhoff, Bertlich, & Frenken, 2022; Imhoff & Bruder, 2014).

Behavioral measures

The relative frequency of secret agreement responses per participant served as the behavioral measure for perceiving secrecy behind events (example item: "Edward Snowden gets Asylum in Russia."). In each of the 242 trials, we recorded the response and the response time. The mean response latency was 3.26 sec (*SD* = 1.32 sec) and the relative frequency of secrecy-responses 39.9 % (*SD* = 15.8 %). A total of 1.2 % of all trials was timed-out before a response was recorded.

Diffusion modeling

The diffusion model parameters were estimated separately for each participant using *fast-dm* (version 30.2, Voss & Voss, 2007). Generally, the parameters cannot be interpreted in absolute terms and are only informative in relation to the additional measure of conspiracy mentality (except for the relative starting bias with 0.50 as neutral point and upper and lower limits). Diffusion modeling is well suited for experimental paradigms like the current one that require binary decisions. Although the current experiments violate the recommendation to reserve such modelling for very fast response times (below 1.5 sec.) of single-stage processing decisions (Ratcliff & McKoon, 2008), the model is actually practically able to recover parameters also from slower response times up to 7 sec that involve more complex than basal single-stage decisions (Axt & Johnson, 2021; Lerche & Voss, 2019). In our experiments, the decisions were rather simple by employing short and standardized phrases and by instructing the participants to decide intuitively and without thinking twice. Accordingly, response times were on average quite fast in all experiments (mostly below 3 sec). To verify these theoretical assumptions, we evaluated the applicability of each model in the reported experiments using graphical and statistical model fit indicators. The graphical model fit visualizes the empirical and predicted responses and quartiles of response times. The statistical model fit procedure (see Voss et al., 2015) uses Monte-Carlo simulations entering 1000 simulated datasets into the diffusion model. The 5 % quantile of the resulting fit indices (i.e., log-likelihood) is set as critical value for the empirical fit indices per participant. The simulations resulting in an exclusion of 5.6 % (87 of 1551) of datasets across all studies signified a sufficient model fit. It is recommended to critically assess the suitability of the model for the task when the number of exclusions *notably* exceeds 5 % (Voss et al., 2015).

The decision process in the diffusion model is noisy with trial-by-trial differences. The stimuli phrases had approximately the same length and content complexity to avoid large inter-trial differences and to keep the reading time constant. Although the model also covers intertrial-variabilities, fixing these additional variability-parameters (of the starting bias and drift rate, but not

of the non-decision time) to zero typically leads to better results (Boehm et al., 2018; Lerche & Voss, 2016) and we followed these recommendations. Results from additional analyses including estimations of the variability of the drift rates are presented in the section about the internal meta-analysis across all studies. The main parameters starting bias, drift rate, boundary separation, and non-decision time were allowed to vary freely. The parameter estimations relied on the *Maximum-Likelihood* criterion that is—without the presence of fast contaminants—described as superior compared to the *Kolmogorov-Smirnov* criterion (Lerche et al., 2017). Comparisons between both estimation criteria and their model fit are reported online (see OSF: a6m39).

Exclusion criteria for the response times ensured the absence of fast contaminants and of prolonged response times that might indicate non-intuitive responding and reasoning. All trials that exceeded the 2.5 Median Absolute Deviation per participant (see Leys et al., 2013) or generally a response time window between 1 to 7 sec. were excluded in the dataset for diffusion modeling (not for the behavioral analysis).

In the first experiment, 2.4 % of the trials were excluded due to the MAD criterion and 1.1 % of the remaining trials because of the restricted time window (1 to 7 sec.). The model fit simulation procedure suggested overall a good model fit by excluding 6 out of 126 participants (4.8 %) from the further parameter analyses due to insufficient model fit. The correlations between the predicted and the empirical responses and response times per quartile (.25, .50, .75) yielded good fit values between .957 and .980.

Results

The correlation between the relative frequency of secret agreement judgements and conspiracy mentality was significant, $r = .353$, $p < .001$. Both the drift rate, $r = .235$, $p = .001$, and the starting bias, $r = .171$, $p = .061$, showed a positive correlation with conspiracy mentality, although the latter did not meet conventional levels of significance (Table 2). The boundary separation returned a

non-significant negative correlation with conspiracy mentality, r = -.119, p = .197. The mean values of the starting bias and the drift rate pointed into the direction of no secret agreements.

	M (SD)	(2)	(3)	(4)	(5)	(6)
(1) Mean response	0.40 (0.16)	.596**	.618**	-.090	.004	.355**
(2) Starting bias	0.46 (0.12)	—	-.229*	<.001	-.085	.171
(3) Drift rate	-0.13 (0.32)		—	-.011	.047	.235**
(4) Boundary separation	1.95 (0.38)			—	-.452**	-.119
(5) Non-decision time	2.35 (0.72)				—	.075
(6) Conspiracy mentality	4.47 (1.14)					—

Table 2. Table of intercorrelations (Exp 1). The correlations base on the datasets after all exclusions for diffusion modeling and can slightly differ for the behavioral analysis without these exclusions. The table shows significant correlations of conspiracy mentality with the mean responses and the drift rate parameter. ** p < .01, * p < .05

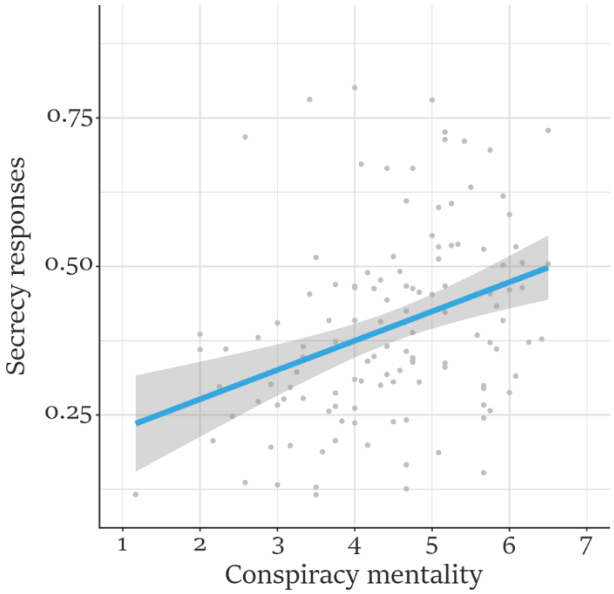

Figure 2. Correlation between conspiracy mentality and the relative frequency of secrecy responses (Exp. 1). The grey area represents the 95%-confidence interval.

Discussion

The first study revealed that higher values on conspiracy mentality are accompanied by more frequent assumptions of secret agreements behind societal and historical events (see Figure 2). This behavioral correlation is mainly mirrored by the drift rate of the diffusion model suggesting a form of motivated processing involved (accumulation hypothesis). The correlation with the starting bias (i.e., presupposition hypothesis) was also substantial, but failed to reach the level of significance in this rather underpowered study. There was no evidence in favor of the distinction hypothesis assuming a more heuristic and less evidence-based decision style, but the negative correlation value with conspiracy mentality was pointing descriptively in the expected direction. The second experiment aims at scrutinizing the role of conspiracy mentality in conspiracy-unrelated domains and uses a different decision criterion.

Experiment 2

The second study tested if conspiracy mentality is relevant in every-day situations as well and how the evaluation of such events is related to the evaluation of bigger conspiracy theory-related events. The underlying assumption is that conspiracy mentality represents a broader framework that consists of general cognitive style of suspecting evil at play, even for non-political and non-societal mundane events. In this experiment, negative intentions replace secret agreements as response domain specifically focusing on *negative* intentions rather than intentionality in general (see Brotherton & French, 2015). Most every-day situations were practically not as well compatible with secrecy as with intentionality decisions.

Method

Participants

Among the initial sample of N = 136 (female = 102, male = 33, non-binary = 1; M_{age} = 28.08, SD_{age} = 11.30) were mainly German students participating for course credit. One participant did not complete the study and two reported that they did not complete it in a serious manner. No technical

problems have been reported. Four participants were excluded as pre-registered (see OSF: a6m39) because they did not reach the minimum frequency per response option (10 %) resulting in a remaining sample size of N = 129.

The sensitivity power analysis in G*Power 3.1 revealed that a sample of N = 129 has 80% power to detect a correlation of .241 when assuming an alpha level of .05 and a two-tailed test. The sample size was differently from the original plan (212) because the experiment was part of a student thesis and we had to terminate data collection at a certain time point, but not contingent on the data.

Procedure

The general design was similar to the first experiment. Participants responded as fast as possible in a binary decision about the existence of negative intentionality behind events, each described in one short sentence per trial. The study comprised two within-subject experimental conditions in which events either thematizing societal or every-day events that were presented block-wise in random order (80 trials per condition and block, 160 trials in total). The response time window has been limited to 7 sec. and the experiment was conducted online using *Inquisit* (version 5, Millisecond Software, LLC) that required the installation of the appropriate plug-in in advance.

Measures

Conspiracy mentality

The same scale as in the first experiment was used (Imhoff & Bruder, 2014, α = .89).

Behavioral measures

The behavioral measure for the perception of negative intentionality was the relative frequency of negative intention decisions, separately calculated for both experimental conditions with societal vs. every-day events as stimuli. One of the sentences in the every-day condition was “A colleague keeps interrupting you in a meeting.”. In each of the 160 trials, we recorded the response and the response time. The mean response latency was 2.86 sec (SD = 1.08 sec) in the societal and

2.67 sec. (*SD* = 1.04 sec) in the every-day condition. The relative frequency of intentionality-responses was 35.5 % (*SD* = 15.2 %) in the societal and 34.2 % (*SD* = 15.9 %) in the every-day condition. A total of 1.1 % of all trials was timed-out before a response was recorded.

Diffusion modeling

The diffusion model settings (using Maximum Likelihood as the estimation criterion) and pre-registered exclusion procedures were the same as in the first experiment. The parameters were estimated separately per experimental condition. Before modeling, we excluded trials as pre-registered due to the Median Absolute Deviation exclusion criterion (4.1 % every-day, 3.5 % societal condition) and due to the response time restriction between 1 and 7 sec. (1.2 % every-day, 0.9 % societal condition). Furthermore, the datasets of four participants in the every-day and two participants in the societal condition were excluded because they did not fulfill the minimum frequency of responses per option within each condition (10 %). This step is necessary for diffusion modeling to map the data accordingly in each condition and is conducted in addition to the above-mentioned exclusions due to the global 10%-criterion across conditions (employed as plausibility check). After modeling, the datasets of three participants (2.4 %) in the every-day condition and nine participants (7.1 %) in the societal condition were excluded from the analyses because they showed a poor model-fit according to the Monte Carlo-simulation procedure. Although having a good model fit, the drift rate of one participant in the every-day condition was arguably too low (-9.82 and the second lowest drift rate value being -2.32), establishing the additional rule to exclude datasets where the drift rate is more than twice as high/low compared to the next (more plausible) one. The final sample size in the every-day condition was *N* = 121 and *N* = 118 in the societal condition. The correlations between empirical and predicted data (see OSF: a6m39) ranged between .945 and .971. for every-day events and between .932 and .971 for societal events suggesting a good model fit.

Results

The hypothesized correlations between conspiracy mentality and the perception of negative intentionality behind every-day, $r = .300$, $p = .001$, and societal events, $r = .393$, $p < .001$, were both significant and did not differ significantly, Steiger's $z = 1.19$, $p = .118$. The only parameter showing a significant correlation with conspiracy mentality was the starting bias in the condition with stimuli describing societal events, $r = .258$, $p = .005$. Table 3 provides an overview of all intercorrelations for the sample of participants that had no missing values in either condition (resulting in slightly different correlation values). The means of the starting bias and the drift rate pointed into the direction to assume no negative intentions in both conditions.

	M (SD)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Mean response (mundane)	0.35 (0.15)	.481**	.475**	-.160	.016	.597**	.417**	-.017	-.052	-.024	.291**
(2) Starting bias (mundane)	0.39 (0.14)	—	-.503**	.028	-.132	.224*	.204*	-.052	.007	-.054	.136
(3) Drift rate (mundane)	-0.11 (0.48)		—	-.135	.144	.324**	.230*	-.008	-.054	.051	.101
(4) Boundary separation (mundane)	1.77 (0.38)			—	-.117	-.232*	-.204*	.041	.185*	.183	-.125
(5) Non-decision time (mundane)	1.99 (0.54)				—	-.099	-.056	.021	.015	.654**	.167
(6) Mean response (societal)	0.36 (0.14)					—	.638**	.035	-.091	-.151	.331**
(7) Starting bias (societal)	0.45 (0.17)						—	-.654**	.143	-.275**	.242**
(8) Drift rate (societal)	-0.19 (0.56)							—	-.106	.183*	-.036
(9) Boundary separation (societal)	1.78 (0.40)								—	-.385**	.137
(10) Non-decision time (societal)	2.19 (0.57)									—	.042
(11) Conspiracy mentality	3.13 (1.01)										—

Table 3. Table of intercorrelations for the mundane and the societal items (Exp. 2). The correlations base on the datasets after all exclusions for diffusion modeling (N = 115) and can slightly differ for the behavioral analysis or analyses separated by conditions without the same exclusions. The table shows significant correlations of conspiracy mentality with the mean responses and the starting bias. ** $p < .01$, * $p < .05$

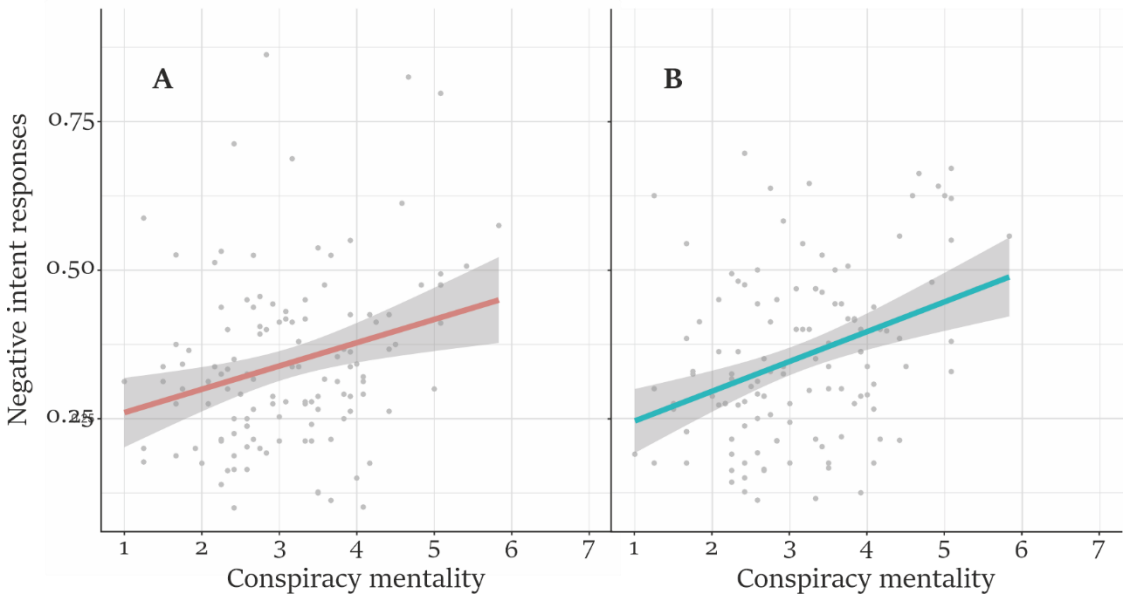

Figure 3. Correlation between conspiracy mentality and the relative frequency of negative intentionality responses (Exp. 2). The grey area represents the 95%-confidence interval. (A) refers to the mundane events condition, (B) refers to the societal events condition.

Discussion

As predicted, conspiracy mentality correlated substantially with the perception of negative intent in both experimental conditions signifying the domain-generalizability of the general attitude to assume malevolent agents at work (see Figure 3). The underpowered study yielded the starting bias as the only significant parameter related to conspiracy mentality (supporting the presupposition hypothesis), albeit only in the societal condition. The mean levels of the starting biases and conspiracy mentality were comparatively low in this sample. Contrary to the first experiment, correlations of conspiracy mentality with the drift rate were not significant. The next study thus aimed at solidifying the respective roles of both, the starting bias and the drift rate, in explaining the correlation between conspiracy mentality and participants' responses in an experiment with more power.

Experiment 3

The third study investigated how the interpretation of negative intent is generally related to conspiracy mentality when using mainly every-day but also societal events as stimuli without block-

wise separation. The aim was to test with sufficient power associations of the starting bias (presupposition hypothesis, like in Experiment 2) and the drift rate (accumulation hypothesis, like in Experiment 1) with conspiracy mentality.

Method

Participants

When initially starting the experiment, we collected data in a German student sample of N = 114 (female = 91, male = 22, non-binary = 1; M_{age} = 26.60, SD_{age} = 11.18). The final sample size was N = 107 after excluding participants who self-reportedly did not fully complete the experiment in a serious manner. This was not in accordance with the pre-registered sample size of 300 (see OSF: a6m39). Although conspiracy mentality and the behavioral tendency to suspect negative intentions correlated as expected, r = .218, p = .024, the sample size was too small to map this meaningfully to diffusion model parameters. We thus started a new study and focus our report on that sample, but also provide results from a pooled analysis across the two (procedurally identical) experiments.

The datasets of the second (main) experiment (N = 299, female = 110, male = 187, non-binary = 2; M_{age} = 29.44, SD_{age} = 9.79) were collected on *Prolific Academic* for 2.13 GBP per participant setting German as first language as prerequisite. Applying the pre-registered procedures, there were no exclusions due to missing trials, self-reported random clicking, or severe technical problems, but one participant did not make enough use of both response options (at least 10 %) resulting in a final sample of N = 298. The sensitivity power analysis in G*Power 3.1 revealed that a sample of N = 298 has 80% power to detect a correlation of .161 when assuming an alpha level of .05 and a two-tailed test.

Procedure

The general procedure and design were similar to the previous study. In this experiment, participants completed 146 trials in random order without any block separations including phrases about a variety of predominantly every-day but also some societal events. The stimuli were initially supposed to refer only to every day events. However, this artificial distinction between big societal and mundane events is not always a clear dichotomous decision and it became clear that—after reconsidering the exact wording later—some items could also be assigned to the societal category. Participants decided as fast as possible for each event per trial about the existence of negative intentionality behind it in a binary decision.

Measures

Conspiracy mentality

The same scale as in both prior experiments was used (Imhoff & Bruder, 2014, α = .92).

Behavioral measures

The behavioral measure for the perception of negative intentionality was the relative frequency of negative intention decisions. One example item was “Someone is listening to loud music on the bus.”. In each of the 160 trials, we recorded the response and the response time. The mean response latency was 2.84 sec. (*SD* = 1.05 sec) and the overall relative frequency of intentionality-responses was 50.7 % (*SD* = 12.2 %). A total of 0.8 % of all trials was timed-out before a response was recorded.

Diffusion modeling

The diffusion model settings were the same as in the prior experiments. The Median Absolute Deviation criterion led to the exclusion of 3.4 % of all trials and the restriction to response times above 1 sec to the exclusion of 1.6 % of the remaining trials. There were not enough remaining trials for diffusion modeling in the datasets of two participants. The Monte Carlo-simulation indicated a sufficient, but not perfect overall model fit as the model fitted the data of 92.6 % of the participants

well, resulting in the exclusion of 22 datasets (final N = 274). The correlation between empirical and predicted data in responses and response times showed a promising range between .931 and .974.

Results

The hypothesized correlation between conspiracy mentality and the relative frequency of perceptions of negative intent was significant, r = .189, p = .001. The starting bias, r = .131, p = .030, the boundary separation, r = -.121, p = .046, and the theoretically less important non-decision time constant, r = .181, p = .003, yielded significant correlations with conspiracy mentality (see Table 4). Pooling data from the initial but uncompleted study with this main study demonstrates a clearer picture in favor of the general behavioral effect, r = .206, p < .001, and the starting bias, r = .156, p = .002, but less in favor of the boundary separation, r = -.077, p = .139, and the non-decision constant, r = .114, p = .027. There was a slight tendency mirrored in the mean starting bias to assume a-priori more negative intentionality and a slight tendency in the mean drift rate to get to the conclusion of no negative intent behind the events.

	M (SD)	(2)	(3)	(4)	(5)	(6)
(1) Mean response	0.51 (0.12)	.511**	.434**	.083	-.030	.177**
(2) Starting bias	0.53 (0.11)	—	-.525**	-.002	.041	.131*
(3) Drift rate	-0.05 (0.32)		—	.073	-.032	.038
(4) Boundary separation	1.74 (0.29)			—	-.261**	-.121*
(5) Non-decision time	2.14 (0.50)				—	.181**
(6) Conspiracy mentality	3.65 (1.19)					—

Table 4. Table of intercorrelations of the main study (Exp 3, main study). The correlations base on the datasets after all exclusions for diffusion modeling and can slightly differ for the behavioral analysis without these exclusions. The table shows significant correlations of conspiracy mentality with the mean responses, the starting bias, the boundary separation, and the non-decision constant. ** p < .01, * p < .05

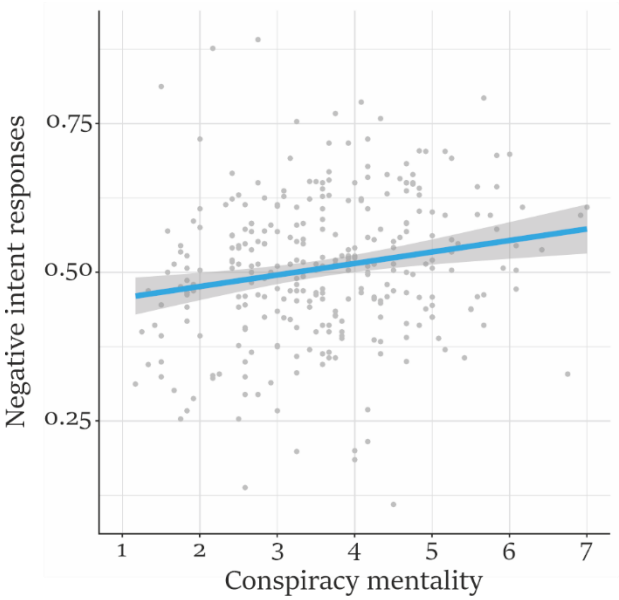

Figure 4. Correlation between conspiracy mentality and the relative frequency of negative intentionality responses (Exp. 3). The grey area represents the 95%-confidence interval.

Discussion

The predicted association between conspiracy mentality and the perception of negative intentionality behind a multitude of events received support in this experiment (see also Figure 4). Further, the study replicated that the starting bias appears to be the most important theory-related parameter and, therefore, further supports the presupposition hypothesis that emphasizes prior beliefs and the role of an antecedent response bias in conspiracy-related decisions. The drift rate was not significantly related to conspiracy mentality providing no evidence in favor of the accumulation hypothesis. As the first experiment showed different results concerning the relevance of the drift rate for conspiracy mentality compared to the second and third study, we conducted a fourth study to clarify the role of the model parameters in the different perceptual domains behind conspiracy theories, i.e., secrecy and negative intent.

Experiment 4

The final experiment was fully pre-registered (see OSF: a6m39) to clarify differences and similarities between the perceptual domains (secret agreements vs. negative intent) behind societal events, especially regarding the role of the diffusion model parameters in relation to conspiracy mentality. The previous three experiments offered no clear conclusion about the drift rate parameter. The first study attributed the correlation of the perception of secret agreements with conspiracy mentality mainly to the drift rate and only partly to the starting bias, whereas the second and third study within the domain of negative intent mapped the correlation with conspiracy mentality largely to the starting bias and yielded no significant results for the drift rate. We sought to examine if this difference resulted from systematic deviances in the cognitive processes between the perceptual domains secrecy and negative intent.

Method

Participants

The English-speaking sample (N = 401; female = 234, male = 160, non-binary = 6, no response = 1; M_{age} = 40.55, SD_{age} = 14.28) from the UK and US was recruited on *Prolific Academic* for 2.50 GBP per participant (pre-registered N = 400). One participant was excluded as pre-registered due to not fully completing the experiment, another participant due to self-reported severe technical problems, five participants because they did not fulfill any of the formal requirements like copying the final completion code, and two participants because they did not reach the required minimum frequency per response option (10 %). The remaining sample had a size of N = 392. The sensitivity power analysis in G*Power 3.1 revealed that a sample of N = 392 has 80% power to detect a correlation of .140 when assuming an alpha level of .05 and a two-tailed test.

Procedure

The general procedure and design were similar to the previous studies. In this experiment, participants completed two blocks, each including 82 trials (164 trials in total) with phrases about a

variety of societal events only (one phrase per trial, no mundane events). As a manipulation of the response format, participants were tasked to decide as fast as possible in one block about the existence of secret agreements behind events, and in the other block about the existence of negative intentionality. The phrases within the blocks had a fixed random order, but the order of both blocks was randomized. The items were selected from the previous experiments in terms of their topicality and international comprehensibility and translated into English.

Measures

Conspiracy mentality

The same scale as in the prior experiments was used (Imhoff & Bruder, 2014, α = .91).

Behavioral measures

The behavioral measures were the relative frequency of negative intention decisions and the relative frequency of secret agreement decisions. One example item was “Elvis Presley dies due to a sudden cardiac death.”. In each of the 164 trials, we recorded the response and the response time. The mean response latency was 2.46 sec. (*SD* = 1.02 sec) in the secret agreement and 2.67 sec. (*SD* = 1.07 sec) in the negative intention response condition. The overall relative frequency of secrecy-responses was 40.9 % (*SD* = 14.0 %) and the relative frequency of intentionality-responses 48.8 % (*SD* = 15.1 %). A total of 0.6 % of all trials was timed-out before a response was recorded.

Diffusion modeling

The diffusion model settings were the same as in the previous experiments (and as pre-registered). Six participants were excluded from the diffusion model analyses in the secret agreement condition (but none in the negative intent condition) because they did not make enough use of both response options within the block (at least 10 %). The Median Absolute Deviation criterion led to the exclusion of 3.8 % of trials in the secrecy and 3.5 % in the intentionality condition. Among the remaining trials, 3.2 % of trials in the secrecy and 2.3 % in the intentionality condition were excluded

due to the restricted response time window between 1 and 7 sec. There were not enough remaining trials for diffusion modeling of four participants in the secrecy and of three participants in the negative-intent condition.

The Monte Carlo-simulation suggests a good model fit for parameters in the secret agreement condition (1.3 % of dataset exclusions with a bad model fit) and a sufficient, but not perfect model fit in the intentionality condition as the model fitted the data of 93.1 % of the participants well, resulting in the exclusion of 27 datasets. The correlation between empirical and predicted data in responses and response times ranged from .940 to .980 in the block with secret agreements as response domain and from .941 to .969 where we asked about the perception of negative intentions. We additionally excluded the datasets of two participants in both response conditions as they represented outlier exceeding the typical range of the drift rate values by applying—as in the second study—the rule to exclude datasets where the drift rate is more than twice as high/low compared to the next (more plausible) one. In both experiments, this does not change the general pattern or significance of the correlations (see OSF: a6m39).

Results

As pre-registered, the perception of secret agreements, $r = .299$, $p < .001$, and negative intentions, $r = .232$, $p < .001$, behind different societal events correlated significantly with conspiracy mentality (with no significant difference between the correlations, Steiger's $z = 1.27$, $p = .102$). In both conditions, the starting bias was the parameter with the strongest correlation with conspiracy mentality. It was the only significant parameter in the context of secret agreement decisions, $r = .168$, $p = .001$, and showed descriptively the highest correlation with conspiracy mentality in the domain of negative intention decisions, $r = .128$, $p = .015$. The other significantly correlating parameters behind the decision about negative intentions were the drift rate, $r = .113$, $p = .032$, and the non-decision constant, $r = .107$, $p = .042$. Table 5 provides an overview of all intercorrelations where excluded

participants from any condition are missing listwise (resulting in slightly different correlation values). The negative mean of the drift rate in both conditions indicated an overall tendency to accumulate information into the decision that no secrecy or negative intent was assumed. The mean starting bias suggested a rather neutral position for the secrecy judgements and a small shift to assume negative intentionality.

In this study, the same participants made judgments about secrecy as well as intentionality. This provided us with the unique opportunity to critically examine whether the respective correlations with conspiracy mentality may be traceable to the same share of variance between these domains as suggested by the postulation that conspiracy beliefs are based on a general suspicious style. In order for this to be true, both (suspecting secrecy and intentionality) should be highly correlated and their correlation with conspiracy mentality should be substantially reduced once the other variable is statistically controlled for. Indeed, decisions for secrecy and negative intent are correlated, $r = .412$, $p < .001$, and the partial correlation of negative intentions with conspiracy mentality when controlling for secrecy-decisions is reduced to $r = .109$ ($p = .031$), and vice versa reduced to $r = .220$ ($p < .001$) when controlling the correlation between secrecy-decisions and conspiracy mentality for intentionality-decisions.

	M (SD)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Mean response (secrecy)	0.41 (0.14)	.564**	.292**	-.102	.010	.409**	.325**	.047	.079	-.103	.283**
(2) Starting bias (secrecy)	0.50 (.15)	—	-.567**	-.020	-.031	.266**	.310**	-.066	.006	-.058	.157**
(3) Drift rate (secrecy)	-0.25 (0.47)		—	.041	-.024	.050	-.038	.088	.097	-.066	.080
(4) Boundary separation (secrecy)	1.68 (0.35)			—	-.234**	-.099	.001	-.018	.211**	.029	-.060
(5) Non-decision time (secrecy)	1.86 (0.61)				—	.101	-.032	.098	-.005	.672**	.085
(6) Mean response (neg. intent)	0.49 (0.15)					—	.572**	.287**	.085	-.033	.212**
(7) Starting bias (neg. intent)	0.53 (0.15)						—	-.542**	.102	-.052	.108*
(8) Drift rate (neg. intent)	-0.12 (0.47)							—	-.003	.041	.134*
(9) Boundary separation (neg. int.)	1.74 (0.39)								—	-.388**	.034
(10) Non-decision time (neg. intent)	2.00 (0.62)									—	.105
(11) Conspiracy mentality	4.86 (0.97)										—

Table 5. Table of intercorrelations for the secrecy and negative intent responses (Exp 4). The correlations base on the datasets after all exclusions for diffusion modeling in both conditions (N = 351) and can slightly differ for the behavioral analysis or analyses separated by conditions without the same exclusions. The table shows significant correlations of conspiracy mentality with the mean responses, the starting bias, the drift rate, and the non-decision constant. ** $p < .01$, * $p < .05$

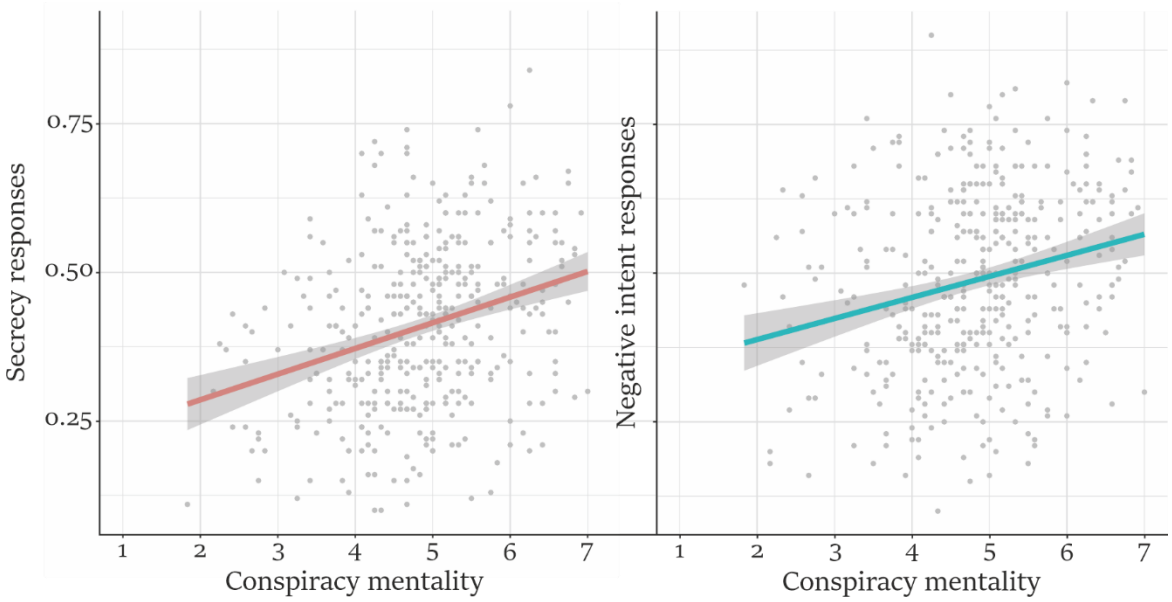

Figure 5. Correlation between conspiracy mentality and the relative frequency of secrecy, respectively negative intentionality responses (Exp. 4). The grey area represents the 95%-confidence interval.

Discussion

The perceptions of secret agreements and negative intentions behind different societal events were robustly related to conspiracy mentality (see Figure 5). Both behavioral measures (suspecting secrecy and negative intent) shared substantial parts of their co-variance with conspiracy mentality as a necessary prerequisite behind the assumption that such decisions are based on a general suspicious style. The starting bias of the diffusion model was the most important correlate of conspiracy mentality in both conditions signifying the relevance of prior conspiracy-related attitudes for biased responding (presupposition hypothesis). As a last step, we meta-analyzed across all studies how the correlation between conspiracy mentality and perceptions of secret agreements and negative intent translates into the parameter estimates of cognitive processes in the diffusion model.

Internal Meta-Analysis

We conducted internal meta-analyses using the *meta* package in *R* (Schwarzer, 2021) to give an overview about the relevance of the different parameters and the behavioral measures. Although the studies employed different response options (secret agreements vs. negative intent), the assumption of a general suspicious attitude behind these decisions allows to combine them in a single meta-analysis and to draw conclusions about the general significance of the cognitive processes. We entered the results of all studies (including the pooled dataset of Experiment 3) in the analyses separated by parameters and the relative frequency of responses. The correlations stemming from the same participants in Studies 2 and 4 were averaged using z-scores before meta-analyzing. The analyses applied the inverse variance method, the Sidik-Jonkman estimator for τ^2, Q-profile method for the confidence interval of τ^2, and Fisher's z-transformation of correlations. There was no substantial heterogeneity in the analyses with $I^2 < 32$ %, $\tau^2 < 0.005$, and no significant *Q*-tests among all meta-analyses (see OSF: a6m39) suggesting the use of the fixed effects models in all cases.

The meta-analyses yielded clear evidence across all studies for the correlation of conspiracy mentality with the relative frequency of perceiving secrecy and intent, $r = .260$, $p < .001$, and the starting bias, $r = .160$, $p < .001$, supporting the presupposition hypothesis (see Figure 6). We found a descriptively smaller ($z = 1.44$, $p = .075$) but still significant correlation for the drift rate, $r = .081$, $p = .011$, and a descriptively smaller ($z = 1.23$, $p = .101$) correlation for the non-decision constant, $r = .102$, $p = .002$. The boundary separation was not significantly correlated with conspiracy mentality, $r = -.046$, $p = .153$, albeit the negative direction of correlations pointed into the expected direction as proposed by the distinction hypothesis.

As the preregistered model settings and exclusion procedures were based on subjective decisions that could have been made differently, we employed robustness analyses for all studies to safeguard the results. Specifically, we eliminated responses outside of the response time window first (1 - 7 sec.), log-transformed the remaining response times and only then applied the relative

exclusions (Median Absolute Deviation). Furthermore, we estimated the intertrial variability of the drift rate that had been fixed in the initial model because it could be argued that the drift rate is not consistent across trials. The resulting model had overall a slightly worse fit compared to the previously reported model (average proportion of excluded datasets: 6.2% vs. 5.0%). The results (see OSF: a6m39), however, supported our findings that the starting bias parameter showed a meta-analytical significant correlation with conspiracy mentality, $r = .125$, $p < .001$. Separate meta-analyses for the stimulus types (societal vs. mundane events) demonstrated that this was only due to the stimuli about societal events ($r = .170$, $p < .001$) but not about mundane events ($r = .082$, $p = .069$). The drift rate consistently yielded small correlations with conspiracy mentality across stimulus types (meta-analytically: $r = .124$, $p < .001$). We also controlled the initial analyses for age but this did not substantially change the pattern of results (see OSF: a6m39).

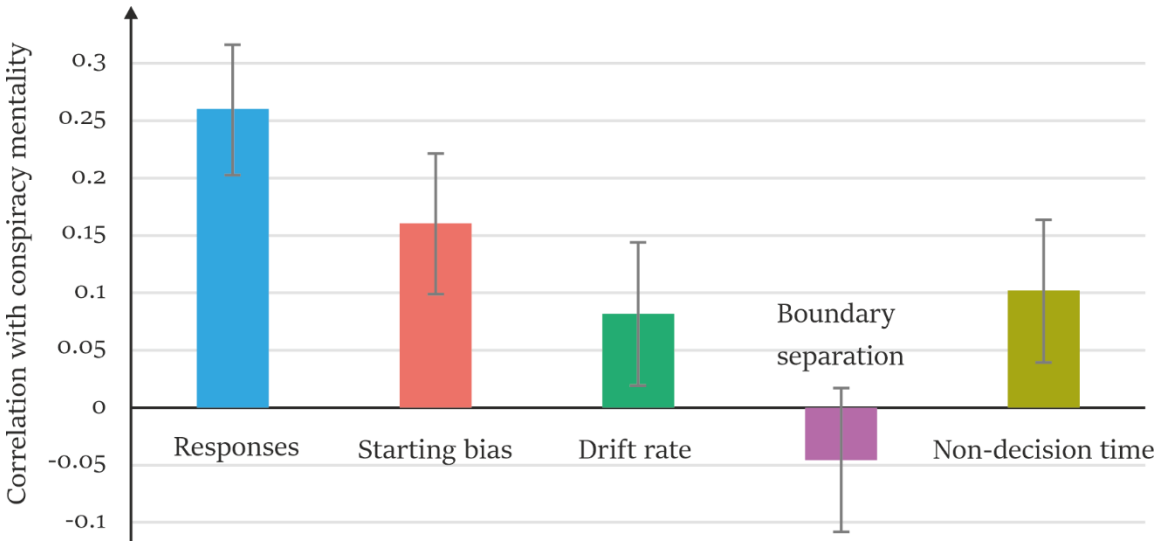

Figure 6. Overview about the meta-analytical results. The values represent the correlations with conspiracy mentality. The starting bias showed the highest correlations with conspiracy mentality among the parameters. All parameters pointed into the expected direction. Error bars display the 95%-confidence intervals.

General discussion

The present experiments examined the early cognitive processes associated with conspiracy mentality in the intuitive interpretation of a multitude of events. The aims of this study were to test if

conspiracy mentality as a general suspicious attitude is connected to more frequent perceptions of secrecy and negative intentionality in big societal as well as small every-day events and to scrutinize the underlying processes of the response decisions in the drift diffusion model. The results demonstrated that conspiracy mentality was indeed related to increased perceptions of secrecy and negative intent. Further, the results supported assumptions about the generalizability of the suspicious perceptual style as it was relevant for societal *and* mundane events and shared overlapping co-variance with secrecy and negative intentionality decisions.

From a cognitive perspective, the most influential parameter of the diffusion model related to conspiracy mentality was the starting bias, i.e., presuppositions in favor of the conspiracy-related outcome for participants scoring higher on conspiracy mentality. Suspicious attitudes as a-priori beliefs seem to mirror negative intuitive expectations about the upcoming event in advance of further processing steps. When intuitively deciding about the background of specific conspiracy-(un)related events, the drift rate correlated with conspiracy mentality only with a small effect size. The small meta-analytical correlation could be interpreted as motivated processing speaking for an accelerated uptake of information in accordance with the belief-consistent outcome. Interestingly, the mean drift rate seemed to suggest a favored processing into the direction of no secrecy and negative intent across all studies, whereas the mean starting bias was usually located around the neutral mid-point. Only in Study 2 with a sample that also scored comparatively lower on self-reported conspiracy mentality, the starting bias was substantially shifted into the direction of no secrecy/ no negative intentions responses.

Furthermore, we observed no significant evidence in the meta-analysis for decision shortcuts (i.e., correlations of conspiracy mentality with the boundary separation parameter). The non-significant result in these intuitive tasks should not erroneously be interpreted as indicator against the existence of these shortcuts. These effects could be involved in later processing or reasoning steps

(and more deliberative tasks) as well or when more information about the event is available than in one short phrase so that the use of shortcuts can actually reduce the informational load. This study is rather a pointer to the *incremental* importance of prior attitudes (and slightly to the relevance of motivated processing) within early processing stages. Theoretically, the starting bias of the model could also be interpreted as a one-way shortcut: When the starting bias is closer to the conspiracy-related decision (for people with higher levels of conspiracy mentality), then the way to this option is shorter (compared to lower values of conspiracy mentality) and less evidence is needed get to *this* conclusion.

The experiments tapped into the very first steps of informational processing as the instructions required the participants to decide intuitively and fast without thinking twice within a restricted time window (which was also necessary for the applicability of the diffusion model). These first impressions are considered as particularly relevant in conspiracy theory contexts also for later processing steps, for example, by unconsciously engaging in motivated reasoning to justify the initial decision preference (van Prooijen et al., 2020). The results are compatible with other studies on a-priori attitude effects (e.g., Taber & Lodge, 2006) as well as content-independent skepticism (Leman & Cinnirella, 2007) and the present experiments applied this perspective to the role of conspiracy mentality by dissecting the processes behind spontaneous decisions about events. Although cognitive differences in conspiracy thinking are typically ascribed to preferences for intuitive than analytic thinking styles (Pennycook et al., 2015), conspiracy mentality was still associated with decisions even within a merely intuitive experimental paradigm where it is conceivable that analytic thinking was prohibited and inter-individual differences, therefore, reduced. This could explain why correlations for the diffusion model parameters with conspiracy mentality were relatively small, albeit showing reliable correlation sizes across all studies for the starting bias. The correlations with behavioral

responses can be interpreted as surprisingly high, especially with regard to the restrained variance of the dichotomous measurements.

In a nutshell, conspiracy mentality seems to relate to a general suspicious processing style that already plays out in the early perpetual stages of multiple events. In the information accumulation framework of the diffusion model, this general attitude of suspicion is predominantly associated with a general predisposition to intuitively assume more negative intentionality and secrecy, but also with motivated processing. Nevertheless, other influences like motivated reasoning (i.e., interpretations affected by the motivation to get to a desired conclusion, see Kunda, 1990) are still conceivable in later processing stages, e.g., due to partisanship (Enders & Smallpage, 2019; Miller et al., 2016).

Implications

The present study implies that the *general* conspiracy mentality can substantially play out in the perception of *specific* events (e.g., see Dyrendal et al., 2021). By stressing out the relevance of prior attitudes without necessarily considering further information, the experiments point to the societal problem of attitude polarization (Lord et al., 1979) in the context of conspiracy theories. Arguments have less room to develop when people tend to perceive and interpret situations spontaneously in accordance with their prior general mindset – and jump to their judgmental outcome without even bothering to process the available information.

Another implication of the prior beliefs within the early informational processing is the indirect emphasis on the conceivable correcting influences of the later, more deliberative analytic thinking. Decisions can be more accurate by shifting the focus more on reasoning and analytic thinking rather than on guidance by first impression and prior beliefs (Bago et al., 2020; Čavojová et al., 2020). Also, other cognitive strategies like consider-the-opposite (Lord et al., 1984) might be beneficial in countering intuitive judgements.

The study has implications on the societal level as well. Since conspiracy beliefs can have behavioral consequences (e.g., sympathy for violent radicalization, Levinsson et al., 2021) and can deteriorate social relations (van Prooijen et al., 2021), there might be a public interest to avoid high levels of conspiracy thinking and related motivated processing of information or a-priori assumptions about bad intentions within a society. At the same time, conspiracy thinking can be a (rational) reaction to the experience of actually happening malevolent actions (see Alper, 2021; Cordonier et al., 2021). Interventions should thus not stop at "correcting" beliefs, but target actual social change in the direction of increased democratic participation, transparency, social exchange, shared prosperity, and a decrease in corruption. This might offer people the chance to experience a benevolent and open society in their immediate perceptual space and thus adjust levels of general suspicion and intuitive negative interpretations of events in the every-day life and on the societal level that shape the base for conspiracy beliefs.

Limitations

Limitations of this study are mainly related to the diffusion model. The conclusions about the cognitive processes rely almost completely on the validity of the model parameters and the applicability of the theoretically-assumed processes to the present paradigm. This concern is especially important for experiments like the current ones with prolonged response times and slightly more complex decisions compared to the original model recommendations. However, the model fit indicators were promising and even slower response time paradigms are technically suitable to the model (Axt & Johnson, 2021; Lerche & Voss, 2019).

Furthermore, the assignments of cognitive processes to the model parameters were theory-driven and could hypothetically rely on other mechanisms as well. For example, the small correlations of conspiracy mentality with the non-decision time were not predicted, and hence not easily interpretable. It is conceivable that this parameter (overall with rather high values above 1 sec.)

represents the time for reading and its correlation with conspiracy mentality could thus be the results of confounded lower levels of education (Imhoff, Zimmer, et al., 2022; van Prooijen, 2017). Compared to the typical use of diffusion models for basal perception tasks, the reading time could also make it more difficult to estimate the model parameters accurately and might mask other simultaneous decision-related processes usually ascribed to the drift rate. Also, it remains unclear to what extent the processes—as assumed in the model and enforced in the experimental design—actually mirror processes in real-world scenarios. Thinking and opinion formation are usually not constrained by time pressure and involve more room for reasoning and the evaluation of more information. This time pressure points to another limitation concerning the boundary separation parameter (i.e., the amount of processed information) as an indicator for heuristic decisions. The increased use of heuristics as coping mechanisms for uncertainty has previously been linked to conspiracy thinking (Kovic & Füchslin, 2018). In the present studies, we particularly asked for intuitive decisions and enforced, therefore, naturally rather heuristic decision-making for all participants. These mandatory decision shortcuts might have partly disallowed variance of conspiracy mentality to play out in the boundary separation parameter. Accordingly, the interpretations of the presented results are restricted only to the very first informational processing steps.

Moreover, restrictions of the modeling procedure required to enforce dichotomous decisions although endorsing conspiracy theories does not always develop from decisions between two options. Conspiracy theories rather appear as expressions of uncertainty allowing also partial-endorsements (instead of absolute beliefs) of many different and even contradictory theories simultaneously (Frenken & Imhoff, 2021). For experiments focusing on intuitive first impressions, this simple experimental design might nevertheless be a sufficient approximation facilitating intuitive and less differentiated processing.

Conclusion

The present study contributes to a clearer picture of the suspicious worldview and its related cognitive processes underlying the tendency to endorse conspiracy theories. This style appears to be generalizable to different domains and relevant for early informational processes where prior conspiracy-related attitudes mainly seem to play out as a starting bias. As first impressions can impact later processes, the study points to the problematic polarization for societies due to deviating perceptions in accordance with prior beliefs and to the difficulty to meet these general perceptual underpinnings when trying to overcome the polarization. Further analytic thinking and balanced representations of different arguments probably help to limit influences of initial biases in favor of more accurate outcomes. Future research might add to this by developing broader cognitive models about the informational processing regarding the endorsement of conspiracy theories how the different initial and following cognitive processes play together that might also be relevant for other contexts like the processing of misinformation (in the presence of an Infodemic) or opinion formation in general.

Acknowledgements

We would like to thank Leslie-Marie Hollstein, Antonia Langer, Ann-Kathrin Otte, Annabelle Strack, and Peter Protic for assisting in data collection and creating the stimuli.

Open Practice

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The open data, open materials, preregistrations, and preregistered analyses are publicly available (OSF: a6m39, https://osf.io/a6m39/).

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