Conspiracy Belief and Norm Adherence

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Chapter 1 – General Introduction

During the last three years, there were several instances in which people believing in conspiracy theories showed behaviors violating the social norm. One prominent example is the attack on the US capitol on January 6, 2020, which was driven by conspiracy theories of a deep state, QAnon, and a stolen election (Wamsley, 2021) and perceived as an attack on core values and norms of democracy (Baker, 2021). Another example are protests against and reduced adherence towards Covid-19 protection measures during the pandemic which were grounded in conspiracy theories that Covid-19 is a hoax (Schraer, 2021) and undermined efforts of the larger society to contain a contagious pandemic (Spring, 2020). In addition to this anecdotal evidence, there are several studies which report a relationship between a higher conspiracy belief, which is short for a higher belief in conspiracy theories, and support of behaviors that go against the social norm. People higher in conspiracy belief are more likely to support human rights violations (Swami et al., 2012), to engage in everyday crimes (Jolley et al., 2019), to justify violent action (Jolley & Paterson, 2020) and to agree to non-normative political action (Imhoff et al., 2021; Imhoff & Bruder, 2014b). At the same time, they are less likely to vote in political elections (Butler et al., 1995), to show political engagement (Jolley & Douglas, 2014b) or to engage in prosocial behaviors (van der Linden, 2015). During the pandemic, people believing in Covid-19 conspiracy theories also engaged in non-normative behaviors ranging from decreased physical distancing to drinking ginger tea in order to fight the virus (for an overview, see van Mulukom et al., 2022).

There are situations where not following the social norm carries benefits for society (Jetten & Hornsey, 2014). However, in other situations, non-normative behavior can put others at risk. This was, for example the case with decreased protection behaviors among people higher in conspiracy belief during the Covid-19 pandemic (Johnson et al., 2022; Spring, 2020) and is also the case for violent political action inspired by the belief in conspiracy theories (Jolley & Paterson, 2020). Despite the potential harm caused by the lower adherence to social norms, a broader examination of the relationship between conspiracy belief and norm adherence so far is missing. Furthermore, while previous studies have used experimental designs to examine the impact of higher conspiracy belief on single behaviors, there was no longitudinal study at the beginning of this dissertation testing whether higher conspiracy belief leads to subsequent lower norm adherence. Therefore, this dissertation set out to examine the relationship between conspiracy belief and the adherence to social norms. It hereby expands the scope of previous studies which examined the relationship between conspiracy belief and single behaviors to a broader theoretical

and empirical examination of conspiracy belief and norm adherence. It further moves the field forward by examining the causal effects of conspiracy belief and norm adherence. In addition, it investigates different possibilities for increasing norm adherence among people higher in conspiracy belief.

To that end, I will first provide a brief overview of the current research on conspiracy belief, hereby describing cognitive, social, and emotional characteristics of people who believe in conspiracy theories. I will then continue with an overview of the research on social norms and discuss the current status quo regarding the relationship between conspiracy belief and norm adherence, as well as interventions aimed at reducing the belief in conspiracy theories. Chapters 2 is a theoretical review integrating the literature on conspiracy belief and social norms, suggesting that the lower norm adherence of people high in conspiracy belief is a natural consequence of a different social reality accompanied and created by the belief in conspiracy theories. Chapter 3 to 6 are empirical manuscripts illuminating the relationship between conspiracy belief and norm adherence. They do so by examining the causal effects of a higher conspiracy belief on norm adherence (Chapter 3) and by investigating different ways in which norm adherence among people higher in conspiracy belief can be increased (Chapter 4-6).

Conspiracy belief

Conspiracy theories are explanations for societal events based on the assumption that a powerful individual or group engages in secret arrangements with malevolent intentions (Douglas et al., 2017; Goertzel, 1994). Some examples for popular conspiracy theories are the theory that Princess Diana did not die in a car accident but was murdered by her family, that the attacks that happened on 9/11 were planned by the US government, or that a secretive group called New World Order is planning to take control over the world (Lewandowsky, Oberauer, et al., 2013). Examples for popular conspiracy theories during the Covid-19 pandemic are that Sars-Cov-19 does not exist and that its existence is only claimed to restrict the freedom of people, that the Covid-19 vaccine is lethal or contains a microchip, or that the virus was designed as a bioweapon and is thus man-made (for an overview for different Covid-19 related conspiracy theories, see also van Mulukom et al., 2022).

Despite the fact that believing in conspiracy theories is stigmatized (Douglas et al., 2021; Lantian et al., 2018), conspiracy theories are quite prevalent: In a representative survey conducted 2011 in the United States, 55% of the people agreed to at least one of seven conspiracy theories

(Oliver & Wood, 2014). In Germany, 30% of the German population said that it is either certainly or probably true that the world is operated by secret powers ("Es gibt geheime Mächte, die die Welt steuern." Roose, 2020). Most of the time, people do not only believe in one, but several conspiracy theories (Goertzel, 1994; Sutton & Douglas, 2020), which partly can be explained by the fact that there are certain cognitive, social and emotional characteristics that make it more likely that an individual believes in a conspiracy theory (for a recent meta-analysis, see Biddlestone et al., 2022).

Among the cognitive factors connected to higher conspiracy belief are a preference for intuitive vs. analytical thinking (Imhoff & Bruder, 2014b; Swami et al., 2014), lower cognitive abilities (Adam-Troian et al., 2019; Rizeq et al., 2021), and the tendency to see patterns in random pictures (van der Wal et al., 2018; J.-W. van Prooijen et al., 2018). On the social level, believing in conspiracy theories is related to low trust (Abalakina-Paap et al., 1999; Brotherton et al., 2013; Green & Douglas, 2018; Imhoff & Lamberty, 2018), paranoia (Brotherton & Eser, 2015; Imhoff & Lamberty, 2018; Jolley & Paterson, 2020), a higher need for uniqueness (Imhoff & Lamberty, 2017; Lantian et al., 2017), narcissism (Bowes et al., 2021; Cichocka, Marchlewska, & de Zavala, 2016), reactance (Hornsey et al., 2018b), and a defensive ingroup identity (Cichocka, Marchlewska, Golec de Zavala, et al., 2016; Sternisko et al., 2021). Believing in conspiracy theories is further related to anxious attachment (Green & Douglas, 2018; Leone et al., 2018), anomie (Brotherton et al., 2013; Bruder et al., 2013; Imhoff & Bruder, 2014b; Majima & Nakamura, 2020; Moulding et al., 2016), and the perception that the world is dangerous (Hart & Graether, 2018; Leiser et al., 2017; Moulding et al., 2016; Pellegrini et al., 2019).

Many (though not all, see Nera et al., 2021) conspiracy theories are characterized by a certain way of understanding society and politics, which is summarized in the concept of conspiracy mentality (Imhoff & Bruder, 2014b). Similarly to Right-Wing-Authoritarianism (Altemeyer, 1988) and Social Dominance Orientation (Pratto et al., 1994), conspiracy mentality is described as a generalized political attitude, that is, a lens through which politics and society are interpreted and structured. This generalized political attitude is characterized by low trust in experts and authorities as well as prejudice towards people with high (vs. low) power and status (Imhoff et al., 2018; Imhoff & Bruder, 2014b; Imhoff & Lamberty, 2018). A higher conspiracy mentality is related to feelings of political powerlessness (Ardèvol-Abreu et al., 2020; Bruder et al., 2013; Imhoff & Bruder, 2014b; Imhoff & Lamberty, 2018; Jolley & Douglas, 2014b; Kofta et al., 2020), which cannot be overcome with traditional democratic means, such as voting, participating in legal demonstrations or joining a political party, but justify non-normative political action, including

illegal protests and the use of violence (Imhoff et al., 2021). Conspiracy mentality is typically measured with the Conspiracy Mentality Questionnaire (Bruder et al., 2013), which usually correlates very highly (Swami et al., 2017) and shows similar patterns in regard to third variables (Biddlestone et al., 2022) with scales measuring the belief in popular conspiracy theories. Thus, they are used interchangeably in this dissertation.

Overall, the individual underpinnings of a higher conspiracy belief can be summarized by a preference for automatic thinking styles and low cognitive abilities, general distrust, feelings of low political power and the desire for uniqueness (Biddlestone et al., 2022). Whereas a lot is known about the individual underpinnings of a belief in conspiracy theories (Biddlestone et al., 2022), a broader examination of the relation between conspiracy belief and the adherence to social norms so far is missing.

Social norms

Social norms are typical and expected behaviors in a group (Cialdini et al., 1991; Ehrlich & Levin, 2005) and as such, they are an integral part of living together in a society. There are norms about how to properly eat (e.g., with a fork instead of with the hands), how to behave in traffic (e.g., drive on the right side; let others pass when they are faster), or how to behave in groups (e.g., to not interrupt, to be fair). Social norms can vary between cultures and groups (Goyal et al., 2020; Heinrichs et al., 2006), but there is no way of escaping them. They shape the way we interpret the social world around us and guide our behaviors naturally and intuitively (Prentice, 2018). Most of the time, we are not even aware that we are following a norm, or that a norm which was communicated to us had an influence on us (Nolan et al., 2008). By following or not following them, norms are "constantly renegotiated and reproduced through social interactions" (Paluck & Shepherd, 2012b, p. 912). To better understand their influence on behavior, literature generally distinguishes between descriptive and injunctive norms.

Descriptive norms describe behaviors which a majority of the ingroup are doing. Usually, individuals are quite receptive to information about the majority behavior and adapt their behavior therein (Cialdini et al., 1990; Nolan et al., 2008; Prentice & Miller, 1993). This tendency to orient oneself in relation to others is, among others, based on the very basic processes of imitation and social learning (Bandura, 1977; Buttelmann et al., 2013). When a majority displays a behavior, it is a signal to the individual that this behavior is functional and adaptive (Deutsch & Gerard, 1955).

Thus, knowledge of a norm offers an information-processing advantage (Cialdini et al., 1991), especially when cognitive resources are low (Jacobson et al., 2011).

Injunctive norms describe behaviors that people of the ingroup approve of and find desirable, that is, behavior that "ought" to be done (Cialdini et al., 1991), independent of whether a majority of the people descriptively adheres to it. One example here is being honest, which typically is a behavior that is socially desirable, but how often people follow this norm is unknown. Another example during the Covid-19 pandemic was the injunctive norm to reduce interpersonal contacts, whereby the extent and way in which people followed this injunctive norm differed between individuals. Here, individuals were only occasionally able to experience this also as a descriptive norm, for example when walking through empty streets, or when existing celebrations were canceled with the explanation that this is due to the concerns for physical distancing. According to self-categorization theory (Hogg & Reid, 2006; John C Turner et al., 1987), people readily follow injunctive norms because they internalize them and perceive them as part of their own identity (Sassenberg et al., 2011; Scholl et al., 2019). This way, fulfilling an injunctive norm induces positive emotions and secures a positive self-image (Christensen et al., 2004). This is especially the case when the injunctive norm is highly relevant for the group identity (Hogg & Reid, 2006). Generally, injunctive norms are more powerful in determining the behavior of its members, as they say more about the core values of the group (Christensen et al., 2004; Schultz et al., 2018). As in the example of physical distancing mentioned above, it often is hard to distinguish between descriptive and injunctive norms, because injunctive norms typically are also displayed by a majority of the people (Cialdini et al., 1991).

As evident from the literature review above, social norms are quite powerful. Perceiving and adhering to social norms of the ingroup is based on mechanisms which can be critical for group survival and thus deeply ingrained in human nature. Social norms are an important basis for the functioning of society, structuring all types of interactions ranging from communication, transportation, cooperation to procreation. Not following social norms, in turn, undermines societal cohesion (Wellen & Neale, 2006) and can put others in danger, such as in the case of lower adherence to protection measures during the Covid-19 pandemic. Thus, it is important to understand why and in which situations individuals deviate from social norms and what motivates them to instead show norm adherence.

Conspiracy belief and norm adherence

As cited above, there are many studies showing that people believing in conspiracy theories report behaviors that go against the social norm. However, a broader examination of the relationship between conspiracy belief and norm adherence so far is missing. Most of the reviewed behaviors were in some way related to the measured conspiracy theory (Bierwiaczonek et al., 2020; Jolley et al., 2020; Jolley & Paterson, 2020; van der Linden, 2015; van Mulukom et al., 2022), or to topics often covered in conspiracy theories, such as politics (Butler et al., 1995; Imhoff et al., 2021; Imhoff & Bruder, 2014b; Jolley & Douglas, 2014b; Swami et al., 2012), belief in climate change (Lewandowsky, Gignac, et al., 2013; Lewandowsky, Oberauer, et al., 2013) or health issues (Hornsey et al., 2018b; Jolley & Douglas, 2014a; Lewandowsky, Gignac, et al., 2013). As such, drawing conclusions from these studies on the relation between conspiracy belief and *general* norm adherence, including the adherence to prosocial norms governing everyday interactions, might be biased. This bears the risk that the negative relation between conspiracy belief and norm adherence is either over-estimated, which could increase stigmatization of people believing in conspiracy theories, or under-estimated, which would indicate an even greater danger of the belief in conspiracy theories for societal cohesion. *Thus, the first goal of this dissertation is to examine whether high conspiracy belief is related to lower norm adherence regarding different kinds of social norms.*

Furthermore, most of the cited research is correlational, requiring an examination whether lower norm adherence indeed is caused by a higher conspiracy belief. *Thus, the second goal of this dissertation is to examine whether a higher conspiracy belief leads to lower norm adherence in a causal sense.*

Interventions against conspiracy belief

As mentioned above, believing in conspiracy theories is related to behaviors that can be harmful for the individual and society. People who believe in Covid-19 conspiracy theories, for example, were more likely to consider chloroquine as a treatment against Covid-19 (Bertin et al., 2020) and less likely to attend to protection measures and get vaccinated (van Mulukom et al., 2022), leading to the preventable deaths of many (Johnson et al., 2022; Spring, 2020). A high conspiracy belief has also been shown to be related to non-normative political action (Imhoff et al., 2021), justification of violence (Jolley & Paterson, 2020), willingness to conduct everyday crimes

(Jolley et al., 2019), prejudice (Jolley et al., 2020) and anti-democratic social movements (Sternisko et al., 2020), underlining the potential harm of high conspiracy belief for society.

Because of these dangerous consequences, there have been attempts to address the belief in conspiracy theories in interventions. Some interventions have focused on preparing individuals for the encounter with a conspiracy theory, hereby providing arguments against the content (Banas & Miller, 2013a; Jolley & Douglas, 2014a, 2017; Stojanov, 2015) or the argumentation (Banas & Miller, 2013a; Stojanov, 2015) of conspiracy theories. This method has been effective in reducing the belief in conspiracy theories when administered before the encounter with the conspiracy theory (Banas & Miller, 2013a; Jolley & Douglas, 2014a, 2017; Stojanov, 2015), though it was not always effective in influencing behavioral intentions (Stojanov, 2015).

Other interventions have tried to decrease conspiracy belief by addressing underlying needs and motives, for example through increasing feelings of control (J.-W. van Prooijen & Acker, 2015), inspiring analytical thinking (Swami et al., 2014), or by increasing the impact of scientific information through self-affirmation (A. M. van Prooijen & Sparks, 2014). As promising as this sounds, the effects of these interventions have been questioned through other studies finding no effects, either in a meta-analysis (Stojanov & Halberstadt, 2020) or in studies using the same methods to change conspiracy belief or related concepts (Lyons et al., 2021; Sanchez et al., 2017; van Elk & Lodder, 2018). Thus, in the studies conducted so far, interventions have been most successful when they provided information refuting conspiracy theories before the encounter with the conspiracy theory. However, this conclusion is somewhat trivial, as there overall is little research on interventions against conspiracy theories (Compton et al., 2021) and several ways of intervening against conspiracy theories and their consequences remain untested.

One aspect that needs to be tested is whether it is important for interventions building on preparing individuals for an upcoming conspiracy theory to mention actual arguments refuting conspiracy theories. Given that conspiracy theories thrive in situations of uncertainty (J.-W. van Prooijen & Douglas, 2017), providing information addressing the uncertainty which provides fertile ground for the conspiracy theory might also be succesful in reducing conspiracy belief and influencing behavior intentions such that injunctive norms are more likely to be followed.

Additionally, the role of social norms in interventions has received very little attention. There recently has been one study showing that feedback on the social norm among UK parents regarding anti-vaccination conspiracy belief decreased anti-vaccination conspiracy belief, although it did not increase vaccination intentions (Cookson et al., 2021b). Given that individuals high in

conspiracy belief are more likely to distrust official sources of communication (Imhoff et al., 2018), an approch building on the norms of people close to the individual might be even more succesful, but so far is not examined.

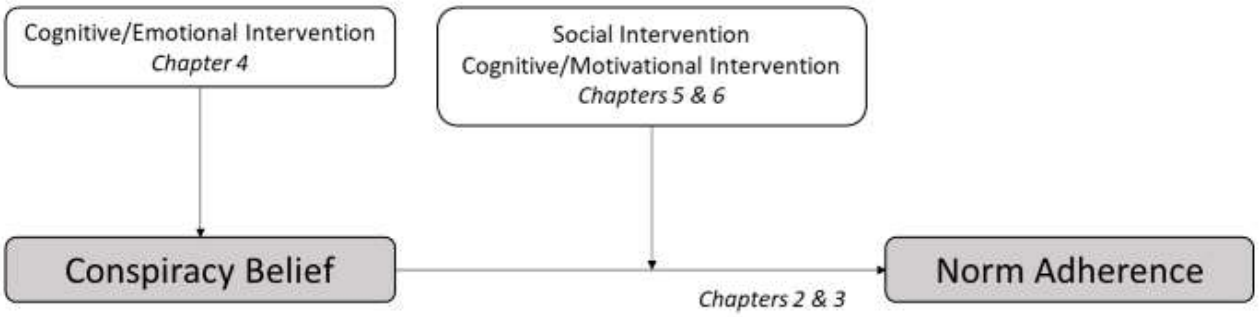
Interventions also mainly focused on reducing the belief in the conspiracy theories itself (Banas & Miller, 2013b; Jolley & Douglas, 2014a, 2017; Stojanov, 2015; Swami et al., 2014). Given that the lower norm adherence of people believing in conspiracy theories can have dangerous effects, it seems advisable to additionally test interventions that directly address the *consequences* of conspiracy theories. When doing so, it seems necessary to take into account the cognitive tendencies related to a high conspiracy belief, such as the tendency for automatic thinking styles. Interventions could, for example, test whether norm adherence can be increased by encouraging analytical thinking. *Thus, the third goal of the dissertation is to examine different possibilities for interventions aimed at increasing norm adherence among people higher in conspiracy belief.*

The current dissertation

The current dissertation examines the relation between conspiracy belief and norm adherence in order to examine (1) whether a higher conspiracy belief is related to lower norm adherence, (2) whether conspiracy belief causes lower norm adherence, and (3) to test different possibilities for interventions aimed at increasing norm adherence among people higher in conspiracy belief (see Figure 1.1). An outline of the different chapters of the dissertation can be found in Figure 1.1 and is described in more detail below.

Figure 1.1

Outline of the dissertation



Chapter 2 is a theoretical manuscript integrating literature on conspiracy belief and social norms. It outlines different reasons why a higher conspiracy belief is related to lower norm adherence. Overall, it describes the social reality that is accompanied and caused by the belief in conspiracy theories, and how it provides the perfect ground for non-normative behavior.

Chapter 3 then empirically tests whether conspiracy belief causes lower norm adherence through one correlational, one experimental and one longitudinal study conducted during the beginning of the Covid-19 pandemic. The studies examine the effect of a political Covid-19 conspiracy theory, that is, the belief that the powerful in society are purposefully exaggerating the pandemic for their advantage. Dependent variables are institutional trust, support of governmental regulations, adoption of physical distancing, adoption of hygiene measures and social engagement, of which the latter four can be seen as social norms at this time.

Chapter 4, 5 and 6 then focus on interventions by testing different ways of increasing norm adherence related to conspiracy belief, namely through a cognitive/emotional intervention, a social intervention and a cognitive/motivational intervention. *Chapter 4* reports one study testing whether addressing a conspiracy theory through a cognitive/emotional intervention increases norm adherence. More specifically, we tested whether providing information designed to address uncertainty regarding the new vaccination method of messenger RNA reduces the belief in a Covid-19 vaccination conspiracy theory and whether this, in turn, increases the likelihood of getting vaccinated when vaccines become available. As the vaccine at that time was a crucial opportunity of ending the pandemic without a huge loss of human lives, getting vaccinated once vaccines are available was an injunctive norm.

Chapter 5 includes a paper by Winter et al. (2021), which examines norm adherence regarding a topic often targeted by conspiracy theories, namely vaccinations. In this paper, we examined whether the subjective norm, which is the expectation of people close to the individual to get oneself vaccinated moderates the otherwise negative relationship between conspiracy mentality and vaccination intentions. Although only correlational, this paper offers a hint of how social interventions might offset the negative effects of a conspiracy mentality on norm adherence.

Chapter 6 features another intervention aimed at increasing norm adherence among people higher in conspiracy belief, here by cognitive/motivational means. In four experimental studies, we tested whether prompting reasoning why a behavior is normative increases norm adherence especially among people high in conspiracy belief. We hereby tried to prevent the tendency of people higher in conspiracy belief for automatic thinking by encouraging reflection; and at the

same time tried to increase motivation for norm adherence by making the reasons for norm adherence salient. In the studies, we distinguished between social norms guiding everyday interactions, such as the norm to not interrupt others, to hold the door for a person that has a lot to carry and to say please and thank you; and norms related to the law, such as to not defraud the government on taxes and to not give alcoholic beverages to minors; and also tested whether prompting reasoning why a behavior is normative is especially effective for a specific type of norm.

Chapter 2 – Conspiracy Belief and Non-Normative Behavior

Chapter 2 of the present dissertation contains a manuscript by the author of the dissertation (Lotte Pummerer). The manuscript included in the dissertation entitled "Conspiracy theories and non-normative behavior" represents an earlier version of a manuscript later published under the title "Belief in conspiracy theories and non-normative behavior" at Current Opinion in Psychology under the doi: https://doi.org/10.1016/j.copsyc.2022.101394. The contributions of the PhD candidate to the manuscript can be found in the following table:

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Lotte Pummerer	1	100 %	N/A	N/A	100 %
Title of paper:		Conspiracy theories and non-normative behavior			
Status in publication process:		Revising for resubmission to *Current Opinion in Psychology*			

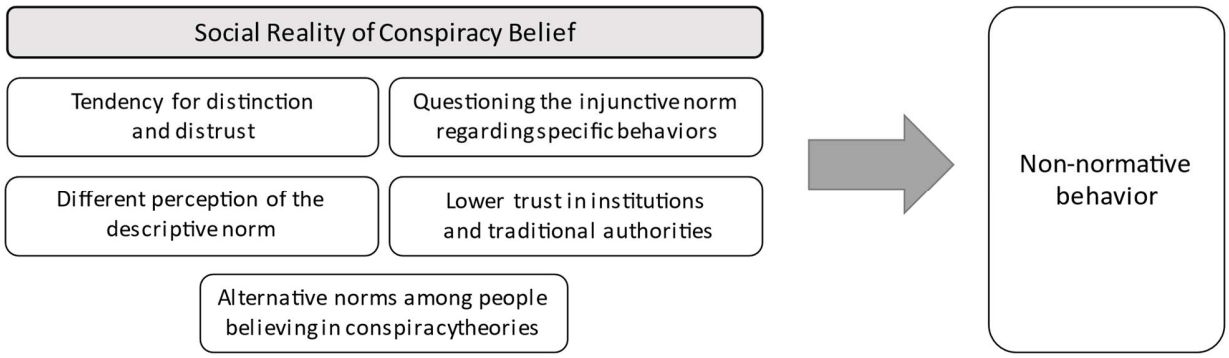
During the Covid-19 pandemic, there were many examples of people believing in conspiracy theories showing non-normative behavior. People believing in conspiracy theories, for example, reported lower social distancing and vaccination intentions (Bierwiaczonek et al., 2020; Pummerer, Böhm, et al., 2022), but instead engaged in behavior like taking chloroquine or drinking ginger tea against the virus (Bertin et al., 2020; van Mulukom et al., 2022). Believing in conspiracy theories is also related to non-normative tendencies such as lower social and political engagement (Jolley & Douglas, 2014b; van der Linden, 2015), lower adherence to social norms (Pummerer, Ditrich, et al., 2022), intentions to engage in everyday crimes (Jolley et al., 2019) and illegal political action (Imhoff et al., 2021). Conspiracy theories claim that powerful forces are conspiring against the population with evil intentions (Goertzel, 1994; Jolley et al., 2018). Two examples are the theory that the september 11 attacks were planned by the US government (Lewandowsky, Oberauer, et al., 2013) or that Sars-Cov-19 does not exist and that its existence is only claimed to restrict the freedom of people (van Mulukom et al., 2022). Independent from any evaluation of the truth of these claims, people believing in conspiracy theories postulate a different factual reality in regard to the respective event than the mainstream (Brotherton et al., 2013). This contribution proposes that the belief in this different factual reality is accompanied by, and results in a different social reality; and that the non-normative behavior of people believing in conspiracy theories is a natural consequence of this different social reality.

Non-normative behavior in this contribution is defined as behavior that differs from how the majority – here, the majority of society – behaves (i.e., descriptive norm) or expresses that one should behave (i.e., injunctive norm, Cialdini & Trost, 1998). The fact that a behavior differs from the descriptive or injunctive norm of the majority is not problematic itself, and there are situations where non-normative behavior is beneficial for society (Jetten & Hornsey, 2014). But there are also instances where non-normative behavior puts others at risk, such as decreased protection behaviors during the Covid-19 pandemic. Social norms are not static, but they are "constantly renegotiated and reproduced through social interactions" (Paluck & Shepherd, 2012b, p. 912) and, thus, constantly changing and evolving. This also means that there rarely is objective knowledge about a social norm in a given moment. Most of the time, the social norm has to be inferred by the individual and, thus, also is dependent on the individual's construction of the social reality and subject to biases (Miller & Prentice, 2016).

This contribution proposes that the non-normative behavior of people believing in conspiracy theories is a natural consequence of a different social reality that is accompanied by, and results out of the different factual reality created by conspiracy theories. This social reality is characterized by a tendency for distinction and distrust in social relationships, a different perception of the descriptive norm, from questioning the injunctive norms regarding specific behaviors, lower trust in institutions and traditional authorities, as well as alternative norms among people believing in conspiracy theories. For a visualization, see Figure 2.1.

Figure 2.1

The social reality of conspiracy belief and non-normative behavior



Tendency for distinction and distrust

Believing in conspiracy theories is related to different personality variables that can be summarized by a tendency for distinction and distrust. Believing in conspiracy theories is related to a higher need for uniqueness, individual narcissism, reactance, as well as collective narcissism (Biddlestone et al., 2022; Sternisko et al., 2021), reflecting a desire to positively distinguish oneself from other individuals and groups. Additionally, believing in conspiracy theories is related to general distrust (Green & Douglas, 2018; Imhoff & Lamberty, 2018; Meuer & Imhoff, 2021), paranoia (Imhoff & Lamberty, 2018), and higher scores on the so-called Dark Tetrad. The four facets of the Dark Tetrad, namely Machiavellianism, narcissism, psychopathy, and sadism seem to be related to conspiracy beliefs by shared features of entertaining odd beliefs, being fatalistic, and distrusting others (Kay, 2021). Distrust, a need for uniqueness, and scores on the Dark Tetrad have also been linked to non-normative behavior (Imhoff & Erb, 2009; Thibault & Kelloway, 2020; J.-

W. van Prooijen, Spadaro, et al., 2022). Overall, a belief in conspiracy theories seems to result out of and contribute to social relationships characterized by a tendency for distinction and distrust, which provides fertile ground for non-normative behaviors.

Different perception of the descriptive norm

Believing in conspiracy theories also appears to be connected to a lower perception of the descriptive norm for behaviors otherwise shown by the majority of the society. People believing in conspiracy theories estimate the percentage of other people following social norms, such as to hold the door for someone who has a lot to carry, as lower than people not believing in the conspiracy theories (Pummerer & Sassenberg, 2022); and people believing in vaccination conspiracy theories estimated the percentage of the vaccination intentions of other UK parents as lower than people not believing in the conspiracy theory (Cookson et al., 2021b). The directionality of this relationship is unclear and potentially bi-directional. People might start to believe in conspiracy theories because they are surrounded by other people believing in conspiracy theories (Cookson et al., 2021a) and by engaging with media suggesting conspiracy theories (Romer & Jamieson, 2020), which then leads to even more engagement with like-minded people and content (Jiang et al., 2021). Repeatedly interacting with people not following a norm changes the perception of the descriptive norm in society (Shepherd, 2017), which often also leads to an adjustment in own behavior (Miller & Prentice, 2016).

Questioning the injunctive norm regarding a specific behavior

People believing in conspiracy theories allege that some explanations for events are different than communicated by official sources, as they are the result of evil powers instead of random events (Clarke, 2019). As such, they also question the injunctive norms surrounding behaviors targeted by the conspiracy theories. For example, by claiming that Covid-19 is a hoax, people believing in such conspiracy theories questioned the injunctive norm that one should try to reduce contacts and wear masks in public places, resulting also in own reduced containment-related behavior – a behavior specific for this type of Covid-19 conspiracy theory (Imhoff & Lamberty, 2020a). Similarly, people believing in vaccination conspiracy theories claim that vaccinations do not have benefits or are over-proportionally harmful, questioning the injunctive norm that everyone should get vaccinated, resulting in lower vaccination rates worldwide among people believing in this conspiracy theory (Hornsey et al., 2018b). Injunctive norms are an important predictor for the

behavior of individuals. In a study examining different predictors for Covid-19 prevention behaviors with machine learning analyses, the injunctive norm far outperformed other predictors such as previous behaviors, knowledge about Covid-19 or society conditions (van Lissa et al., 2022). Thus, by questioning the injunctive norm, believing in conspiracy theories reduces normative behaviors targeted by the conspiracy theory.

Lower trust in institutions and traditional authorities

By claiming a different factual reality, conspiracy theories also cast doubt on institutions and traditional authorities. This can happen directly by accusing scientists and official institutions of malfeasance, such as in the case of conspiracy theories that Covid-19 is a hoax, or very subtle by offering an alternative explanation for events while claiming that all other explanations are wrong. This way, conspiracy theories casts doubt on the present structure of society (J.-W. van Prooijen, Spadaro, et al., 2022) and the present way of accumulating knowledge and interpreting evidence (Imhoff et al., 2018). The directionality of this relationship was examined in a recent longitudinal study which showed that the belief in a political Covid-19 conspiracy theories led to subsequent lower institutional trust, but not vice versa (Pummerer, Böhm, et al., 2022). These initial findings need to be further examined and corroborated in future studies. Lower trust in institutions and authorities, in turn, decreases cooperation and prosocial behavior (Irwin, 2009; Spadaro et al., 2020), which is closely related to the emergence and adherence to social norms (van Kleef et al., 2019).

The lower trust in institutions and traditional authorities is related to the previous section of questioning the injunctive norm. Often, both forms of casting doubt go hand in hand, but there are conspiracy theories in which one of the two is prevalent (compare, for example, the direct behavioral consequences from the belief that the traditional formula of the Coca-Cola company was replaced by an inferior formula to the belief that the attack on 9/11 was planned by the US government). Furthermore, while the injunctive norm targeted by conspiracy theories often is very specific, the questioning of the authorities can have broader effects, and seem to be one underlying reason why the belief in one conspiracy theory also predicts the belief in other, even mutually exclusive, conspiracy theories (Wood et al., 2012). This way, the belief in two different conspiracy theories can be correlated, but still have distinct behavioral outcomes (Imhoff & Lamberty, 2020a).

Alternative norms among people believing in conspiracy theories

Non-normative behavior has two aspects: One is a *decreased* display of behaviors reflecting the existing social norm, the other one is an *increased* display of behaviors disregarded by the majority. Just as in other groups, there is the emergence of new norms among people believing in conspiracy theories which become part of the social reality of people believing in conspiracy theories. These new norms often develop around popular figures (Harrell, 2019; Paluck & Shepherd, 2012a) and in distinction to the alleged outgroup (Hogg & Reid, 2006; Spears, 2021). Examples of new norms during the Covid-19 pandemic among people believing in conspiracy theories were behaviors ranging from drinking ginger tea against the virus to drinking bleach (Bertin et al., 2020; Imhoff & Lamberty, 2020a; Pummerer, Böhm, et al., 2022), which often developed after popular figures advertised these methods (Chary et al., 2021).

Conclusion

A belief in conspiracy theories is not only a belief in a different factual reality, but it is accompanied by, and results in a different social reality. This social reality is characterized by a tendency for distinction and distrust in social relationships, a different perception of the descriptive norm, the questioning of injunctive norms regarding specific behaviors targeted by the conspiracy theory, lower trust in institutions and traditional authorities, as well as new norms of the ingroup. The non-normative behavior then is a logical consequence of this different social reality.

This non-normative behavior displayed by people believing in conspiracy theories can have negative societal outcomes, as shown in the link between conspiracy belief and the willingness to commit violence (Imhoff et al., 2021; Jolley & Paterson, 2020) and everyday crimes (Jolley et al., 2019). However, there are other circumstances in which they might also serve the benefit of society, for example by inspiring innovation or societal change (Imhoff & Lamberty, 2020b).

Understanding the different social reality underlying the relationship between conspiracy theories and non-normative behavior can help to develop new interventions. Interventions against conspiracy theories so far have often focused on the factual aspects of conspiracy theories (see e.g. Banas & Miller, 2013; Jolley & Douglas, 2014a, 2017; Stojanov, 2015). This contribution proposes that the belief in conspiracy theories is also accompanied by, and results in, a different social reality. Future interventions should also consider this social reality in order to develop interventions against those consequences of the belief in conspiracy theories that are harmful for society.

Chapter 3 – Consequences of Conspiracy Belief

Chapter 3 of the present dissertation contains a manuscript that is the result of a cooperation between Lotte Pummerer (first author), Prof. Dr. Robert Böhm (second author), Dr. Lau Lilleholt (third author), Dr. Kevin Winter (fourth author), Prof. Dr. Ingo Zettler (fifth author) and Prof. Dr. Kai Sassenberg (sixth author). The manuscript entitled "Conspiracy Theories and Their Societal Effects During the COVID-19 Pandemic" is published in Social Psychological and Personality Science under the doi https://doi.org/10.1177/19485506211000217. The contributions of the PhD candidate (and of the co-authors, respectively) to the manuscript can be found in the following table:

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Lotte Pummerer	1	60 %	60 %	60 %	44 %
Robert Böhm	2	0 %	10 %	0 %	2 % *
Lau Lilleholt	3	0 %	10 %	0 %	2 % *
Kevin Winter	4	0 %	0 %	10 %	10 %
Ingo Zettler	5	0 %	10 %	0 %	2 % *
Kai Sassenberg	6	40 %	10 %	30 %	40 %
Title of paper:		Conspiracy Theories and Their Societal Effects During the COVID-19 Pandemic			
Status in publication process:		published (*Social Psychological and Personality Science*)			

* minor corrections in the writing process

As COVID-19 was spreading around the world, so did conspiracy theories—that is, explanations for events based on powerholders' secret, malevolent arrangements (Goertzel, 1994)—about the virus according to media reports (Gogarty & Hagle, 2020; Schulman & Siman-Tov, 2020). Some of these theories centre around the origin of the virus, while others focus on the local or national reaction to the pandemic (Gogarty & Hagle, 2020). Believing in conspiracy theories is known to undermine prosocial behavior and trust in authorities (Imhoff et al., 2018; Jolley & Douglas, 2014b). Both are key to the successful fight against COVID-19. Indeed, the fight against this pandemic will, according to most experts (e.g., Chu et al., 2020), only be successful when most people adopt hygiene measures and physical distancing—thereby following governmental recommendations. Accordingly, the support of conspiracy theories is likely to endanger the success of efforts to fight the pandemic.

An investigation of the consequences of belief in a conspiracy theory related to COVID-19 on attitudes and behavior during the pandemic thus is of highest societal relevance and the main objective of the current research. Across one survey study with a national random sample, one experiment, and one longitudinal study we examine the influence of the belief in and the confrontation with a conspiracy theory about the governmental reaction to COVID-19, the *political Covid-19 conspiracy* (PCC). More specifically, the PCC suggests that the powerful in one's society are exploiting the pandemic to their advantage. Overall, our studies not only contribute to the understanding of conspiracy theories during the fight against COVID-19, but also to the understanding of effects of conspiracy theories in general, for instance, by advancing research on conspiracy theories through testing their *consequences* in an experiment and a longitudinal study—including analyses for a reversed direction of relations.

Effects of conspiracy theories

Conspiracy theories are built on the notion that a powerful group is acting in secret, thus building on (and potentially also creating) suspicion towards the powerful such as the government. Therefore, it is not surprising that a general conspiracy mentality (CM)—that is, the mental preparedness to belief in conspiracy theories (Imhoff & Bruder, 2014a)—is negatively related with trust in experts and authorities (Imhoff et al., 2018; Imhoff & Lamberty, 2018). Being confronted with conspiracy theories, in addition, reduces the willingness to engage in joint societal efforts: For instance, being confronted with an anti-vaccine conspiracy theory decreased vaccination intentions (Jolley & Douglas, 2014a), and being confronted with a conspiracy theory about global

warming reduced pro-environmental behavior (Van der Linden, 2015). Taken together, this suggests that in the context of COVID-19 believing in or being confronted with a PCC should undermine trust in the government and other authorities as well as prosocial attitudes and behaviors.

What attitudes and behaviors are likely to be affected by the belief in a conspiracy theory and are relevant in the context of COVID-19? First, trusting is closely related to agreement with the trustee's arguments (Légal et al., 2012). Hence, a stronger belief in PCC should also lead to less support of governmental regulations in the context of COVID-19. Second, these regulations strongly require (among others) two types of behavior, namely, the adoption of hygiene measures and physical distancing. Whereas hygiene measures are a well-established means of health prevention, physical distancing has been a so far unfamiliar measure for societies at large. Consequently, those measures are applied out of different motivations: Hygiene measures are in line with intuitive responses to a health threat, whereas physical distancing requires trust in health officials. Accordingly, a stronger belief in PCC should lead to less physical distancing, but not necessarily affect the adoption of hygiene measures. Indeed, first studies provide evidence that the belief in PCC is negatively related to behavior relevant for the containment of the COVID-19 pandemic in general (Imhoff & Lamberty, 2020a; Teovanović et al., 2021) and specifically to physical distancing (Biddlestone et al., 2020; Bierwiaczonek et al., 2020). Finally, there was a wave of prosocial behavior related to the pandemic such as helping vulnerable people at high risk to deal with the situation (BBC, 2020; Vergin, 2020). Given that conspiracy beliefs have been shown to undermine prosocial behavior in other domains, the belief in PCC might also predict lower social engagement related to the pandemic.

In sum, we predicted that the belief in PCC leads to (i) lower institutional trust, (ii) lower support of governmental regulations, (iii) lower adoption of physical distancing (but not lower adoption of hygiene measures), and (iv) lower social engagement.

Overview of current research

So far, most research tested the relation between the *belief* in conspiracy theories and other variables, such as trust, using cross-sectional or correlational studies (e.g. Goertzel, 1994; Imhoff & Lamberty, 2018c). More recently, experimental studies started to provide evidence for the effects of the *confrontation* with conspiracy theories with the aim to establish causality (Einstein & Glick, 2015; Jolley & Douglas, 2014b; van der Linden, 2015). Longitudinal research that provides

evidence for the effects of *beliefs* across time is very rare. The only exception we are aware of is a very recent article by Bierwiaczonek et al. (Bierwiaczonek et al., 2020), demonstrating that the belief in COVID-19 conspiracy theories predicts lower physical distancing. Extending this work, we sought to test (i) whether this effect generalizes to trust in and support for governmental regulations, as well as social engagement, and (ii) whether the confrontation with a PCC results in the same effects.

Tackling these gaps and in order to provide a comprehensive test of our predictions, we conducted a cross-sectional correlational study using a random sample (Study 1), an experiment confronting participants with a PCC (Study 2), and a two-wave longitudinal study testing the predicted effects of belief in a PCC across time (and also the reversed order; Study 3).

Study 1: Survey study

Method

Participants and procedure

This preregistered study (https://aspredicted.org/ks4ch.pdf) was part of the weekly COVID-19 Snapshot MOnitoring in Denmark (COSMO Denmark; see http://dx.doi.org/10.23668/psycharchives.2795). Therefore, the sample size was not tailored to the current research question. Instead, a random sample of 5,000 people of the Danish adult population (for details see Supplement) was invited on March 30, 2020, via citizens' official digital mail (*e-Boks*, see https://e-boks.com/danmark/en/) to complete an online survey set up via formr (Arslan et al., 2020) about COVID-19, which was completed by 775 respondents (15.5%). As preregistered, 344 participants were excluded from the analyses, because they worked in the health sector, are chronically ill, or had been infected by the virus, leaving a sample size of N = 425 (48.9% = male, 50.8% = female; M_{Age} = 52.53, range: 20-84 years). According to a sensitivity power analysis, this sample size is sufficient to detect an effect of r = .173 with 95% power and of r = .135 with 80% power, respectively. Responses to all items were voluntary and participants were only included in the analyses when they responded to all items of a scale, which is why Ns vary slightly across analyses. A complete list of measures, further methodological details, and deviations from the preregistrations for all three studies are included in the Supplement. All data and scripts are openly available under http://dx.doi.org/10.23668/psycharchives.4587 (data) and http://dx.doi.org/10.23668/psycharchives.4660 (scripts).

Measures

For internal consistency and descriptive statistics of each scale, see Table 3.1.

Institutional trust was assessed with five items measuring trust towards the police, state authorities, politicians, experts, and hospitals/doctors, respectively, on a 7-point scale from 1: *Very low confidence* to 7: *Very high confidence.*

Support of governmental regulations: Participants rated their perception of the appropriateness of 18 policies implemented by the Danish government to fight COVID-19 (e.g., "It makes sense that schools and day-care institutions are closed") on a scale from 1: *Disagree* to 7: *Agree*.

Adoption of physical distancing was assessed by letting participants evaluate two behaviors aimed at keeping distance to other people on a 7-point scale from 1: *Never* to 7: *Often* (e.g., "I try to limit the amount of physical contact I have with others [e.g. handshakes, kisses on the cheek, hugs])".

Adoption of hygiene measures was assessed regarding three behaviors communicated by health officials aimed at avoiding infection (e.g., "I make sure to cough or sneeze in my sleeve rather than in my hands") on a 7-point scale from 1: *Never* to 7: *Often*.

Social engagement was assessed with five items (e.g., "Helping elderly, sick or quarantined people with shopping or related tasks") on a 3-point scale (1: *I've already done this*, 2: *I plan to do this*, 3: *I do not plan to do this*). The internal consistency of this scale and the adoption of hygiene measures was not satisfying, which could also not be improved by excluding items. Thus, results need to be interpreted with caution.

PCC items were inspired by news articles (e.g. Karni, 2020; Kultur, 2020) and tweets (Kirk, 2020; Mitchell, 2020). Participants rated five items (e.g., "Powerful people are using COVID-19 in order to crash the economy") on a 5-point scale from 1: *Disagree* to 5: *Agree*.

Table 3.1

Internal consistency, mean, and standard deviation for all scales in Study 1

Variable (possible response range)	*N*	α	*M* (*SD*)
Institutional trust (1-7)	421	.86	5.98 (0.84)
Support of governmental regulations (1-7)	399	.90	6.04 (0.84)
Adoption of physical distancing (1-7)	422	.74	6.79 (0.64)
Adoption of hygiene measures (1-7)	420	.62	6.40 (0.74)
Social engagement (1-3)	418	.48	1.46 (0.40)
Political COVID-19 Conspiracy (PCC; 1-5)	416	.79	1.71 (0.72)

Results

We tested the hypothesized relation between PCC and all outcome measures in multiple regressions controlling for participants' gender, children (yes/no), and education (see Table 3.2). Due to a high number of missing values ($N = 164$) and hereby deviating from our preregistration, we did not include age in these analyses. As hypothesized, people who believed to a stronger extent in the PCC reported lower institutional trust, lower support of governmental regulations, less adoption of physical distancing, and less social engagement. As further predicted, PCC was unrelated to the adoption of hygiene measures. Results including age as additional predictor showed the same effects, except for an nonsignificant prediction of social engagement (see Supplement, Table S2).

Table 3.2

Multiple regressions for all outcomes on political COVID-19 conspiracy (PCC), gender, children, and education

	Institutional trust (*df* = 401)				Support of governmental regulations (*df* = 381)				Adoption of physical distancing (*df* = 403)				Adoption of hygiene measures (*df* = 401)				Social engagement (*df* = 397)			
Predictors	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI
PCC	-0.30 (0.06)	-0.26	< .001	[-0.417; -0.192]	-0.40 (0.06)	-0.34	< .001	[-0.509; -0.285]	-0.14 (0.05)	-0.15	.003	[-0.227; -0.048]	-0.05 (0.05)	-0.05	.308	[-0.154; 0.049]	-0.07 (0.03)	-0.12	.018	[-0.123; -0.012]
Gender	0.16 (0.08)	0.09	.051	[-0.001; 0.320]	0.05 (0.08)	0.03	.564	[-0.114; 0.208]	0.02 (0.06)	0.02	.766	[-0.108; 0.146]	0.13 (0.07)	0.09	.077	[-0.014; 0.270]	0.04 (0.04)	0.05	.309	[-0.038; 0.120]
Children	-0.11 (0.09)	-0.06	.213	[-0.293; 0.066]	-0.15 (0.09)	-0.08	.113	[-0.326; 0.035]	-0.17 (0.07)	-0.12	.018	[-0.314; -0.029]	-0.47 (0.08)	-0.28	<.001	[-0.626; -0.309]	-0.08 (0.05)	-0.09	.086	[-0.167; 0.011]
Education	0.05 (0.06)	0.04	.462	[-0.076; 0.166]	-0.13 (0.06)	-0.10	.041	[-0.248; -0.005]	-0.01 (0.05)	-0.01	.917	[-0.100; 0.090]	-0.05 (0.05)	-0.04	.383	[-0.153; 0.059]	0.04 (0.03)	0.06	.225	[-0.023; 0.096]

Discussion

This survey study provided first evidence for our hypothesis that the belief in PCC is related to lower institutional trust, support of governmental regulations, adoption of physical distancing, and social engagement. No relation was found between belief in PCC and adoption of hygiene measures. Given that the internal consistency of the social engagement scale was relatively low and that the effect of PCC on this outcome did not hold when only participants providing their age were included, this particular finding needs to be treated with caution. The low internal consistency might have resulted from the fact that we assessed prosocial behavior across very different domains, where adopting one behavior might exclude adopting another one (e.g., for time reasons). We altered this measure in Study 2 accordingly. Due to its cross-sectional design, the current study did not allow to draw any conclusions about causality. Therefore, we experimentally manipulated the confrontation with a PCC in Study 2.

Study 2: Experimental study

Method

Participants and procedure

We aimed to recruit 200 participants to be able to detect an effect of $d = 0.40$ (roughly the mean effect size across the four outcome measures in Study 1) at 80% power with $\alpha = .05$. Participants were invited via a German university's student mailing list on May 29, 2020 for participation in a short study about COVID-19. Of the 261 who completed the questionnaire 19 participants were excluded, based on preregistered criteria (https://aspredicted.org/hg5a7.pdf), leaving $N = 242$ participants for the final sample (69.8 % female, 28.1 % male; $M_{Age} = 23.98$, range 18-61 years). Participation was not compensated. Due to unexpectedly quick responses, the sample size was slightly larger than planned.

After providing consent, participants in the PCC condition read about a fictitious conspiracy theory in the format of a news report. In this report, it was suggested that a big German company was using COVID-19 as a cover to ally with the government in order to implement digital medical data storage (see Supplement). Participants considered the text as medium plausible ($M = 3.29$, $SD = 1.67$, 7-point response scale from 1: *not at all* to 7 *totally plausible*). No text was given in the control condition. Afterwards, the measures described below were administered. Participants in the experimental condition were then very thoroughly debriefed, after which the belief that the

company was involved in a conspiracy theory was lower in the experimental vs. control group, $t(234.24)^{1} = -2.17$, $p = .031$, $d = 0.28$.

Measures

Items were similar to those in Study 1, but adapted to the German language and context. Descriptive statistics and internal consistency for all scales are reported in Table 3.3.

Institutional trust was assessed with four items about trust in the federal and state ministries as well as federal institutions with a 7-point scale from 1: *really low trust* to 7: *really high trust.*

Support of governmental regulations: Participants indicated their support for 11 regulations implemented in Germany to fight the virus in case of another rapid spread (e.g., school closure; 1: *totally unacceptable* to 7: *totally acceptable*).

Adoption of physical distancing consisted of six items, two items used in Study 1 plus four additional items for better reliability (e.g., "Do not meet in big groups"), which were answered regarding another rapid spread using a slider from *I would not do it (0%)* to *I would do it (100%)*.

Social engagement in case of another rapid spread was measured with seven items (e.g., "Offering to talk with people at risk"), four of them also included in Study 1, with a slider from *0%: I would not do it*, to *100%: I would do it*. The substantial changes to this scale resulted in a higher internal consistency.

PCC was assessed with the same 5 Items as in Study 1.

Conspiracy Mentality (CM) was assessed using the 12-item scale by Imhoff and Bruder (2014; e.g., "Those at the top do whatever they want") from 1: *Disagree* to 7: *Agree* in order to explore whether the manipulation specifically affects the belief in PCC or also CM more generally.

[1] Non-integer degrees of freedom indicate that a Welch-test was used to correct for differences in variance between conditions.

Table 3.3

Internal consistency, mean, and standard deviation for all scales in Study 2 (N = 242)

Variable (response scale)	α	*M* (*SD*)
Institutional trust (1-7)	.85	5.38 (0.98)
Support of governmental regulations (1-7)	.88	5.44 (0.96)
Adoption of physical distancing (0-100)	.77	86.55 (13.50)
Social engagement (0-100)	.72	36.52 (18.60)
Political COVID-19 Conspiracy (PCC; 1-7)	.76	2.32 (1.12)
Conspiracy Mentality (CM; 1-7)	.89	3.10 (1.08)

Results

Manipulation check

As intended, participants confronted with the conspiracy theory (M = 2.57; SD = 1.29) scored higher on the PCC scale than participants in the control group (M = 2.14; SD = 0.94), $t(177.68) = 2.82$, $p = .005$, 95%-$CI_{\Delta M}$ [0.128; 0.721], $d = 0.38$. Regarding conspiracy mentality, the PCC group (M = 3.21, SD = 1.14) did not differ from the control group (M = 3.02, SD = 1.03), $t(240) = 1.41$, $p = .159$, 95%-$CI_{\Delta M}$ [-0.078; 0.474], $d = 0.17$, suggesting that the confrontation affected the belief in PCC but not CM more generally.

Hypothesis tests

We tested our hypothesis that being confronted with PCC leads to lower institutional trust, support of governmental regulations, adoption of physical distancing, and social engagement using independent sample t-tests (Welch-tests in cases where the variance differed between conditions, see Table 3.4). As hypothesized, participants in the PCC (vs. control) condition reported lower institutional trust, less support of governmental regulations, and less adoption of physical distancing. Contradicting our prediction, social engagement did not differ between conditions.

Table 3.4

Means, standard deviations and test statistic comparing experimental and control group in Study 2 (N = 242)

	PCC group		Control group			Test statistics			
Variable (response scale)	*M*	*SD*	*M*	*SD*	*df*	*t*	*p*	95%-CI	*d*
Institutional trust (1-7)	5.23	1.10	5.49	0.88	190.24	-1.97	.050	[-0.518; <0.001]	0.26
Support of governmental regulations (1-7)	5.23	1.04	5.59	0.87	240	-2.96	.003	[-0.607; 0.122]	- 0.37
Adoption of physical distancing (0-100)	84.54	14.42	88.05	12.63	202.48	-1.97	.050*	[-7.022; 0.005]	- 0.26
Social engagement (0-100)	35.54	17.78	37.25	19.22	240	-0.71	.481	[-6.479; 3.058]	0.09

Note: *exact p-value was .04969.

Discussion

Results from this experiment largely replicate the results of the correlational Study 1. Individuals were affected by the confrontation with a PCC in the expected direction: less institutional trust, less support of governmental regulations, and less adoption of physical distancing, although the effects for adoption of physical distancing as well as institutional trust were on the margin of the conventional levels of significance (one *p* slightly smaller and one slightly larger than .05). It seems noteworthy that these consequences resulted from simply reading a short text about the mentioned conspiracy theory, though.

As a limitation, participants in the control condition did not read any text, which is an additional difference between conditions beside the confrontation with the conspiracy in the experimental condition and might thus have affected the results. However, additional analyses reported in the Supplement (Table S11) showed that PCC carried large parts of the effect of the experimental manipulation. Therefore, we are confident that the results can be interpreted as an outcome of confrontation with the PCC.

Study 3 aimed to come as close as possible to the test of causal effects of the belief in (rather than the confrontation with) a PCC. To this end, we implemented a longitudinal design. In addition, we also aimed to replicate the findings from Study 1 in a cross-sectional analysis.

Study 3: Longitudinal study

Method

Participants and procedure

Participants were invited during the first shutdown in Germany on March 24, 2020 via the student mailing list of a Germany university to fill in an online questionnaire in exchange for the chance of winning one of twenty-five 10 € gift cards. At timepoint 1 (t1) we aimed to recruit 350 participants to be able to detect correlations of r = .15 at 80% power with α = .05. Due to unexpectedly quick responses, data collection was only stopped after 552 university students completed the study of which 546 (69.6 % female, 30 % male; M_{Age} = 24.11, range 18-61 years) fulfilled the preregistered inclusion criteria (for t1: https://aspredicted.org/w5hf5.pdf; for t2: https://aspredicted.org/m6pg3.pdf).

After providing informed consent, participants completed measures of institutional trust, support of governmental regulations, adoption of physical distancing, adoption of hygiene measures, social engagement, CM, and belief in PCC (for additional measures unrelated to the current hypotheses see Supplement). At the end of the questionnaire, participants could voluntarily provide their e-mail address and consent to be invited for a second wave, which 194 participants did. Between May 15 and 28—when shops had reopened, but a lot of restrictions were still in place in Germany—, 150 participants took part in the second survey (t2), with 134 participants (15.7% = male, 83.6% = female; M_{Age} = 24.18, range: 18-61 years) fulfilling the preregistered inclusion criteria. With the given sample size the longitudinal analysis can detect an effect of f^2 = .059 (≈ r = .24) with 80% power and α = .05 according to a sensitivity power analysis using G*Power (Faul et al., 2007). No substantial differences between this subgroup and the whole sample regarding the variables included in the analyses below occurred (for details see Supplement).

Measures

Table 3.5 provides information about descriptive statistics and internal consistency of the scales.

Institutional trust and *support of governmental regulations* were assessed with the same scales as in Study 2.

Adoption of physical distancing was assessed using one item at t1 (“Do not meet other people”). For t2, the same six items were used as reported in Study 2. Adoption of physical distancing, hygiene measures, and complementary medicine all used the same slider from 0: *I have not adapted* to 100: *I have 100% adapted this behavior*.

Adoption of hygiene measures was captured by three behaviors at t1 and five at t2 communicated by the Centers for Disease Control and Prevention (2020) and its German equivalent, the Robert Koch Institute (2020) (e.g., "In case you have to sneeze: Cover your mouth and nose with a tissue"), which resembled the hygiene items used in Study 1 but considers differences between recommendations in Denmark and Germany.

Adoption of complementary medicine: For exploratory purposes we also asked about behavior changes that are implemented to avoid a COVID-19 infection with eight behaviors that have no scientifically proven impact in fighting the virus (adapted from Betsch et al., 2020; e.g., "Drinking ginger tea"). Similar questions are part of the prepping behavior measure by Imhoff and Lamberty (Imhoff & Lamberty, 2020a), which contained items about the reliance on alternative remedies.

Social engagement was measured with four items at t1, (e.g., "Could you imagine to socially engage during the pandemic by running errands for members of the risk population?") with a slider from 0: *not willing to engage*, to 100: *willing to engage*. At t2, the same seven items as in Study 2 (including the four items from t1) were used, this time measured on a 3-point scale (would not do it – would do it – already have done it) to also include self-reported behavior in the indicator.

Conspiracy Mentality (CM) and *PCC* were assessed using the same scales as in Study 2.

Table 3.5

Internal consistency, mean, and standard deviation for all scales at t1 (N = 546) and t2 (N = 134) in Study 3

	t1		t2	
Variable (response scale)	α	*M* (*SD*)	α	*M* (*SD*)
Institutional trust (1-7)	.87	5.61 (1.05)	.84	5.49 (0.96)
Support of governmental regulations (1-7)	.91	5.99 (0.98)	.89	5.47 (0.95)
Adoption of physical distancing (0-100)	-	86.07 (22.85)	.64	85.34 (14.17)
Adoption of hygiene measures (0-100)	.55	62.18 (27.23)	.68	61.52 (23.42)
Social engagement (0-100 at t1; 1-3 at t2)	.63	55.82 (25.99)	.43	1.77 (0.29)
Adoption of complementary medicine (0-100)	.71	10.58 (13.90)	.79	11.96 (16.54)
Political COVID-19 Conspiracy (PCC; 1-7)	.77	2.16 (1.05)	.69	2.06 (0.91)
Conspiracy Mentality (CM; 1-7)	.90	3.34 (1.15)	.89	2.98 (1.03)

Results

Cross-sectional analysis

Table 3.6

Bivariate correlations between the political COVID-19 conspiracy (PCC) scale as well as conspiracy mentality (CM) scale and outcomes assessed at t1 (N = 546) in Study 3

	PCC			CM		
Outcomes	*r*	*p*	95%-CI	*r*	*p*	95%-CI
Institutional trust	-.39	<.001	[-.454; -.311]	-.30	<.001	[-.374; -.221]
Support of governmental regulations	-.33	<.001	[-.398; -.248]	-.11	.011	[-.191; -.025]
Adoption of physical distancing	-.30	<.001	[-.372; -.219]	-.17	<.001	[-.253; -.090]
Adoption of hygiene measures	.05	.251	[-.035; .133]	.07	.089	[-.011; .156]
Social engagement	-.09	.031	[-.175; -.009]	-.01	.799	[-.095; .073]
Adoption of complementary medicine	.20	<.001	[.120; .281]	.22	<.001	[.139; .299]

As in Study 1, we computed bivariate correlations between PCC and the outcome measures at t1 (see Table 3.6). People who believed stronger in the PCC trusted institutions less, supported governmental regulations less, and reported less physical distancing as well as social engagement. Adoption of hygiene measures was unrelated to the belief in PCC. These results are consistent with the results of Studies 1 and 2. They should, however, be considered as exploratory, due to deviations from our preregistration regarding scale composition (for details see Supplement, especially Table S13).

Additional exploratory analyses indicate that the belief in PCC was positively related to the adoption of complementary medicine. Moreover, the correlations between CM and the outcome measures match those for belief in PCC, except that CM does not correlate with social engagement.

Longitudinal analysis

Next, we tested our hypotheses using the cross-lagged prediction of each outcome measure at t2 by PCC at t1, controlling for the respective outcome at t1 using separate linear regressions (see Table 3.7). As hypothesized, PCC predicted lower institutional trust, and (marginally) also

lower support of governmental regulations. Different to our hypotheses, PCC at t1 did not predict the adoption of physical distancing and social engagement at t2. Additional exploratory tests for the reverse direction of the relation (i.e., regressing PCC-t2 on PCC-t1 and institutional trust-t1 or support of governmental regulations-t1) did not provide evidence for the prediction of PCC from institutional trust or support of governmental regulations (see Table 3.9). Thus, the belief in PCC seems to affect institutional trust and support of governmental regulations rather than the other way around.

When entering CM at t1 as predictor for exploratory purposes, it likewise predicted institutional trust and support of governmental regulations, but no evidence for the reverse direction of the relation occurred (see Tables 3.8 & 3.9), suggesting that both concepts have similar longitudinal effects.

Table 3.7

Multiple regression analyses in rows with political COVID-19 conspiracy (PCC) (t1) and criterion (t1) as predictors of criterion (t2) (N = 134) in Study 3

	PCC (t1)				Criterion (t1)			
Criterion (t2)	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI
Institutional trust (t2)	-0.16 (0.08)	-0.15	.037	[-0.315, -0.010]	0.57 (0.08)	0.54	<.001	[0.418; 0.715]
Support of governmental regulations (t2)	-0.17 (0.09)	-0.16	.051	[-0.348; 0.001]	0.39 (0.11)	0.31	<.001	[0.181; 0.599]
Adoption of physical distancing (t2)	-1.90 (1.36)	-0.12	.164	[-4.591; 0.787]	0.14 (0.06)	0.21	.019	[0.024; 0.264]
Adoption of hygiene measures (t2)	-0.01 (1.94)	0.00	.998	[-3.846; 3.836]	0.46 (0.07)	0.53	<.001	[0.330; 0.588]
Social engagement (t2)	< 0.01 (0.02)	0.00	.977	[-0.045; 0.047]	0.01 (0.00)	0.53	<.001	[0.004; 0.007]
Adoption of complementary medicine (t2)	2.26 (1.27)	0.12	.078	[-0.259; 4.783]	0.70 (0.08)	0.59	<.001	[0.537; 0.861]

Note: Analyses for adoption of physical distancing and complementary medicine are exploratory and therefore not reported in the main text.

Table 3.8

Multiple regression analyses in rows with conspiracy mentality (CM) (t1) and criterion (t1) as predictors of criterion (t2) (N = 134) in Study 3

	CM (t1)				Criterion (t1)			
Criterion (t2)	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI
Institutional trust (t2)	-0.18 (0.06)	-0.20	.006	[-0.300; 0.052]	-0.57 (0.07)	0.55	<.001	[0.429; 0.718]
Support of governmental regulations (t2)	-0.26 (0.07)	-0.30	<.001	[-0.398; 0.125]	-0.42 (0.10)	0.33	<.001	[0.220; 0.612]
Adoption of physical distancing (t2)	-0.93 (1.13)	-0.07	.415	[-3.161; 1.311]	0.15 (0.06)	0.22	.012	[0.034; 0.273]
Adoption of hygiene measures (t2)	0.11 (1.62)	0.01	.945	[-3.096; 3.319]	0.46 (0.07)	0.52	<.001	[0.330; 0.588]
Social engagement (t2)	-0.02 (0.02)	-0.07	.350	[-0.057; 0.020]	0.01 (0.00)	0.54	<.001	[0.004; 0.007]
Adoption of complementary medicine (t2)	1.82 (1.13)	0.12	.110	[-0.418; 4.061]	0.67 (0.09)	0.56	<.001	[0.494; 0.839]

Table 3.9

Testing the reverse causal order: Multiple regression analyses in rows with institutional trust and support for governmental regulations (t1) and political COVID-19 conspiracy (PCC)/ conspiracy mentality (CM) (t1) as predictors of PCC/CM (t2) (N = 134) in Study 3

	Institutional trust (t1)				PCC / CM (t1)			
Outcomes (t2)	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI
PCC (t2)	<0.01 (0.07)	0.00	.995	[-0.141; 0.140]	0.59 (0.07)	0.59	<.001	[0.446; 0.735]
CM (t2)	-0.01 (0.06)	-0.01	.860	[-0.130; 0.109]	0.76 (0.05)	0.79	<.001	[0.652; 0.858]

	Support of governmental regulations (t1)				PCC / CM (t1)			
	B (SE)	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI
PCC (t2)	-0.06 (0.09)	-0.05	.489	[-0.235; 0.113]	0.58 (0.07)	0.57	<.001	[0.433; 0.724]
CM (t2)	-0.01 (0.07)	-0.01	.858	[-0.160; 0.133]	0.76 (0.05)	0.79	<.001	[0.653; 0.858]

Discussion

The current results replicated the findings from Study 1 and added that PCC positively predicted higher adoption of complementary medicine as well as that all outcome measures except social engagement showed the same correlation pattern with CM. Moreover, PCC and CM predicted trust and support for governmental regulations, as well as marginally the adoption of complementary medicine, but not adoption of physical distancing and social engagement across time. No evidence for reverse cross-lagged effects was found. The lack of predicted significant effects for some of the outcomes in the longitudinal analyses might be due to a lower sample size at t2 or due to the low internal consistency of the social engagement scale. The lack of a relation between PCC/CM and the adoption of physical distancing and social engagement over time might result from situational changes (the shutdown had been lifted between both measurement points). Alternatively, these behaviors might be rather stable (similar to habits) and, thus, barely any changes across time occur, which would be required to find an effect in the reported analysis.

In addition to the results reported here, we also explored the effect of another conspiracy theory, namely, that the virus was intentionally created by humans in China (see Supplement, Table S12). Given that belief in one conspiracy theory is highly correlated with the belief in other—sometimes even contradictory—conspiracy theories (Bruder et al., 2013; Swami et al., 2010; Wood

et al., 2012), one might assume that the China-related conspiracy theory should assert the same effects as PCC, but correlations were substantially lower. This suggests that conspiracy theories might assert mainly an effect in the domain they are about, but this needs to be tested in future research.

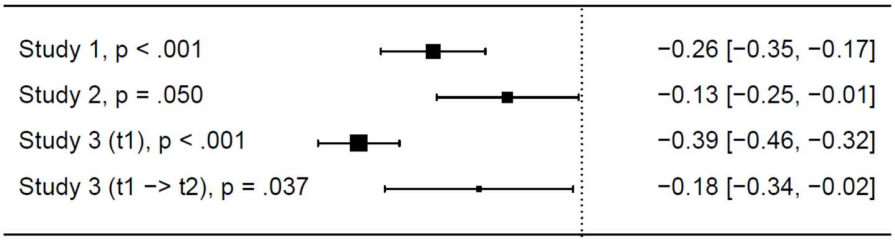
General discussion

The current research examined the relation between the belief in PCC and societally important attitudes as well as (self-reported) behaviors in the context of COVID-19. We tested the hypotheses that the belief in PCC asserts a negative influence on institutional trust, support for governmental regulations, adoption of physical distancing, and social engagement, but not on the adoption of hygiene measures in a survey study with a random-sample, an experimental study, and a longitudinal study—all preregistered—conducted in two different European countries. Given that effects in some studies did not reach conventional levels of significance, we summarize the results in Figure 3.1. Based on effect sizes and *p*-values, the effects in Study 2 and the longitudinal analysis of Study 3 are weaker, which is further not surprising, given that the influence of third variables and reversed directions of relations are not accounted for in study 1. Across studies, PCC predicted less institutional trust, less support for governmental regulations, and (to a somewhat lesser extent given the results of the longitudinal analysis in Study 3) also less adoption of physical distancing. The borderline effects (i.e., $p > .03$) in these cases can, given the overall pattern, most likely be attributed to the random variance of effect sizes rather than to the non-existence of the respective effect. Moreover, PCC clearly did not predict the adoption of hygiene measures. For social engagement, no clear evidence for a relation to PCC was found. In sum, our hypotheses regarding institutional trust, support for governmental regulations, adoption of physical distancing, and (with a null effect) for hygiene measures were supported.

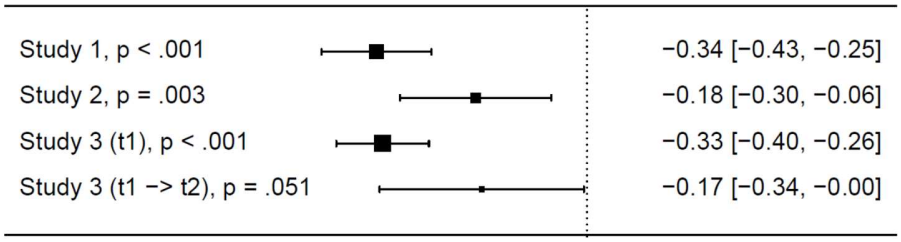
Figure 3.1

Relation between Political COVID-19 Conspiracy and outcomes variables across all studies. Effect sizes transformed to r with 95%-CI

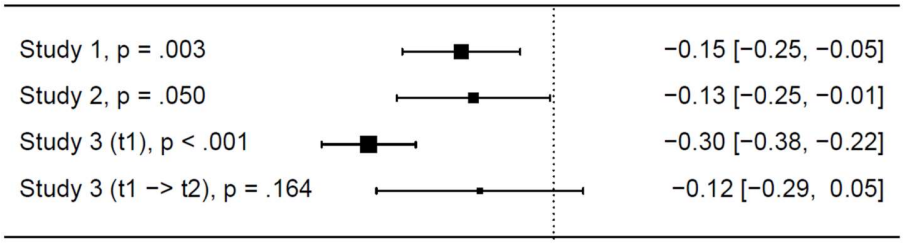
(a) Institutional trust



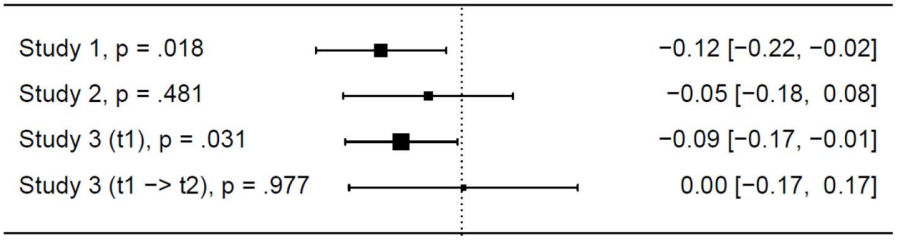
(b) Support for governmental regulations



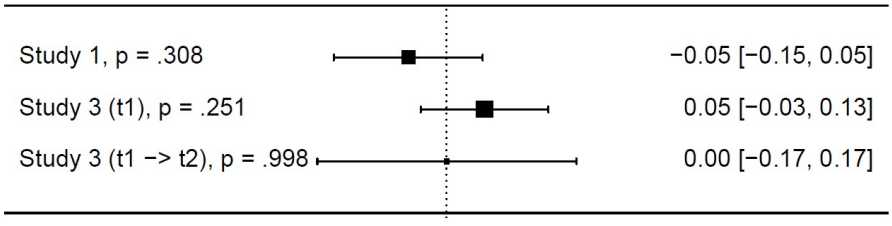
(c) Adoption of physical distancing



(d) Social engagement



(e) Adoption of hygiene measures



A number of additional findings are worth noting. First, CM also predicted institutional trust and support for governmental regulations, but none of the other measures. This indicates that considering the belief in specific conspiracy theories is worthwhile, given that PCC predicted different outcomes than the more general concept of conspiracy mentality. Second, as low institutional trust might also be the cause of lower support of governmental regulations and the adoption of behavior implied by these regulations, we preregistered and tested whether institutional trust mediates those effects of PCC. Considering all results, we found no convincing support for this mediation, because no evidence was found in those analyses testing effects of PCC (for details see Supplement, Table S14). Further research should explore additional possible concepts underlying the effects of PCC.

The results extend existing research on the negative effects of conspiracy theories on societally relevant behavior by showing that such effects also occur in the context of COVID-19. Going beyond earlier research, our results suggest (a) that PCC asserts a causal effect (e.g., compared to Imhoff & Lamberty, 2020a), and (b) that PCC predicts trust and support for governmental regulations (but not individual health behaviors), and not only adoption of physical distancing (compared to Bierwiaczonek et al., 2020). Thinking about the implications, the finding that being only confronted with a conspiracy theory can undermine institutional trust, support of governmental regulations, and adoption of physical distancing suggests that media coverage sharing conspiracy theories might counteract the fight against the virus. Given the importance of successfully fighting new COVID-19 infections, gaining the summarized insides for this specific context is a relevant contribution in itself.

The current set of studies also advances the research about conspiracies in general. The most important contribution in this respect is the demonstration that the *confrontation* with and the *belief* in conspiracy theories are related and show the same pattern of effects. We combined—to our knowledge, for the first time—experimental and longitudinal research on PCC in a certain context and found equivalent results, even though believing in a conspiracy is very different from reading about it for the first time. This raises the question whether being convinced of a conspiracy is crucial or whether the mere knowledge about it has similar effects, which should be addressed by future research.

Second, Study 3 is among the few longitudinal studies testing the effect of conspirational thoughts across time. The findings of this study advance our knowledge about the effects of conspiracy theories, in particular because we find effects of PCC and CM across time, but not for

the reversed temporal relation. Given that this is only one study, further research replicating this pattern regarding societal and other outcomes is needed.

Clearly, the current research also has some limitations. First, one methodological limitation is that the sample size of the longitudinal data set was not ideally suited for (re)testing the small to medium effects we found for some of the outcome measures in Studies 1 and 2. The overview of effect sizes suggests that a highly powered longitudinal study might also have found effects on the adoption of physical distancing and potentially also on social engagement. Second, our findings concern a political conspiracy theory surrounding COVID-19, thus around the topic of a health and global crisis. It is an open question whether the findings might generalize to other pandemics and health-related issues, and (especially) to conspiracy theories surrounding other issues. Also, the COVID-19 conspiracy as well as our measurements were political in nature, thus, there might have been an influence of, for example, ideology and other political attitudes which were not considered herein.

To conclude, the current research advances our knowledge about conspiracy theories, by demonstrating that the confrontation with and the belief in conspiracy theories are associated with less institutional trust and lower support for and adoption of regulations put forward by these institutions. This advances research on conspiracy beliefs by showing parallel effects for confrontation with and believing in conspiracies. In the context of the COVID-19 pandemic, the current findings imply that the spread of a political COVID-19 conspiracy undermines the attitudes and behaviors related to a successful mitigation of the spread of COVID-19.

Chapter 4 – Cognitive/Emotional Intervention

Chapter 4 of the present dissertation contains a manuscript that is the result of a cooperation between Lotte Pummerer (first author), Dr. Kevin Winter (second author), and Prof. Dr. Kai Sassenberg (third author). The manuscript entitled "Addressing Covid-19 Vaccination Conspiracy Theories and Vaccination Intentions" is published in the European Journal of Health Communication under the doi https://doi.org/ 10.47368/ejhc.2022.201. The contributions of the PhD candidate (and of the co-authors, respectively) to the manuscript can be found in the following table:

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Lotte Pummerer	1	70 %	80 %	60 %	65 %
Kevin Winter	2	10 %	0 %	20 %	30 %
Kai Sassenberg	3	20 %	20 %	20 %	5 %
Title of paper:		Addressing Covid-19 Vaccination Conspiracy Theories and Vaccination Intentions			
Status in publication process:		published (*European Journal of Health Communication*).			

From the start of the Covid-19 pandemic, researchers tried to design a vaccine against Covid-19, which would stop the spread of the virus once enough people have been vaccinated (i.e., herd immunity is reached). Yet, despite huge efforts of promoting the vaccine, not all people were willing to get vaccinated, and often governmental goals of the desired percentage of vaccinated people, for example, in the US (Tin, 2021) or Europe (Kijewski, 2021), were not met. A critical barrier to receiving vaccinations is the belief in conspiracy theories (Hornsey et al., 2018b; Jolley & Douglas, 2014a).

Conspiracy theories evolve as a sense-making mechanism (Newheiser et al., 2011; van Harreveld et al., 2014) and thus often spread in situations of personal (Heiss et al., 2021) and societal (J.-W. van Prooijen & Douglas, 2017) uncertainty. Despite their harmful consequences (Imhoff et al., 2021), ways of counteracting them are few. One of the methods that have been successful in countering misinformation and conspiracy theories is inoculation (Lewandowsky & Cook, 2020; van der Linden et al., 2020). Here, participants are warned about conspiracy arguments to come and provided with anti-conspiracy arguments beforehand. However, one potential pitfall is that participants through inoculation might not only come in contact with *anti*-conspiracy arguments, but also with the conspiracy itself (Banas & Miller, 2013b).

Building on the idea of providing participants with resources *before* being confronted with a conspiracy theory, we here report a study in which participants receive explanations addressing uncertainties about the new vaccination method of using messenger RNA. To our knowledge, this is the first example of an intervention based on addressing uncertainties tied to a situation and topic (i.e., the new vaccination method) where conspiracy theories are likely to arise. With the study, we seek to advance knowledge on processes underlying the development of belief in conspiracy theories as well as their confrontation. We also want to raise awareness among journalists and policymakers for the possibility of countering conspiracy theories and their consequences by identifying topics of uncertainty *before* conspiracy theories gain popularity.

Fertile ground for conspiracy theories

Conspiracy theories are defined as the belief that powerful forces, such as Big Pharma, influential individuals, or institutions, are conspiring against the public with malign intent (Douglas et al., 2017). Believing in conspiracy theories is linked to certain personality variables (Abalakina-Paap et al., 1999; Imhoff & Bruder, 2014a; Lantian et al., 2017), but situational factors also make it more likely for conspiracy theories to evolve, which include individual or collective threat (Heiss

et al., 2021; Newheiser et al., 2011; J.-W. van Prooijen, 2020) and societal crises (J.-W. van Prooijen & Douglas, 2017). These situations give rise to feelings of uncertainty and ambivalence (van Harreveld et al., 2014). Conspiracy theories can be understood as a sense-making mechanism in reaction to the uncertainty associated with a specific situation or topic, offering closure (Hofstadter, 1964; J.-W. van Prooijen & Jostmann, 2013).

The Covid-19 pandemic constituted such a societal crisis. Adding to already existing uncertainties, a new type of vaccine was introduced – a vaccine using messenger RNA (mRNA). As this was a new method, it was likely to raise uncertainties and, thus, constituted a perfect breeding ground for conspiracy theories.

Countering conspiracy beliefs

Once an individual believes in a conspiracy theory, it becomes very hard to correct it (Ecker et al., 2011; Lewandowsky et al., 2012), but there are attempts to decrease their influence. Some interventions work by *addressing underlying needs and motives*. For example, the tendency to believe in conspiracy theories was lower when participants felt in control (Sullivan et al., 2010; J.-W. Van Prooijen & Acker, 2015, but see also van Elk & Lodder, 2018), or after a self-affirmation intervention (A. M. van Prooijen et al., 2013). It was also lower when motivation was high for analytical compared to intuitive thinking (Swami et al., 2014). Other interventions work by *addressing the content of the conspiracy theory*. It seems possible to decrease the belief in conspiracy theories by providing rational arguments (Banas & Miller, 2013b), though other studies found that this method does not lead to the intended behaviour change (Jolley & Douglas, 2014a; Stojanov, 2015) and that it fails when being confronted with conspiracy arguments right before (Jolley & Douglas, 2017).

Overall, countering conspiracy theories through arguments seems most successful when individuals encounter anti-conspiracy arguments *before* engaging with a conspiracy theory, as shown in *inoculation* interventions. In these interventions, participants are (a) warned that they will likely be confronted with a specific conspiracy theory and (b) provided with anti-conspiracy arguments debunking logical and empirical fallacies of the conspiracy theory (Lewandowsky & Cook, 2020; McGuire, 1961a). This method has successfully addressed misinformation (Maertens et al., 2020; Roozenbeek & van der Linden, 2019) and anti-vaccine conspiracy theories (Jolley & Douglas, 2017).

Current study

The current study builds on the idea of reaching out to individuals before they might entertain conspiracy beliefs. Unlike inoculation, the current approach does not provide counter-arguments but tailored explanations aiming to reduce the uncertainty associated with a specific topic or situation. This approach holds two advantages: first, it refutes potential conspiracy theory content without mentioning their arguments and, thus, bearing the risk of potentially reinforcing another conspiracy theory; second, it addresses needs of certainty regarding this specific topic, which otherwise could steer the individual towards the sense-making function of conspiracy theories.

The preregistered experiment was conducted in the Covid-19 context based on the observation that introducing the new vaccination method using mRNA evoked uncertainty amidst the already uncertain situation of a pandemic. This study aimed to address this uncertainty by providing tailored explanations, testing whether it would reduce agreement with a Covid-19 vaccination conspiracy theory and increase vaccination intentions. Crucially, the study was conducted before participants could develop a strong attitude regarding this new method, which was when mRNA vaccines first gained media attention (November/December 2020), and thus before conspiracy theories surrounding it were widely spread. We hypothesised that receiving a *relevant explanation* addressing uncertainties surrounding the vaccination reduces agreement with a Covid-19 vaccination conspiracy theory (H1) and increases vaccination intentions (H2) compared to only reading three short facts about the vaccination *(no explanation)*, or reading an *irrelevant explanation* before reading the facts.[2]

We also predicted that receiving relevant explanations would influence the agreement with a Covid-19 vaccination conspiracy theory and vaccination intentions, especially in people with a stronger propensity to believe in conspiracy theories (i.e., higher conspiracy mentality; Imhoff & Bruder, 2014), expecting an interaction between conspiracy mentality and explanation type (H3).

Method

Participants and Procedure

We aimed at a sample size of at least $N = 485$ (power of .80, $\alpha = .05$, expected effect size: $f^2 = .02$) after data exclusions. The sample was recruited through a German online survey panel

[2] Please note that the condition labels differ from the preregistration, in order to better capture what was manipulated.

between November 26th and December 2nd 2020, and was representative of the population regarding age, gender, and county of residence. Of the 504 participants who submitted complete data, we excluded 122 for failing an attention check, as preregistered. With the resulting sample of $N = 382$ (181 male, 200 female, 1 Other; $M_{Age} = 44.29$, range: 19-69 years) we had 69% power to detect the target effect of $f^2 = .02$, but 80% power to detect an effect of $f^2 = .026$. We had also preregistered to exclude participants based on an outlier analysis ($N = 2$) for analyses concerning both predictors, as well as participants with medical conditions ($N = 46$) and/or people who already had a Covid-19 infection ($N = 7$) for those analyses predicting vaccination intentions, expecting that the latter two groups would not want or be able to get vaccinated. However, they still reported considerably high intentions to get vaccinated ($M = 44.7$, $SD = 36.3$), invalidating our concerns. Thus, to not further reduce the originally representative sample, we did not follow up on these three exclusions, and doing so did not meaningfully change the results (see supplement, Table S1). As exclusions were much larger than expected, we additionally report analyses for all complete observations in the Supplement (Table S3).

Participants were randomly assigned to the *no explanation* ($N = 119$) *relevant explanation* ($N = 131$), or the *irrelevant explanation* ($N = 132$) condition. All participants were confronted with three short facts potentially raising uncertainty about the new vaccination method: (1) that it is based on the mRNA technique (which seems to have similarities with DNA and could raise the fear of genetic modifications), (2) that it is used for the first time in this form (which might convey insecurities in procedure and unknown side effects); and that (3) the approval of the vaccine is much faster than usual (which might raise anxieties that safety protocols are not met). In the *no explanation* condition, participants only read the three statements. In the *relevant explanation* condition, all facts were accompanied by three to five sentences giving background information addressing potential uncertainties. The text (1) explained how mRNA vaccinations work explicitly stating that it would not interfere with the genetic substance of the cell; (2) it mentioned this technique being researched for decades and that it is one of the safest techniques, but so far mainly was not used due to low effectiveness rather than unwanted side effects; and (3) that approval procedures are accelerated due to public importance, but that all safety protocols are met. In the *irrelevant explanation* condition, participants read an explanatory text about yeast dough before reading the three facts about the vaccination. The number of paragraphs and length of this text matched the text about the vaccination method. Participants had to spend at least 10 seconds per paragraph (at least 30s total) before they could proceed.

After receiving the respective information, all participants responded to our measures of Agreement with a Covid-19 Vaccination Conspiracy Theory, Vaccination Intention, and Conspiracy Mentality. As exploratory measures, we also included 4 items measuring Institutional Trust and Support of Governmental Regulations (Pummerer, Winter, et al., 2022). The study was preregistered under https://aspredicted.org/V6W_PTG, and all deviations from the preregistration are noted in the manuscript. All materials are included in the Supplement. Data and scripts are available under http://dx.doi.org/10.23668/psycharchives.5377 (data) and http://dx.doi.org/10.23668/psycharchives.5378 (syntax).

Measures

Agreement with a Covid-19 Vaccination Conspiracy Theory (VCT) was measured with six items (e.g., "Pharma companies working on the new vaccines against SARS-CoV-2 are hiding dangers about this new vaccine" from 1: *Totally Disagree* to 7: *Totally Agree*; α = .93; adapted from Shapiro et al., 2016). *Vaccination Intention* was assessed by asking "How likely is it that you will get vaccinated against the new corona-virus once a vaccination is available?" (from 0%: *I certainly will not get vaccinated against the Corona-Virus* to 100%: *I will definitely get vaccinated against the Corona-Virus*). *Conspiracy Mentality* (CM) was measured with 12 items (e.g., "Those at the top do whatever they want" from 1: *Disagree* to 7: *Agree*; α = .94; Imhoff & Bruder, 2014). Correlations between measures are reported in Table 4.1.

Table 4.1

Correlations between measures. All correlations are significant at p < .001.

	VCT	*CM*
Vaccination Intention	-.73	-.60
CM	.72	-

Results

Regression Models

To test the hypotheses, we conducted separate linear multiple regression analyses regressing VCT (H1) and vaccination intention (H2) on explanation type, CM (mean-centred), and their interaction (H3). Explanation type was coded using orthogonal contrasts (focal contrast: +2 *relevant*, -1 *irrelevant*, -1 *no*; residual contrast: 0, +1, -1) in order to allow for an independent interpretation of the regression coefficients (Aiken et al., 1991). Both contrasts, as well as their

interactions with CM, were included as predictors. We checked whether CM differed between explanation types, which was not the case, $F(2, 379) = 0.01$, $p = .991$.

As hypothesised, people in the *relevant explanation* condition were less likely to agree to items suggesting a Covid-19 vaccine conspiracy theory (H1) and showed higher vaccination intentions (H2) compared to the *irrelevant* and *no explanation* condition (see Table 4.2), as shown by a significant main effect of the focal contrast (see Table 4.3). Higher CM predicted stronger agreement with a Covid-19 vaccination conspiracy theory and lower vaccination intentions. However, contradicting H3, there was no interaction between CM and the focal contrast, indicating that the relevant explanation had an effect independent from participants' general propensity for conspiratorial thinking. The regression model predicted VCT with $F(5, 376) = 83.63$, $p < .001$; explained variance $R^2 = .53$; and vaccination intentions with $F(5,376) = 46.01$, $p < .001$; explained variance $R^2 = .38$. Results were similar when controlling for age and gender as well as when conducting the analysis with the full sample (see Supplement, Table S2 & S3).

Table 4.2

Means and standard deviations

	VCT (1-7)		Vaccination Intention (0-100)		CM (1-7)	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
relevant explanation	3.4	1.6	64.0	35.7	3.7	1.6
irrelevant explanation	3.6	1.5	56.4	37.8	3.7	1.4
no explanation	3.9	1.5	52.2	34.1	3.7	1.5
overall	3.6	1.5	57.7	36.2	3.7	1.5

Table 4.3

Multiple regressions for agreement with a Covid-19 vaccination conspiracy theory (VCT) and vaccination intention (N = 382)

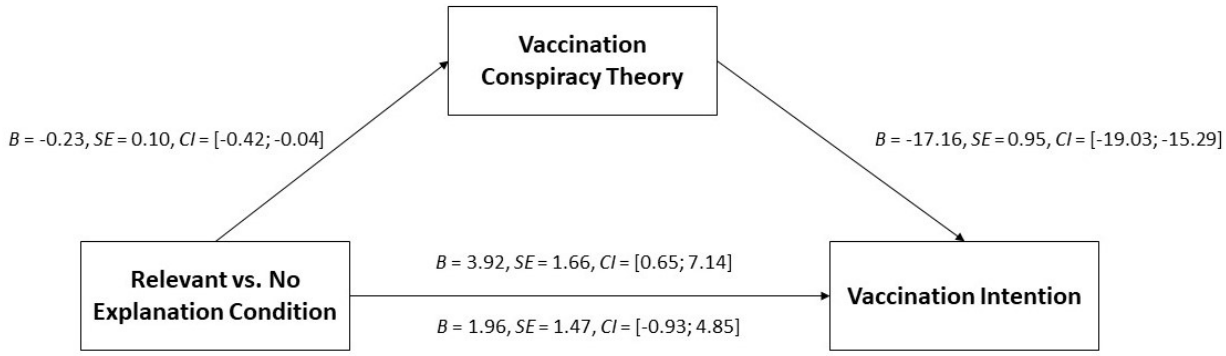
	VCT (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.63 (0.06)	-	66.28	< .001	[3.52; 3.74]	57.57 (1.47)	-	39.16	< .001	[54.68; 60.46]
CM (mean-centered)	0.75 (0.04)	0.71	20.01	< .001	[0.67; 0.82]	-14.76 (1.00)	-0.60	-14.76	< .001	[-16.73; -12.79]
Focal contrast	-0.11 (0.04)	-0.10	-2.94	.004	[-0.19; -0.04]	3.15 (1.03)	0.12	3.05	.002	[1.11; 5.17]
Residual contrast	-0.11 (0.07)	-0.06	-1.63	.105	[-0.24; 0.02]	2.17 (1.81)	0.05	1.19	.233	[-1.40; 5.73]
Interaction term (CM x focal contrast)	0.01 (0.03)	0.02	0.53	.599	[-0.04; 0.06]	0.24 (0.68)	0.02	0.36	.721	[-1.10; 1.59]
Interaction term (CM x residual contrast)	0.00 (0.05)	0.00	-0.01	.995	[-0.09; 0.09]	-0.30 (1.27)	-0.01	-0.24	.810	[-2.79; 2.18]

Mediation Analyses

As an exploratory analysis, we tested whether the agreement with a Covid-19 vaccination conspiracy theory explained the effect of the *relevant explanation* condition on vaccination intention, hereby only including the *relevant (+1) and no (-1) explanation* condition (following Jolley & Douglas, 2017). Indeed, agreement with a vaccination conspiracy theory mediated the effect of explanation type on vaccination intention (see Figure 4.1).

Figure 4.1

Mediation model of explanation type predicting vaccination intention through agreement with a Covid-19 vaccination conspiracy theory (N = 250, 10 000 bootstrap samples, CI reflect 95%-confidence intervals)



Discussion

In a preregistered experiment, we showed that an intervention addressing uncertainties regarding the new mRNA vaccine by providing relevant explanations decreased subsequent agreement with a Covid-19 vaccination conspiracy theory and, by doing so, increased vaccination intentions compared to reading only facts potentially inducing uncertainty or an irrelevant explanation and said facts. Our intervention was based on two different strategies: Addressing motives/needs underlying conspiracy theories (here, the need for certainty regarding the vaccination) and doing so before the individual engages with a conspiracy theory (one important aspect of inoculation). Extending existing methods of intervention, we show that combating vaccination conspiracy theories does not only work when people can be warned about the specific content of known conspiracy theories but also in situations where information counteracts uncertainty providing grounds for the belief in conspiracy theories (e.g., questions like: “Why was the development so fast?”, “Why a new method?”). Unlike inoculation, the explanations did not argue against any alleged cover-ups by the pharma industry and the government but provided information about the mechanism of the mRNA vaccine, how long this method has been used, and why the approval of the vaccine is faster than usual. Overall, the explanation addressed conspiracy theories by addressing existing uncertainty rather than existing conspiracy theories.

Providing a relevant explanation had a broader effect on the agreement with a Covid-19 vaccination conspiracy theory as well as vaccination intention – independent of the conspiracy mentality of the individuals. This is noteworthy because it broadens the potential target group of this intervention beyond those who have a general tendency to believe in conspiracy theories. Future research might look at whether a general reduction of feelings of uncertainty has similar effects on beliefs and intentions in the domain of vaccination.

One limitation of the study is that the observed effect size of the intervention is relatively small (i.e., they only explained 1.1% and 1.5% of the variance). Still, we are convinced that even small effects can make a valuable contribution in the current context (Funder & Ozer, 2019). Moreover, the intervention was very brief (< 2 minutes), and increasing the dosage might increase the effect size. The study was conducted using a sample representative of the (German) population regarding age, gender, and county of residence, which is important for drawing practical conclusions. However, due to the form of recruiting (online) and this being a scientific study, we might have still only reached a specific population. Additionally, vaccination intentions were only investigated after reading the explanations. Thus, despite random assignment to conditions, we cannot control if intentions already differed before.

We also included a condition (*irrelevant explanation*) in which participants read the facts after reading a neutral text about yeast dough. Agreement with a Covid-19 vaccination conspiracy theory and vaccination intentions in this condition was in-between the two other conditions. In fact, comparing the two conditions, which included explanations (i.e., *relevant* or *irrelevant*) to the *no explanation* condition also yielded a significant contrast, indicating that reading a text alone significantly decreased agreement with a vaccination conspiracy theory and increased vaccination intentions (see Supplement, Table S4), which was in line with an additional hypothesis that was also preregistered. One possible explanation is that reading a detailed explanatory text–no matter if about the vaccination or yeast dough–might have induced analytical thinking, thereby decreasing subsequent agreement with a vaccination conspiracy theory (Swami et al., 2014). It might also be that participants did not ponder on the uncertainty-inducing facts as much due to reading a text. As different interpretations are possible, we did not emphasize this finding here. It deserves further research, potentially uncovering additional ways of decreasing the impact of conspiracy theories. In regard to the analyses here, excluding the *irrelevant explanation* condition and only comparing the *relevant explanation* condition with the *no explanation* condition, if anything, increased effect sizes, while comparing the *irrelevant explanation* condition with the *no explanation* condition did

not yield a significant difference (see Supplement, Table S5 and S6). This difference makes it likely that the difference between presenting an (*irrelevant* or *relevant*) *explanation* and presenting no explanation reported above is driven by the relevant (and not the *irrelevant*) *explanation* condition.

Our study shows that providing explanations regarding (new) vaccines is important. In light of findings from inoculation theory (Lewandowsky & Cook, 2020; Maertens et al., 2020; Roozenbeek & van der Linden, 2019), this might especially (or even only) be successful when participants were not confronted with the conspiracy theory yet. Once individuals have a strong opinion about the topic, it is very hard to change (Jolley & Douglas, 2017). This fact might also explain why attempts of reaching vaccination sceptics by providing scientific explanations one year (or more) after vaccination conspiracy theories have spread do not seem to reach the target population to the aspired extent, although conclusions here are clearly beyond the scope of this study.

In line with the rule that scientific communication should only present "fact-checked" information, all information presented in the study was based on scientific grounds. However, our study also shows that presenting short facts in some cases is not enough or might even give rise to uncertainties around an issue (here, a new vaccine). Since we did not have a condition without those short facts, we can only speculate here, but as the facts were around critical issues, presenting (only) these might have even increased uncertainty regarding this new vaccination method. This bears implications for science communication as it emphasises the importance of providing (detailed) explanations in cases where true, but short facts leave room for speculation and, thus, uncertainty.

There are many studies indicating that people who believe in conspiracy theories are less likely to be reached with rational information (Pytlik et al., 2020; Swami et al., 2014). Our study suggests that this is not always the case. While it might be harder to reach individuals once a strong opinion is formed (Jolley & Douglas, 2017), it seems possible to do so at an early stage with explanations tailored towards addressing uncertainties in a situation where questions and scepticism abound. Thus, by identifying topics of uncertainty, potential future conspiracy theories might be anticipated and addressed before they gain popularity.

Chapter 5 – Social Intervention

Chapter 5 of the present dissertation contains a manuscript that is the result of a cooperation between Dr. Kevin Winter (first author), Lotte Pummerer (second author), Prof. Dr. Matthew Hornsey (third author) and Prof. Dr. Kai Sassenberg (fourth author). The manuscript entitled "Pro-vaccination subjective norms moderate the relationship between conspiracy mentality and vaccination intentions" is published in the British Journal of Health Psychology under the doi https://doi.org/ 10.1111/bjhp.12550. The contributions of the PhD candidate (and of the co-authors, respectively) to the manuscript can be found in the following table:

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Kevin Winter	1	20	60	70	60
Lotte Pummerer	2	20	20	10	10
Matthew Hornsey	3	20	0	0	10
Kai Sassenberg	4	40	20	20	20
Title of paper:		Pro-vaccination subjective norms moderate the relationship between conspiracy mentality and vaccination intentions			
Status in publication process:		published (*British Journal of Health Psychology*)			

Vaccinations help to contain the dissemination of serious diseases and pandemics – as has become obvious with the spread of COVID-19. Already before the current pandemic, the WHO (World Health Organization, 2019) termed vaccine hesitancy a global health threat. Anti-vaccination communities that facilitate vaccination hesitancy draw heavily upon conspiracy beliefs in framing their arguments (Kata, 2010; Smith & Graham, 2019) – and this was in particular true in the COVID-19 pandemic (Pullan & Dey, 2021). Exposure to anti-vaccine conspiracy theories has been demonstrated to have a negative impact on vaccination intentions (Chen et al., 2021; Jolley & Douglas, 2014a, 2017). This is backed by recent research that links conspiracy beliefs about COVID-19 to lower vaccination intentions (Freeman et al., 2020; Hornsey et al., 2021).

Empirical survey research on the psychological roots of anti-vaccination sentiments has corroborated the role of conspiracy beliefs. People who endorse conspiracy beliefs to a stronger extent have more negative attitudes toward vaccination (Hornsey et al., 2018, 2020; Lewandowsky et al., 2013). The size of these relationships is relatively large, which is troubling given that researchers have not yet identified a robust strategy for reducing conspiracist thinking. At the same time, this finding is largely unconnected to the existing literature on the predictors of vaccination attitudes and intentions. To close this gap, the current research aims at integrating research on conspiracy beliefs with one of the dominant models in this realm, the theory of planned behavior (TPB; Ajzen, 1991).

To be more precise, we sought to highlight the extent to which the relationship between conspiracy mentality and vaccination intentions is dependent on the perceptions of what close others think about vaccination (the subjective norm in terms of TPB). Drawing on extant theory and research, we examine two competing predictions: are those high in conspiracy mentality immune to subjective norms, or do subjective norms mitigate the role of conspiracy mentality in predicting vaccination intentions?

By contributing to understanding the role of conspiracy beliefs in the formation of low vaccination intentions, the current research provides information relevant to counteract the impact of these beliefs in the context of vaccination. It should be noted that in the current research we are targeting people who are hesitant to get vaccinated rather than people who are in principle against vaccination, as the former are by far more frequent and the latter might be too deeply entrenched in their attitudes to be successfully targeted by prevention approaches to be derived from the current research.

Conspiracy beliefs and vaccination: The role of subjective norms

Conspiracy theories are "explanations for important events that involve secret plots by powerful and malevolent groups" (Douglas et al., 2017, p. 538; Goertzel, 1994). Examples of *anti-vaccination* conspiracy theories include the argument that vaccination promoters profit from illnesses caused by vaccinations, or that vested interests are exaggerating the benefits of vaccinations while minimizing the dangers (Kata, 2010). Building on the observation that the belief in one conspiracy theory predicts believing in other unrelated conspiracy theories (Swami et al., 2010), researchers have postulated that some people have a "conspiracist worldview", "conspiracy mindset", or "conspiracy mentality"; that it is commonplace for groups of elites with vested interests and malevolent intentions to conduct elaborate hoaxes on the public (Imhoff & Bruder, 2014a). There is compelling evidence that this conspiracy mindset predicts more negative attitudes toward vaccination in general. Not only is this effect relatively large, it is also robust cross-nationally (Hornsey et al., 2018b; Lewandowsky, Gignac, et al., 2013). Thus, to counteract declining vaccination rates, it is necessary to find ways to reduce or attenuate the effects of people's general propensity to endorse conspiracy beliefs.

People are social animals, heavily influenced by their perceptions of the beliefs and attitudes of close others (e.g., friends and family). These perceptions are often referred to as a "subjective norm". The notion of subjective norms plays a central role in many theories of decision making, including TPB (Ajzen, 1991), social identity theory (J C Turner, 1991), and norm focus theory (Cialdini et al., 1991). Although subjective norms are referred to in multiple theories of behaviour, we frame the current paper within the language of TPB which argues that behavioural intentions are driven by three components: the subjective norm (i.e., whether one perceives important others to expect one to perform the behaviour), the attitude toward the behaviour (i.e., whether one thinks that the behaviour is favourable or unfavourable), and perceived behavioural control (whether one perceives performing the behaviour to be under one's volitional control, similar to self-efficacy). The role of subjective norms has been extensively studied with regard to health-related behaviours generally (e.g., Hamilton et al., 2020) as well as vaccination intentions specifically, often based on TPB. Overall, there is evidence that the perception that close others approve of vaccination is a powerful predictor of one's own vaccination intentions (Chen et al., 2021; Gerend & Shepherd, 2012; Yang, 2015). Indeed, a recent meta-analysis of 17 studies showed that subjective norms were a strong predictor of vaccination intentions ($\beta = .35$) even after

controlling for one's own attitudes toward vaccination and one's perceived control over the behaviour (Xiao & Wong, 2020).

One question that has not been examined in the literature – and the question that forms the focus of the current paper – is whether subjective norms can moderate the relationship between a conspiracy mentality and vaccination intentions. Analysis of extant theory and research suggests two competing possibilities.

First, it is possible that those high in conspiracy mentality will be particularly *un*affected by the attitudes of close others. Believing in conspiracy theories usually goes hand in hand with believing non-normative explanations for events and with challenging widely accepted knowledge (Sternisko et al., 2020). Thus, conspiracy theories seem to be especially appealing to people who want to stand out from the masses. Accordingly, a more pronounced conspiracy mentality relates to higher need for uniqueness (Imhoff & Lamberty, 2017; Lantian et al., 2017) as well as to non-normative behaviour both in terms of political engagement (Imhoff et al., 2021) and health-related issues. For instance, those high in conspiracy mentality are less likely to adopt governmental safety guidelines to prevent the spread of COVID-19 such as physical distancing (Hornsey et al., 2021; Imhoff & Lamberty, 2020a; Kowalski et al., 2020; Marinthe et al., 2020; Pummerer, Böhm, et al., 2022). Thus, there is good evidence to assume that people with a stronger conspiracy mentality are less affected by norms surrounding them. Based on this notion, we predict (and preregistered) that the positive relationship between the subjective norm to get vaccinated and vaccination intentions should be weaker the stronger the conspiracy mentality (Hypothesis A).

Although Hypothesis A provides a reasonable fit to existing theory, it is possible to make the case for the opposite effect: that subjective norms will moderate the negative relationship between conspiracy mentality and vaccination intentions. The subjective norm relates to opinions of close others such as friends and family and does not necessarily represent widely accepted knowledge. While believing in conspiracy theories is related to rejection of mainstream explanations and majorities (Imhoff et al., 2018), it does not rule out other sources of social validation such as one's close social environment (i.e., friends and family). Thus, contrary to Hypothesis A, it is possible that a vaccine-supportive subjective norm will attenuate or eliminate the relationship between conspiracy mentality and vaccination intentions (Hypothesis B).

Overview of the current research

We conducted five studies to test whether the positive relationship between the subjective norm to get vaccinated and vaccination intention is weaker the stronger people's conspiracy mentality (Hypothesis A) or whether subjective norms moderate the negative relationship between conspiracy mentality and vaccination intentions (Hypothesis B). In line with TPB, our analysis of subjective norms is conducted after controlling for attitudes and perceived behavioural control.

Our data also allow us to test a third independent prediction, namely that subjective norms mediate the relationship of conspiracy mentality and vaccination intentions. This seems plausible given that those strongly endorsing conspiracy beliefs might be surrounded by others sharing their views. As we are mainly interested in the question whether subjective norms could be the starting point for a potential intervention against the negative correlation between conspiracy mentality and vaccination intentions, the mediation prediction was neither our initial hypothesis nor is it the focus of the current contribution. Still, we provide the results of the mediation analyses in the Supplement.

We decided to present a merged analysis of the data for the following reasons: (1) all studies used the same design and measures, (2) combining all studies increases our statistical power to detect the true effect of interest with smaller confidence intervals, and (3) we wanted to be transparent as well as efficient in presenting all studies we conducted to test this research question (note that we have conducted no additional studies beyond the ones reported here testing the present research question). We preferred this approach over conducting one large study, because we wanted to achieve more heterogeneity with regard to the occasions and vaccinations. Studies 3 to 5 were preregistered (Study 3: https://aspredicted.org/m2y7v.pdf, Study 4: https://aspredicted.org/ht937.pdf, Study 5: https://aspredicted.org/dh6np.pdf). For the sake of consistency across studies, we deviated from the preregistered analysis plans in some minor respects, which will be explained in the Method and Results sections.

Method

Design and participants

All five studies were cross-sectional with a correlational design. Studies 1 and 2 were conducted in the lab, while Studies 3 to 5 were online studies. In Study 1, 195 German undergraduates were recruited via a local participant pool. In Study 2, 200 participants from the same pool participated. Both studies were part of larger study packages lasting approximately one

hour for which participants received 8 Euros as reward. A total of 405 German undergraduates took part in Study 3 (N = 355 via the university's mailing list, N = 50 via Prolific Academic). Participants recruited via the mailing list got the chance to win one out of 35 vouchers each worth 10 Euros, while participants on Prolific Academic received £1.10 each. In Studies 2 and 3, unrelated experimental manipulations were applied before collecting the data for the current research question, but in both cases the manipulations did not moderate the results of the analyses reported below. Study 4 was conducted via Prolific Academic among participants from the general German population as part of a longer questionnaire containing constructs unrelated to the current research question. Two hundred and twenty-two German adults completed the questionnaire (N = 37 undergraduates, N = 128 employed, N = 33 both, and N = 24 neither). Participation was remunerated with £1.40. For Study 5, we collected data from 446 German undergraduates (via the university's mailing list) who got the chance to win one out of 40 vouchers each worth 10 Euros.

Applying our preregistered exclusion criteria reduced the initial sample of N = 1,468 by 188 participants (for participant flow see Figure 5.1). Thus, the sample used in the merged analysis consisted of N = 1,280 participants (851 female, 414 male, 15 other, age: M = 24.71, SD = 6.15, range = 18-74). This sample size would allow us to find a small effect (f^2 = 0.01) of a single regression coefficient in a linear multiple regression with five predictors and a power of .80 (α = .05, two-tailed). Demographic information about the subsamples is presented in Table 5.1.

Figure 5.1

Participant flowchart

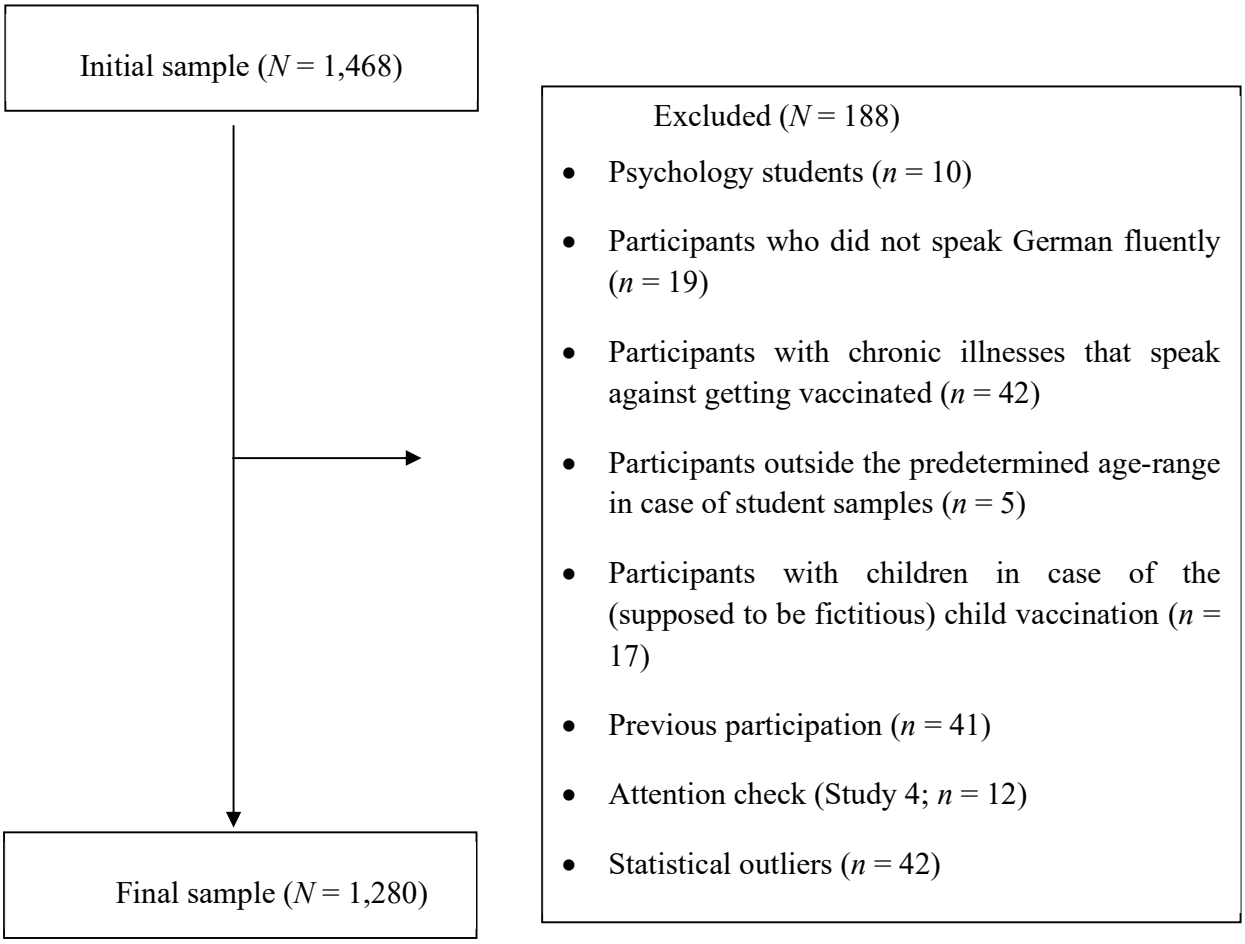


Table 5.1

Number of participants and demographic information across the five studies.

	N	Gender	Age *M* (*SD*)	Age range
Study 1	168	123 female, 43 male, 2 other	22.47 (3.06)	18-35
Study 2	145	104 female, 38 male, 3 other	23.92 (3.30)	19-35
Study 3	378	256 female, 116 male, 6 other	23.46 (3.16)	18-34
Study 4	197	94 female, 103 male	32.33 (10.70)	18-74
Study 5	392	274 female, 114 male, 4 other	23.35 (3.72)	18-35

Procedure and measures

The procedure and measures of all five studies were similar (a complete list of measures is provided in the Supplement). In all studies, we assessed participants' general *conspiracy mentality* with 12 items (Imhoff & Bruder, 2014a). The items (e.g., "There are many very important things happening in the world about which the public is not informed", "A few powerful groups of people determine the destiny of millions", "Secret organisations can manipulate people psychologically so that they do not notice how their life is being controlled by others") were assessed on a 7-point scale (1 = *does not apply* to 7 = *does apply*; $\alpha = .92$).

Across the five studies we tested our predictions regarding a row of different vaccinations and diseases: vaccination against an unspecified disease in a foreign country one wants to travel to (from now on called "travel vaccination"; Studies 1, 2, and 5), vaccination of one's own (imagined) child against hepatitis B (from now on called "child vaccination"; Studies 1, 2, and 5), vaccination against COVID-19 once a vaccine becomes available (Studies 3 and 5), seasonal vaccination against influenza[3] (Study 4), and vaccination against the tick-borne encephalitis virus (TBEV; Study 5). The area in which study participants were living is an official risk area of an infection with TBEV transmitted through tick bites. In Studies 1 and 2, the travel vaccination was always presented before the child vaccination. In Study 5, we included order of presentation as an additional between-subjects factor in our design. However, as this factor did not moderate the predicted effect, we removed it from the analysis (which is in accordance with our preregistration).

Subjective norm, behavioural control, attitudes toward the respective vaccination, and vaccination intentions were all measured with items following the recommendations of the TPB (Ajzen, 1991; Schifter & Ajzen, 1985). For each vaccination, we measured the *subjective norm* ("People I care about probably think I should get vaccinated against [name of the disease]" from 1 = *do not agree at all* to 7 = *fully agree*) and behavioural control. The *behavioural control* items slightly differed across studies, because the items we originally employed did not form an internally consistent scale. One of these items ("Whether I get vaccinated or not depends solely on me" from 1 = *do not agree at all* to 7 = *fully agree*) was used in all studies. Thus, we included only this item in our analyses for the sake of comparability (which is a deviation from the preregistration of Study 3).

[3] Study 4 was conducted at the beginning of the current seasonal influenza vaccination cycle in October 2020.

In all studies, except Study 3, we measured the *attitudes toward the specific vaccinations* with three items per vaccination ("For me the vaccination against this disease would be…", e.g., from 1 = *undesirable* to 7 = *desirable*; α = .90-.94). We decided not to assess the specific attitude in Study 3, because for the fictitious vaccinations in the preceding studies attitude and intention were barely distinguishable concepts due to their high correlation ($r > .83$ for the child vaccination). In all studies, we measured the *general attitude toward vaccinations* with five items (taken from Lewandowsky et al., 2013; e.g., "I believe vaccines are a safe and reliable way to prevent the spread of preventable diseases" from 1 = *do not agree at all* to 7 = *fully agree*; α = .77). For the sake of consistency across studies, we used the general attitude for our main analyses (although deviating from the preregistrations of Study 4 and 5, where we preregistered to use the specific attitude).

The *intention to get vaccinated* was captured with one item per vaccination (using a slider from 0% = "I would definitely not get vaccinated" to 100% = "I would definitely get vaccinated"). In the case of influenza and TBEV, we first asked participants whether they already had been vaccinated against the particular disease and counted "yes" responses as an intention of 100%.

Analytic plan

To test the hypothesis that conspiracy mentality weakens the relationship between subjective norm and vaccination intentions, we conducted a multiple regression analysis. In case of multiple vaccinations per study, the results of the merged analysis refer to averaged scores across the single vaccinations. These results were consistent with two other analysis procedures: randomly choosing one of the multiple vaccinations per participant and analysing only the vaccination that was presented first. The same is true for a linear mixed model considering participants, study, and vaccination type as random effects. We regressed the intention to get vaccinated on mean-centred conspiracy mentality, mean-centred subjective norm, and their interaction term. We also included the general attitude toward vaccinations and perceived behavioural control as covariates in line with TPB. In the reported main analysis, we entered the predictors in separate steps. That is, we entered (1) the covariates, (2) the main effects of conspiracy mentality and subjective norm, and (3) the interaction of conspiracy mentality and subjective norm.

Results

Table 5.2 contains the correlations between conspiracy mentality and all relevant other measures as well as between subjective norm and vaccination intention for the single vaccinations. Table 5.3 displays the means and standard deviations of all central constructs across all studies and vaccinations.

Table 5.2
Correlations between conspiracy mentality and other measures as well as between subjective norm and vaccination intention for all vaccinations in all single studies.

	Vaccination	Conspiracy mentality – Subjective norm	Conspiracy mentality – Vaccination intention	Subjective norm – Vaccination intention	Conspiracy mentality – General attitude toward vaccinations	Conspiracy mentality – Attitude toward the specific vaccination
Study 1	Travel	-.11	-.27***	.49***	-.41***	-.28***
	Child	-.15	-.28***	.62***		-.35***
Study 2	Travel	-.19*	-.17*	.55***	-.30***	-.30***
	Child	-.22**	-.19*	.68***		-.23**
Study 3	COVID-19	-.18**	-.28***	.71***	-.44***	-
Study 4	Influenza	.01	-.05	.72***	-.38***	-.14*
Study 5	Travel	-.12*	-.20***	.48***	-.40***	-.25***
	Child	-.10*	-.20***	.66***		-.25***
	COVID-19	-.22***	-.32***	.76***		-.34***
	TBEV	-.09	-.11*	.63***		-.21***
Overall	-	-.10**	-.20***	.75***	-.37***	-

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 5.3
Means (Standard Deviations) of the central measures for all vaccinations in all studies.

	Vaccination	Conspiracy mentality (1 – 7)	General attitude toward vaccinations (1 – 7)	Subjective norm (1 – 7)	Attitude toward the specific vaccination (1 – 7)	Behavioural control (1 – 7)	Vaccination intention (0 – 100)
Study 1	Travel	4.04 (1.28)	5.83 (1.14)	6.60 (0.88)	6.55 (0.88)	5.72 (1.56)	90.85 (15.10)
	Child			6.19 (1.10)	5.99 (1.31)	4.99 (1.86)	81.89 (23.72)
Study 2	Travel	3.79 (1.15)	6.07 (0.88)	6.57 (0.83)	6.23 (1.13)	5.30 (1.99)	90.84 (15.66)
	Child			6.20 (1.15)	5.99 (1.23)	4.37 (2.03)	83.75 (21.69)
Study 3	COVID-19	3.21 (1.08)	6.08 (0.95)	5.79 (1.48)	-	5.17 (1.86)	80.53 (23.66)
Study 4	Influenza	3.60 (1.17)	6.13 (0.86)	4.34 (1.85)	5.61 (1.43)	5.68 (1.48)	57.17 (35.95)
Study 5	Travel	2.93 (1.09)	5.93 (0.99)	6.14 (1.19)	6.41 (0.91)	5.39 (1.67)	88.06 (16.19)
	Child			6.15 (1.15)	6.44 (0.92)	4.83 (1.84)	90.24 (16.18)
	COVID-19			5.38 (1.63)	5.79 (1.45)	5.10 (1.91)	77.20 (25.98)
	TBEV			5.49 (1.52)	6.29 (1.12)	5.76 (1.55)	83.96 (26.27)
Overall	-	3.36 (1.20)	6.01 (0.97)	5.71 (1.43)	-	5.27 (1.61)	79.80 (24.53)

Testing the moderation hypothesis

Entering the covariates into the multiple regression analysis in the first step, we found that higher vaccination intentions were predicted by both a more positive attitude towards vaccination in general, B = 10.35, SE = 0.64, 95% CI [9.09, 11.61], β = 0.41, t(1277) = 16.13, p < .001, and lower perceived behavioural control, B = -1.12, SE = 0.39, 95% CI [-1.88, -0.36], β = -0.07, t(1277) = -2.88, p = .004. Adding the main effects of our key variables to the multiple regression in a second step, we found higher vaccination intentions to be predicted by lower conspiracy mentality, B = -1.33, SE = 0.39, 95% CI [-2.10, -0.56], β = -0.07, t(1275) = -3.40, p = .001, and higher subjective norm, B = 11.74, SE = 0.32, 95% CI [11.12, 12.37], β = 0.68, t(1275) = 36.75, p < .001. To test our hypotheses, we entered the interaction of conspiracy mentality and subjective norms to the multiple regression analysis in a third steps and found a significant interaction of these two variables on vaccination intention, B = 0.69, SE = 0.25, 95% CI [0.20, 1.19], β = 0.05, t(1274) = 2.74, p = .006 (Table 5.4). The direction was in line with Hypothesis B that predicted an attenuation of the relationship between conspiracy mentality and vaccination intentions, when subjective norm was high (and not with our preregistered Hypothesis A that predicted high conspiracy mentality to reduce the relationship between subjective norm and vaccination intentions). As can be seen in Figure 5.2, higher conspiracy mentality was only related to lower vaccination intentions when the perceived subjective norm to vaccinate was low (i.e., -1 *SD*), B = -2.39, SE = 0.55, 95% CI [-3.46, -1.31], t(1274) = -4.35, p < .001. When subjective norm was high (i.e., +1 *SD*), there was no significant relationship between conspiracy mentality and vaccination intentions, B = -0.41, SE = 0.51, 95% CI [-1.42, 0.64], t(1274) = -0.80, p = .426.

The main analysis was carried out in a way that fits the TPB framework; that is, entering subjective norms, attitudes, and perceived behavioural control simultaneously in the regressions. It should be noted, though, the interaction effect of conspiracy mentality and subjective norm was even stronger when not controlling for attitudes and behavioural control, B = 0.91, SE = 0.26, 95% CI [0.41, 1.42], β = 0.07, t(1276) = 3.53, p < .001.

The results for the single vaccinations largely resemble this pattern (Table 5.5). For the travel vaccination, the child vaccination, the COVID-19 vaccination, as well as the TBEV vaccination, an interaction of conspiracy mentality and subjective norm emerged. In all these cases, conspiracy mentality predicted vaccination intention to a lesser degree, when subjective norms were perceived as high as compared to low.

However, for the influenza vaccination the pattern looked quite differently. There was no interaction effect of conspiracy mentality and subjective norm on vaccination intention. In addition, this was the only vaccination where no relationship between conspiracy mentality and vaccination intention occurred, B = -0.76, SE = 1.67, 95% CI [-4.05, 2.52], β = -0.03, $t(191) = -0.46$, $p = .648$. Thus, there was no relationship in the first place that could have been moderated by high subjective norms.

Table 5.4

Unstandardized coefficients (B), standard errors (SE) and standardized coefficients (β) from hierarchical multiple regression analyses for the merged analysis.

Variable	Equation 1		Equation 2		Equation 3	
	B (SE)	β	*B (SE)*	β	*B (SE)*	β
Step 1						
General attitude toward vaccinations	10.35 (0.64)***	0.41	4.52 (0.50)***	0.18	4.38 (0.50)***	0.17
Behavioural control	-1.12 (0.39)**	-0.07	-0.56 (0.27)*	-0.04	-0.55 (0.27)*	-0.04
Adj. R^2	.17					
F(2, 1277)	135.79***					
Step 2						
Subjective norm			11.74 (0.32)***	0.68	11.69 (0.32)***	0.68
Conspiracy mentality			-1.33 (0.39)**	-0.07	-1.40 (0.39)**	-0.07
R^2_{Change}			.43			
F(2, 1275)			678.71***			
Step 3						
Subjective norm x Conspiracy mentality					0.69 (0.25)**	0.05
R^2_{Change}					.002	
F(1, 1274)					7.52**	

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

Figure 5.2

Vaccination intention as a function of subjective norm and conspiracy mentality (merged analysis: N = 1,280). Shaded areas represent 95% confidence intervals.

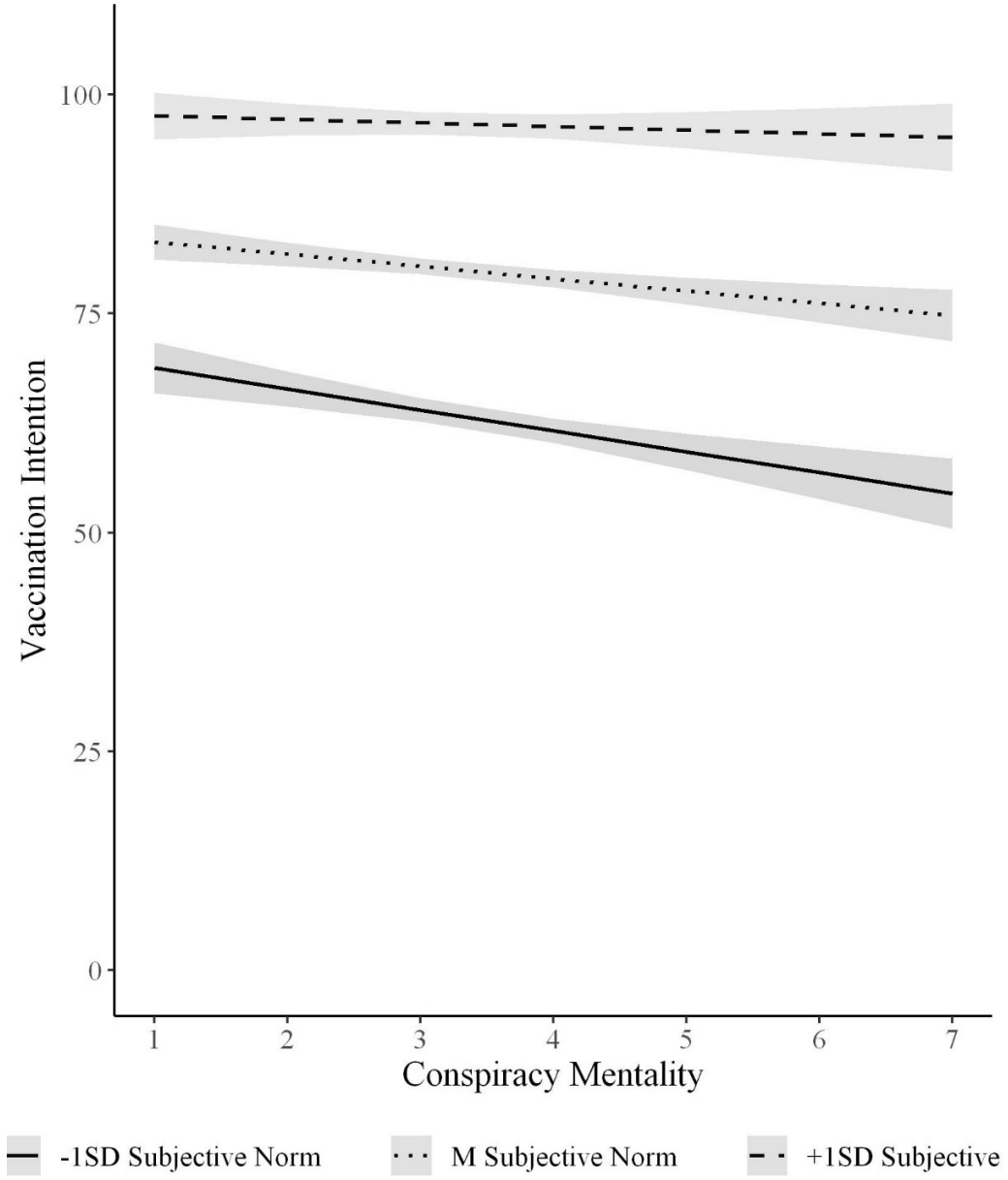


Table 5.5

Overview of interaction effects of conspiracy mentality and subjective norm on vaccination intention from the multiple regressions; presented for the single vaccinations and for the merged analysis.

	B (SE)	95% CI	β	*t*	df	*p*
Travel	0.75 (0.35)	[0.06, 1.45]	0.07	2.14	699	.033
Child	1.26 (0.33)	[0.61, 1.92]	0.10	3.78	699	<.001
COVID-19	0.78 (0.31)	[0.18, 1.38]	0.06	2.55	764	.011
Influenza	0.60 (0.81)	[-1.01, 2.20]	0.04	0.73	191	.465
TBEV	1.35 (0.59)	[0.19, 2.52]	0.09	2.29	386	.023
Merged analysis	0.69 (0.25)	[0.20, 1.19]	0.05	2.74	1274	.006

General Discussion

The current research set out to illuminate whether subjective norms moderate the negative relationship between a conspiracy mentality and vaccination intentions. Consistent with previous research, both subjective norms and conspiracy mentality were associated with vaccination intentions. More relevant to the current paper, however, an interaction between conspiracy mentality and subjective norm on vaccination intentions emerged across a number of different vaccination contexts. Speaking against Hypothesis A, conspiracy mentality did not weaken the relationship between subjective norm and vaccination intentions. To the contrary, conspiracy mentality *only* predicted lower vaccination intentions when the subjective norm to vaccinate was low (consistent with Hypothesis B). When the subjective norm was high, conspiracy mentality did not play a role with regard to vaccination intentions. For instance, when close others approved of the COVID-19 vaccination, people with high conspiracy mentality were as willing to get vaccinated against COVID-19 as those with low conspiracy mentality. This finding suggests an important boundary condition to the presumed negative impact of conspiracy mentality on vaccination intentions: when close others approve of vaccination, this appears to trump conspiracist thinking as a factor in shaping one's intentions to vaccinate. In sum, most of the existing literature focuses on the conditions under which belief in conspiracy theories limits the impact of social influences (e.g., Imhoff et al., 2018). The current research is the first to identify a factor (i.e., high

subjective norm) that moderates the relationship between conspiracy beliefs and vaccination intentions.

In addition to this primary finding, we replicated and extended previous work by finding a consistent negative relationship between conspiracy mentality and vaccination intentions. This goes beyond previous work that correlated the belief in vaccination-*specific* conspiracy theories with lower vaccination intentions (Jolley & Douglas, 2014a, 2017) or correlated conspiracy mentality with more negative vaccination *attitudes* (Hornsey et al., 2018b; Lewandowsky, Gignac, et al., 2013).

A closer inspection of the single vaccinations revealed that the pattern of results did not only occur for the merged dataset, but also for almost all of the single vaccinations. For the travel vaccination, the child vaccination, the COVID-19 vaccination, and the TBEV vaccination we consistently found support for Hypothesis B, which speaks for the generalizability of our findings across entirely different vaccinations. While the results are consistent across the different vaccinations, it should be noted that the influenza vaccination constitutes an exception in some regards. First, it is the only vaccination for which the interaction effect was not significant. Second, vaccination intentions were not related to conspiracy mentality– another pattern that only occurred for this particular vaccination and that could also explain the absence of an interaction effect. As the influenza vaccination was only included in Study 4, sample characteristics or other unknown influences on this specific study might explain the deviating results. At the same time, they could also be rooted in the vaccination itself. Given that the influenza vaccination takes place every year, participants' habitual behaviour (i.e., whether they have regularly been vaccinated against influenza in the past) might be more predictive of vaccination intentions than the generalised attitudes we assessed. In addition, influenza vaccination is primarily recommended to people older than 60 years who constituted a minority of our sample. Last, it should be noted that there were supply shortages regarding the influenza vaccine in Germany at the time of conducting the study.

Limitations and future directions

Although the current research revealed interesting new insights, it comes with limitations. First, the setup of all studies was cross-sectional. Thus, the current data do not allow to draw conclusions about the directionality of relationships. Longitudinal studies are needed to detect any causal effects involved in the interplay of conspiracy mentality and subjective norm when it comes to vaccination intentions. Experimental approaches might be less suitable here, given that both the general conspiracy mentality and expectations of friends and family are hard to manipulate.

One could also criticise the fact that the current studies do not cover actual vaccination behaviour, but only self-report measures of vaccination intentions. However, for influenza and TBEV, we did ask participants whether they had already been vaccinated as an indicator of past behaviour. In addition, given that behavioural intention strongly influences actual behaviour (Ajzen, 1991), the current findings might still be applicable to actual vaccination decisions – an assumption that needs to be proven in field studies. Moreover, both vaccination intentions and subjective norm perceptions were assessed with single item measures as is often done in research on TPB (Ajzen, 1991). Although we acknowledge that multi-item measures are to be preferred, we are reassured by the strong face validity of the items that were used. It should be noted that we focused on pro-vaccination subjective norms in line with the TPB approach, which considers positive subjective norms as predictors of behavioural intentions. The influence of vaccination-sceptical subjective norms, which might be prevalent among those high in conspiracy mentality, remains to be tested in future research.

Practical implications

The current findings have some interesting implications for how to deal with vaccination hesitancy that has its roots in conspiracy beliefs (as appears to be the case for the COVID-19 vaccines, for example). While a lot of effort in both research and practice is put into debunking conspiracy theories or persuading those who believe in them (e.g., Banas & Miller, 2013; Cook et al., 2017; Jolley & Douglas, 2017), our results suggest a different (probably complementary) strategy. Considering the attitudes of friends and families seems to be highly important: When these close others convey the impression that getting vaccinated is what they think a person should do (i.e., the norm), conspiracy mentality no longer predicts vaccination intentions. This seems particularly promising as attempts to influence conspiracy believers are often unsuccessful, especially when the communication comes from authorities (Imhoff et al., 2018; Lamberty & Imhoff, 2018). In the current case, personalised health communication might be more successful (Sassenrath et al., 2017, 2018). When talking, for instance, about the COVID-19 vaccination, it could be a first step to reveal one's own positive vaccination intentions to close others who endorse conspiracy beliefs. Rather than trying to reduce conspiracy beliefs, signalling a positive subjective norm might be a means of circumventing the negative impact of a conspiracist tendency on vaccination intentions.

As outlined in the introduction and as is reflected in the samples under investigation, our research mostly focused on people who are hesitant to get vaccinated but not necessarily have

deeply entrenched worldviews that lead them to reject any vaccination per se. Thus, subjective norms might be helpful to reach those on the edge to conspiracist beliefs but might be less effective among those who are deeply enmeshed in fringe conspiracy communities. In terms of practical implications this is important to acknowledge as potential interventions should be tailored to the audience of interest.

Conclusions

The current research provides first evidence that conspiracy mentality and subjective norm conjointly predict vaccination intentions. However, it is not conspiracy mentality that reduces the impact of subjective norm as was initially expected. Rather, it is the subjective norm that determines whether or not the conspiracy mentality negatively predicts vaccination intentions. Conspiracy mentality negatively predicts vaccination intentions only when the norms set by close others is not in favour of vaccination. Thus, keeping social bonds instead of rejecting people who are susceptible to conspiracy beliefs should be encouraged. This way, it seems possible to contain the negative impact of conspiracy beliefs, and possibly also the spread of serious diseases.

Chapter 6 – Cognitive/Motivational Intervention

Chapter 6 of the present dissertation contains a manuscript that is the result of a cooperation between Lotte Pummerer (first author), Dr. Lara Ditrich (second author), and Prof. Dr. Kai Sassenberg (third author). The manuscript included in the dissertation entitled "Think about it! Reasoning reduces the negative relation between conspiracy belief and norm adherence" represents an earlier version of a manuscript later published under the title "Think About It! Deliberation Reduces the Negative Relation Between Conspiracy Belief and Adherence to Prosocial Norms" at Social Psychological and Personality Science under the doi https://doi.org/10.1177/19485506221144150. The contributions of the PhD candidate (and of the co-authors, respectively) to the earlier version of the manuscript can be found in the following table:

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Lotte Pummerer	1	60 %	80 %	70 %	60 %
Lara Ditrich	2	0 %	10 %	0 %	10 %
Kai Sassenberg	3	40 %	10 %	30 %	30 %
Title of paper:		Think about it! Reasoning reduces the negative relation between conspiracy belief and norm adherence			
Status in publication process:		Submitted (*Social Psychological and Personality Science*)			

Conspiracy theories state that a group of powerful people secretly cooperate to pursue malevolent goals (Douglas et al., 2017; Goertzel, 1994). Examples of conspiracy theories are the belief that world leaders in fact are reptiloids that took on human form and are now controlling the earth (Parramore, 2021) or that 5G caused the spread of Sars-CoV-2 (Freeman et al., 2022). These narratives go against mainstream explanations for events (Brotherton, 2013) and can be accompanied by actions rejected by the majority, such as the Capitol siege on Jan 6, 2021 (Parramore, 2021) or the burning of telegraph poles (Jolley & Paterson, 2020).

Beyond this anecdotical evidence, there is research showing that believing in conspiracy theories leads to behaviours that go against the accepted norm. Believing in conspiracy theories, for instance, predicted reduced adherence to COVID-19 guidelines (Bierwiaczonek et al., 2020; Pummerer et al., 2022; for an overview, see van Mulukom et al., 2022) and non-normative political demands (Lamberty & Leiser, 2019) longitudinally. Being confronted with conspiracy theories and a conspiratorial worldview also increased intentions to engage in everyday crimes (Jolley et al., 2019) and acceptance of non-normative political engagement like violent attacks or illegal demonstrations (Imhoff et al., 2021). Overall, the more people believe in conspiracy theories, the less they adhere to social norms. This is problematics because a shared understanding and acceptance of social norms is essential for the functioning of a community, raising the question of whether and how norm adherence among people high in conspiracy belief can be facilitated.

Despite the negative impact of conspiracy belief on society, research on how to mitigate these effects so far is scarce. To address this gap, we conducted four studies investigating whether prompting *reasoning about the functions* of a social norm (i.e., thinking about the reasons why a behaviour is normative) reduces the negative relation between conspiracy belief and norm adherence and thereby can increase norm adherence especially among those with stronger conspiracy belief.

Conspiracy theories and anti-normative behaviour

Usually, people follow social norms, defined as typical attitudes and behaviours of a group (Prentice, 2012). Norms guide people's behaviour without the explicit force of laws (Cialdini & Trost, 1998), as individuals turn to cues to inform their behaviour, such as the cue of what the majority thinks or how the majority acts (Erb et al., 1998; Nolan et al., 2008). However, for people believing in conspiracy theories, this process of orienting oneself along mainstream thoughts and behaviours is not as pronounced for several reasons. First, research has repeatedly demonstrated

that a stronger belief in conspiracy theories is connected to a higher need for uniqueness (Imhoff & Lamberty, 2017; Lantian et al., 2017), which undermines influence by the majority (Imhoff & Erb, 2009). Additionally, conspiracy beliefs correlate with distrust against other people (Brotherton et al., 2013; Goertzel, 1994; Green & Douglas, 2018). This distrust is especially pronounced regarding the powerful, such as the government or politicians (Imhoff et al., 2018; Imhoff & Bruder, 2014a; Imhoff & Lamberty, 2018). In persuasion literature, trustworthiness (i.e., the attitudinal component of trust) is a critical predictor of social influence (Bochner & Insko, 1966; Milliman & Fugate, 1988). Thus, if people high in conspiracy belief have lower trust in other people and specifically the government, they should be less influenced by them and thus, care less about their behaviour and norms. Overall, while people not believing in conspiracy theories intuitively follow norms, conspiracy belief seems to be connected to a tendency to go against the social norm. This deviating tendency by those high in conspiracy beliefs might be especially pronounced in regard to norms enforced by the government, such as norms connected to the law.

Social norms are functional

Social norms fulfil important functions for society as well as the individual (Cialdini & Trost, 1998). Some norms, such as washing the hands after visiting the bathroom, aim for individual and collective survival through disease prevention. Other norms help to establish security for members of a group (Ehrlich & Levin, 2005), for example, norms guiding emergency responses or treatment of the elderly. Norms such as laws regarding traffic or communication rules (e.g., not interrupting others) can also facilitate the coordination of group efforts (Cialdini & Trost, 1998). Taken together, social norms usually are not random but serve a goal at the societal level.

However, people might not always think about the reasons for a behaviour, and identifying the societal goal behind a norm might require *systematic processing,* which is a thinking style based on reasoning and elaborate thought processes, compared to a faster, but less effortful *intuitive processing* (Kahneman, 2011; Strack & Deutsch, 2004). Activating systematic processing has been shown to increase normative behaviours in previous research beyond the context of conspiracy belief. Here, reflecting on social norms such as kindness increased the willingness to donate (Exline et al., 2012), and making a commitment – which typically is done after making a conscious choice – increased health behaviours such as the use of safety belts (Geller et al., 1989) and decreased drug use (Hall et al., 1990). Thus, when individuals do not follow a norm intuitively, reasoning and

conscious decision making can increase norm adherence when the functions of the normative behaviour are desirable to the individual (Zhang & Chiu, 2012).

In sum, these findings suggest that prompting reasoning about normative behaviour leads to higher norm adherence in the general population. We argue that this effect might be even more pronounced among those high in conspiracy belief for two reasons. First, based on the arguments summarized above, people high in conspiracy belief are less likely to *intuitively* adhere to norms than those low in conspiracy belief, leaving more room for an effect of reasoning among those high in conspiracy belief. Second, people high in conspiracy belief are generally more likely to be guided by intuitive rather than analytical thinking (Imhoff & Bruder, 2014a; Swami et al., 2014; J.-W. van Prooijen et al., 2018) and to show impulsive behaviours (compared to those low in conspiracy beliefs; Bowes et al., 2021; Swami et al., 2016). Therefore, there is also more room for prompting reasoning to change the thinking style among those high (compared to low) in conspiracy belief. Overall, prompting reasoning why a behaviour is normative addresses tendencies specifically of individuals high in conspiracy belief and, thus, should especially increase norm adherence among people high in conspiracy belief.

Reasoning as an intervention addressing the effects of conspiracy belief

There have been previous attempts to alter cognitive processing with the goal of intervening against conspiracy beliefs. This research aimed at changing the belief in conspiracy theories themselves rather than their detrimental correlates and consequences. For example, Swami and colleagues (Swami et al., 2014) report three studies showing that people engaging in tasks promoting analytic thinking subsequently reported lower belief in conspiracy theories than people in a control group. Similarly, providing participants with tailored arguments (Jolley & Douglas, 2017; Orosz et al., 2016) or information (Pummerer, Winter, et al., 2022) reduced agreement with the conspiracy theories, especially when participants read those arguments *before* developing a strong opinion about the conspiracy theory (Jolley & Douglas, 2017). Preparing individuals for potential arguments and persuasion attempts from opponents, including arguments supporting conspiracy theories, is called inoculation (McGuire, 1961b). Inoculation has been shown to decrease the likelihood of believing in conspiracy theories (Banas & Miller, 2013b; Jolley & Douglas, 2017), likely because it increases deception monitoring and deeper processing (Compton et al., 2021). Overall, there is evidence that inspiring systematic processes can help to reduce the *development* of conspiracy beliefs, specifically when applied before individuals come in contact

with a conspiracy theory (Jolley & Douglas, 2017). Despite this potential, there so far have been no interventions using these cognitive processes to address the *consequences and correlates* of conspiracy theories.

Overview of current research

In four studies, we tested whether the negative relation between conspiracy belief and adherence to social norms can be mitigated by encouraging thinking about the reasons underlying the social norms. We hypothesized and preregistered that higher conspiracy belief is related to lower norm adherence when not prompting reasoning, but that this relation is smaller in size after prompting reasoning (main hypothesis). Reasoning was prompted by asking participants to reflect on reasons why a behaviour is normative before rating their norm adherence. To be more precise, participants were asked to describe the reason why a behaviour is normative by choosing from different reasons (Study 1) or by writing at least two keywords about the reasons (Study 2 – 4). Thus, the reflection was tailored to the individual, allowing individuals to provide their own view (rather than a best but superimposed answer) regarding the functions of a normative behavior.

We also examined whether the type of norm moderated the pattern predicted in our main hypothesis. More specifically, in Study 1, we distinguished between norms related to security or not, expecting that the effect of reasoning would be especially pronounced for norms related to security issues. This was, however, not the case. For the sake of readability, we do not report the results for this moderator in the main analysis below but include the preregistered[4] analysis including this factor in the Supplement.

In addition, we tested whether a reasoning intervention is differently effective for norms related or not related to the law in Studies 3 and 4. As mentioned above, conspiracy belief is related to a negative attitude towards the government (Imhoff & Lamberty, 2018), making it more likely that people high in conspiracy belief specifically deviate from norms related to the law – a hypothesis we preregistered for Study 3 but not Study 4. All research materials, preregistered analyses as well as additional analyses can be found in the Supplement. In the Supplement, we also report three additional studies that differ from the here reported studies by lacking an experimental manipulation (Studies S1 and S2) or by using the same manipulation but for a different dependent

[4] Preregistrations are available under https://aspredicted.org/DGU_OOV (Study 1), https://aspredicted.org/YAH_RQQ (Study 2), https://aspredicted.org/XH7_RYD (Study 3) and https://aspredicted.org/TDM_NW3 (Study 4).

variable (Study S3). Data and scripts are available under https://researchbox.org/661&PEER_REVIEW_passcode=OQTEOA.

Because the study procedure and analysis were highly similar for the four studies, we report Methods and Results for all studies together and also conducted a merged analysis across all studies. Combining all analyses allows to examine the existence and overall strength of the effect of a reasoning process on norm adherence while increasing statistical power. To our knowledge, these are the first reported studies trying to mitigate the *consequences* of conspiracy belief. Results can lay the groundwork for later interventions. In addition, they might give more insights about the underlying processes of other attempts to decrease conspiracy theories.

Method

Participants

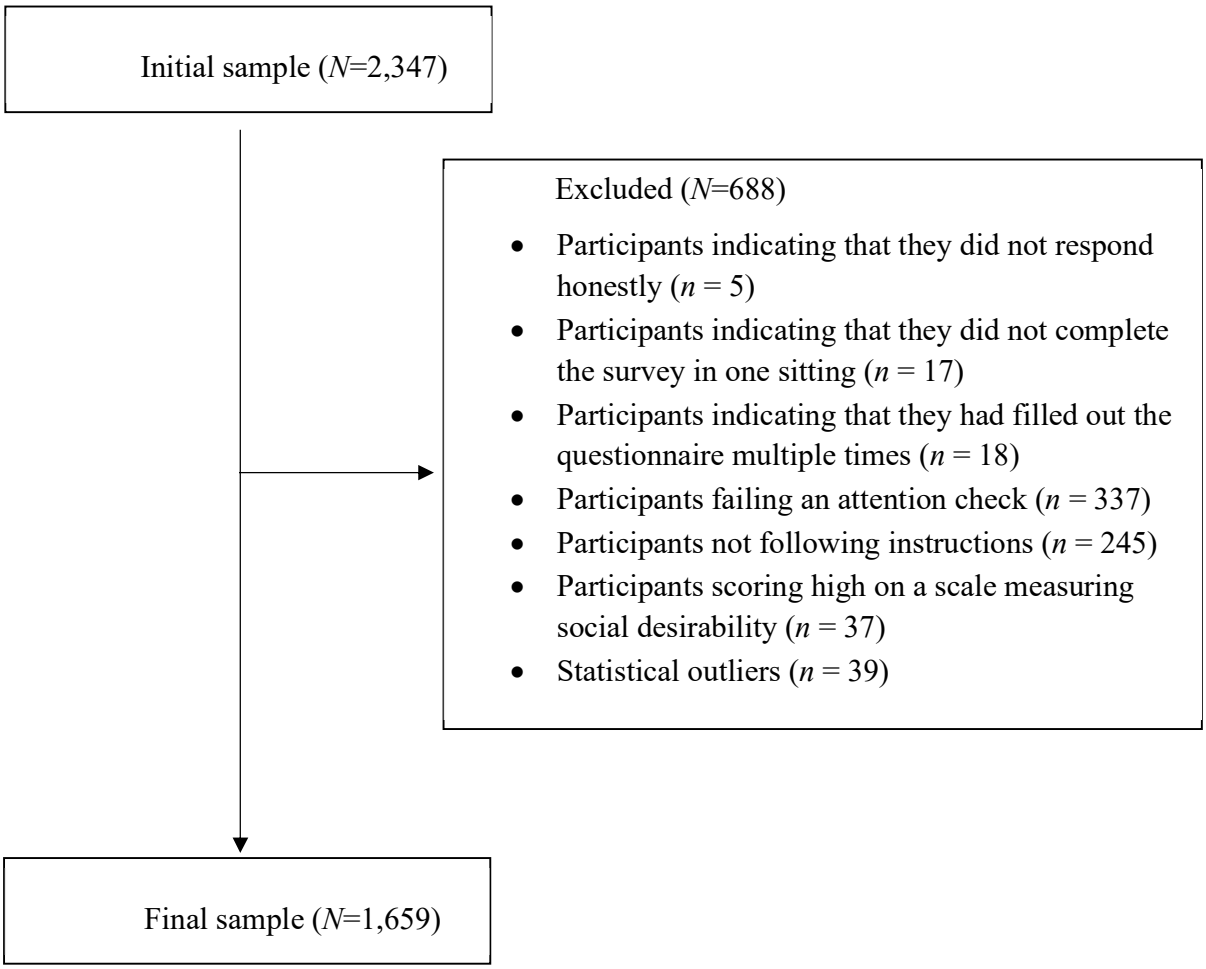
Overall, we recruited data from 2,347 workers on Amazon Mechanical Turk who participated in short online experiments (2-8 minutes) in exchange for $0.40 to $1.20. Sample size was determined by power calculation for an effect of f^2=.02 (Study 1-2) or simulation using effects of earlier studies (Study 3-4) with the aim to reach 80%-power with α=.05. We excluded *N*=688 participants based on preregistered exclusion criteria: Most of the participants were excluded on the grounds of failed attention checks (*N*=337) or not following instructions (*N*=245). For the attention check, participants in Study 1 had to remember the last norm they were asked about; and participants in Study 2, 3 and 4 were asked to follow a subtle prompt to give a certain answer at the end of a question block (Berinsky et al., 2014). To check whether participants followed the instructions, research assistants blind to the hypotheses rated all responses to open questions regarding their consistency with the instructions. This was done for all conditions in Studies 3 and 4 (but not Study 2), as participants in the control condition participated in the same writing task, but after rating the adherence to all norms, so the same exclusion criterion could be applied to all conditions. In Studies 3 and 4, we also excluded participants with high scores on a six-item social desirability scale (Kruglanski et al., 2000, e.g., “I believe one should never engage in leisure activities”, alpha.86-.89), given that reporting norm adherence in the legal context might be sensitive to social desirability. Participants with a mean score above 5 on a 6-point scale were excluded. For an overview of the exclusions, see participant flow (Figure 6.1).

As there was a considerable number of participants in Study 3 who had to be excluded for not following the instructions for the writing task, we conducted a screening for Study 4. Here,

participants had to write about one positive and one negative event of the last week. Participants were only invited to participate in the study if they followed the instructions in this task and wrote meaningful phrases. Participants were aware that the successful screening was a prerequisite for their participation in Study 4. This led to decreased exclusions but potentially also altered the mindset in which participants approached the main study, which may have affected the effect of the manipulation (for a detailed consideration, see discussion section). The final sample consists of *N*=1,659 participants (for demographic information, see Table 6.1). Participants rated their adherence to 4 (Studies 3 & 4), 6 (Study 1), or 8 (Study 2) norms, leading to overall 8,902 observations.

Figure 6.1

Participant flowchart. All exclusions followed preregistered criteria.



Note. Some participants fulfilled several exclusion criteria.

Table 6.1

Number of participants and demographic information across the four studies

	N	Gender	Mean Age	Age range (years)
Study 1	343	58.3% male, 41.1% female	38.49	18–87
Study 2	395	58.0% male, 41.3% female	37.23	19–89
Study 3	541	49.4% male, 49.2% female	39.34	19–80
Study 4	380	48.2% male, 51.8% female	39.43	19-78
Overall	1,659	53.0 % male, 46.2 % female	38.68	18-89

Procedure

Participants rated the adherence to each norm on a separate page. After seeing the norm, participants in the *control condition* were asked to directly rate whether they follow this norm. Participants in the *reasoning condition* were asked to provide the same rating, but *after* responding to the question: "What is the reason this behaviour is considered normative?". In Study 1, participants could choose between "providing safety", "making the world predictable", "showing respect to other people", or "other", providing them with a text box to write their own reason. In order to increase the time and depth of people thinking about the reasons why a behaviour is normative, we changed the answer format after Study 1. For Studies 2 to 4, participants were asked to write at least two keywords mentioning reasons why the respective behaviour is considered normative.

In order to rule out differences due to exclusions or the length of the survey, participants in the control condition were given the task of choosing reasons (Study 2) or the same task of writing about the reasons (Study 3 and 4) why the behaviour is normative towards the end of the study and, thus, after they had indicated their norm adherence for all norms. After the norm adherence measure, participants filled out measures assessing conspiracy belief. Details about additional exploratory measures are reported in the Supplement.

In Studies 3 and 4, we additionally manipulated the relation of the norm to the law. More specifically, half of the participants received social norms that in a pilot study were rated as *not* being related to the law (M=4.75, SD=3.72 for norms of Study 3 and M=4.70, SD=3.83 for norms of Study 4, 1-11 point scale from *totally disagree* to *totally agree*, sample item: "Hold the elevator for someone approaching."), whereas the other half read norms rated as *related* to law (M=9.02,

SD=1.70 and *M*=8.93, *SD*=1.76, sample item: "Do not give alcoholic beverages to minors"). For a list of all norms see Table 6.2.

Measures

Norm Adherence was measured on an 11-point scale from 1: *Never* to 11: *Always* for the statement "I show this behaviour". Each participant rated 4-8 items depending on the study. We had originally preregistered to conduct a linear multiple regression analysis, with the mean adherence score per participant as criterion. However, the internal consistencies across norms within each study was unsatisfactory (Cronbach's alpha ranging between .48 and .69). Thus, we deemed it more appropriate to conduct a linear mixed model with adherence to each norm as criterion and participant id and norm as random factors. Results for the linear mixed models do not differ from those of the linear multiple regression analyses (see Supplement). The mean and standard deviation per subsample and item type are reported in Table 6.3.

Conspiracy Belief was assessed with 6 items measuring the belief in existing conspiracy theories, adapted from Lewandowsky, Gignac and Oberauer (2013). Each conspiracy theory (sample item: "The Apollo moon landings never happened and were staged in a Hollywood film studio") was rated from *1: strongly disagree* to 7: *strongly agree.* Here, the mean rating for each participant across those 6 items was calculated and entered into the analyses (alpha =.87-.91). Mean and standard deviation overall and per study are reported in Table 6.3.

Table 6.2

Overview of all norms featured in the studies

Type	Norm	Study
Not law-related	Be quiet in a library.	1
	Do not talk during a movie.	1, 2
	Do not lie to a friend.	1, 2
	When at someone else's home, ask permission to do things such as turning on the television or using the bathroom.	1, 2
	Call to let someone know you will be late or are not going to show up for an appointment.	1, 2
	Do not interrupt others.	1, 2
	React if someone cries “help”.	1, 2
	If there is a line, go to the back of the line instead of pushing or cutting your way to the front.	1
	Do not share private information with people that you don’t know.	1, 2
	When you are about to bump into someone walking in the opposite direction, move to the right.	1, 2
	Flush the toilet after use.	1
	Hold the door for a person that has a lot to carry.	1, 3
	Dress formally when attending a wedding.	3
	Hold the elevator for someone approaching.	3
	When agreed to meet, stick to the arranged time.	3
	Say please and thank you.	4
	Help the elderly if you see they need help.	4
	Say "excuse me" if you're in someone's way or you need to get past.	4
	Chew with your mouth closed.	4
Law-related	Do not defraud the government on taxes.	3
	Complete jury duty when asked to do so.	3
	In a restaurant, pay for your meal, even if it didn’t taste well.	3
	Do not assault people who say mean things to you.	3
	Do not sleep or camp overnight in national parks except in designated areas.	4
	Do not pay bribes, even if it hurts your chances of success.	4
	Do not give alcoholic beverages to minors.	4
	Do not assume another person's identity to get benefits.	4

Table 6.3

Means and standard deviations of the variables

		Observations	*Participants*	*M (SD)*
Norm Adherence (1-11)				
Study 1	not law-related	2,058	343	9.78 (1.62)
Study 2	not law-related	3,160	395	9.58 (1.62)
Study 3	law-related	1,056	264	9.88 (1.89)
	not law-related	1,108	277	9.81 (1.58)
Study 4	law-related	744	186	9.89 (2.16)
	not law-related	776	194	9.77 (1.69)
Across all studies	Law-related	1800	450	9.88 (2.01)
	Not law-related	7102	1209	9.70 (1.66)
Conspiracy Belief (1-7)				
Study 1			343	2.49 (1.36)
Study 2			395	2.95 (1.67)
Study 3			541	2.90 (1.58)
Study 4			380	2.86 (1.47)
Across all studies			1,659	2.82 (1.54)

Results

In order to test whether conspiracy beliefs correlate negatively with norm adherence, but less so after being prompted to reason, we conducted a multilevel model. The dependent variable was norm adherence. Conspiracy belief (mean-centered per study), reasoning (-1 control, 1 reasoning), norm type (-1 not law related, 1 law related), as well as their interactions were entered as fixed factors. Norm and participant were entered as random factors. The final formula took the form of: adh ~ conspiracy belief*reasoning*norm type + (1|Norm) + (1|Participant). Analyses were conducted in R (R Core Team, 2020) , using the package lme4 (Bates et al., 2015) for regression analyses and the package reghelper (Hughes & Beiner, 2021) for simple slopes.

In all studies, norm adherence was negatively related to conspiracy beliefs, and higher in the reasoning than in the control condition (for statistical details see Table 6.4). Both main effects were qualified by the predicted reasoning x conspiracy belief interaction which was significant in Studies 2 and 3, *B*=0.06, *SE*=0.03, *p*=.042, *d*=0.21 and *B*=0.11, *SE*=0.03, *p*=<.001, *d*=0.35, and similar in size but only marginal due to the smaller sample size in Study 1, *B*=0.06, *SE*=0.04, *p*=.067, *d*=0.20. In Study 1 and 2, conspiracy belief negatively predicted norm adherence in the control condition, *B*=-0.13, *SE*=0.05, *p*=.010, *d*=-0.28 and *B*=-0.14, *SE*=0.04, *p*=<.001, *d*=-0.38, but the negative correlation disappeared when participants were prompted to reason, *B*=0.00, *SE*=0.05, *p*=.936, *d*=0.01 and *B*=-0.02, *SE*=0.04, *p*=.556, *d*=-0.06. The same pattern was seen in Study 3: Conspiracy belief negatively predicted norm adherence in the control condition, *B*=-0.34, *SE*=0.04, *p*=<.001, *d*=-0.76, but the negative relationship was weaker in the reasoning condition, *B*=-0.11, *SE*=0.04, *p*=.009, *d*=-0.23. In Study 4, the predicted reasoning x conspiracy belief interaction was not significant and, if anything, there was a trend in the opposite direction, *B*=-0.03, *SE*=0.04, *p*=.530, *d*=-0.07, which is discussed below.

Studies 3 and 4 also tested whether the reasoning x conspiracy belief interaction was weaker for norms related to the law than norms not related to the law, which was not the case in both studies. There was, however, a conspiracy belief x norm type interaction in Study 4, *B*=-0.23, *SE*=0.04, *p*<.001, *d*=-0.58. Conspiracy belief negatively predicted norm adherence when norms were related to the law, *B*=-0.37, *SE*=0.06, *p*=<.001, *d*=-0.66, but not when they were not related to the law *B*=0.08, *SE*=0.06, *p*=.140, *d*=0.15, underlining the difference of this study to Studies 1-3.

Discussion of differences between studies

One likely reason for the divergent findings of Study 4 (compared to the other studies) are differences in the recruitment procedure. In this study, we screened participants and only included those who closely followed the instructions in the screening questionnaire (i.e., who wrote a reasonable text in response to two open questions), of which participants were aware. Given that the screening questionnaire required participants to deliberate on past events, this might have led them to expect that careful deliberation would also be essential in the main study. In other words, through our recruitment procedure, we might have inadvertently prompted systematic processing among all participants instead of only those in the reasoning condition. This is in line with the finding that conspiracy belief did not correlate negatively with adherence to norms not related to the law in the control condition, *B*=0.13, *SE*=0.08, *p*=.097, *d*=0.17, which is different to the

previous studies and earlier research. Overall, there are good reasons to assume that the screening procedure might have affected the results in Study 4. However, this interpretation is speculative and the differences might also be an outcome of the regular variation of effect sizes. Therefore, we report the findings from Study 4 and consider them as regular effects. Given the differing effect sizes between studies, we decided to conduct a merged analysis across all studies to estimate the overall effect size.

Table 6.4

Multilevel regression analysis per study predicting adherence to the norms by conspiracy belief, reasoning condition, norm type and their interactions

	Study 1				Study 2				Study 3				Study 4			
Predictors	*B (SE)*	*t*	*p*	95%-CI	*B (SE)*	*t*	*p*	95%-CI	*B (SE)*	*t*	*p*	95%-CI	*B (SE)*	*t*	*p*	95%-CI
Intercept	9.77 (0.20)	48.14	< .001	[9.36; 10.19]	9.62 (0.10)	96.36	< .001	[9.42; 9.83]	9.86 (0.13)	73.74	< .001	[9.60; 10.11]	9.83 (0.11)	85.73	< .001	[9.61; 10.06]
conspiracy belief (mean-centered)	-0.06 (0.03)	-1.73	.085	[-0.13; 0.01]	-0.08 (0.03)	-2.93	.004	[-0.13; -0.03]	-0.22 (0.03)	-7.90	< .001	[-0.28; -0.17]	-0.14 (0.04)	-3.55	<.001	[-0.22; -0.07]
reasoning (-1 control, 1 reasoning)	0.12 (0.05)	2.54	.012	[0.03; 0.21]	0.23 (0.05)	4.92	< .001	[0.14; 0.32]	0.10 (0.04)	2.22	.027	[0.01; 0.19]	0.15 (0.06)	2.60	.010	[0.04; 0.27]
norm type (-1 not law related, 1 law related)	-	-	-	-	-	-	-	-	0.03 (0.13)	0.25	.812	[-0.22; 0.29]	0.06 (0.11)	0.48	.645	[-0.17; 0.28]
conspiracy belief *reasoning	0.06 (0.04)	1.84	.067	[-0.00; 0.13]	0.06 (0.03)	2.04	.042	[0.00; 0.11]	0.11 (0.03)	4.05	<.001	[0.06; 0.17]	-0.03 (0.04)	-0.63	.530	[-0.10; 0.05]
conspiracy belief *norm type	-	-	-	-	-	-	-	-	-0.03 (0.03)	-1.17	.245	[-0.09; 0.02]	-0.23 (0.04)	-5.62	< .001	[-0.31; -0.15]
reasoning *norm type	-	-	-	-	-	-	-	-	-0.07 (0.04)	-1.46	.144	[-0.15; 0.02]	-0.04 (0.06)	-0.68	.500	[-0.16; 0.08]
conspiracy belief *reasoning*norm type	-	-	-	-	-	-	-	-	-0.00 (0.03)	-0.16	.874	[-0.06; 0.05]	0.02 (0.04)	0.50	.618	[-0.06; 0.10]|

Merged analysis

In order to calculate the overall effect size, we conducted a merged analysis by entering all studies in one multilevel model. Norm adherence was predicted by conspiracy belief (mean-centered), reasoning condition (-1 control, 1 reasoning), norm type (-1 not law related, 1 law related), as well as their interactions as fixed factors, and norm and participant as random factors. Study did not account for any variance when entered into the model. The analysis revealed that norm adherence was negatively predicted by conspiracy belief, B=-0.19, SE=0.02, p<.001, d=-0.47 and positively by reasoning, B=0.12, SE=0.03, p<.001, d=0.19 (for statistical details see Table 6.5). Supporting our main hypothesis, the main effect was qualified by a Conspiracy Belief x Reasoning interaction, B=0.06, SE=0.02, p=.001, d=0.16. Conspiracy belief negatively predicted norm adherence in the control condition, B=-0.25, SE=0.03, p<.001, d=-0.46, but this effect was mitigated when participants were prompted to reason, B=-0.12, SE=0.03, p<.001, d=-0.21. For a visualization, see Figure 6.2. There was no three-way-interaction between conspiracy belief, reasoning condition and norm type. However, there was a Conspiracy Belief x Norm Type interaction, B=-0.11, SE=0.02, p<.001, d=-0.28, such that conspiracy belief predicted norm adherence more negatively for norms related to the law B=-0.30, SE=0.03, p<.001, d=-0.41 than norms not related to the law B=-0.08, SE=0.02, p<.001, d=-0.22. There also was a Reasoning x Norm Type interaction, B=- 0.06, SE=0.03, p=.028, d=-0.10 such that reasoning for all individuals (independent of conspiracy belief) only increased norm adherence regarding norms not related to the law B=0.18, SE=0.03, p<.001, d=0.34, but not regarding norms related to the law, B=0.06, SE=0.05, p<.253, d=0.05. The main effect of norm type was not significant, p = .358.

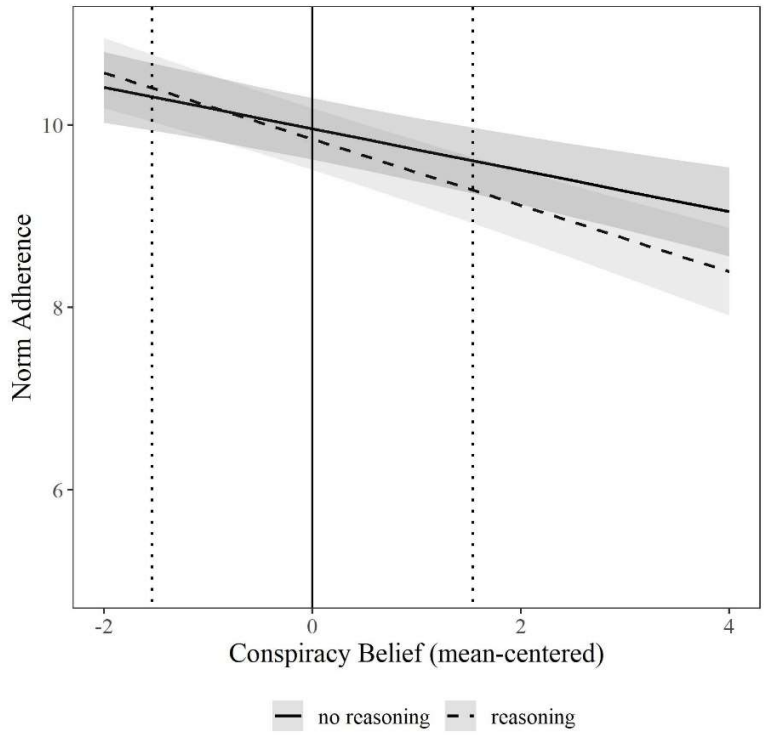
Table 6.5

Multilevel regression analysis for the merged dataset predicting norm adherence by conspiracy belief (mean-centered), reasoning condition, norm type and their interactions

	Norm Adherence				
	B	*SE*	*t*	*p*	*95%-CI*
Intercept	9.82	0.09	104.83	<.001	[9.63; 10.00]
conspiracy belief (mean-centered)	-0.19	0.02	-10.12	< .001	[-0.22; -0.15]
reasoning condition (-1 control, 1 reasoning)	0.12	0.03	4.19	< .001	[0.06; 0.18]
norm type (-1 not law related, 1 law related)	0.09	0.09	0.93	.358	[-0.10; 0.27]
conspiracy belief *reasoning	0.06	0.02	3.50	<.001	[0.03; 0.10]
conspiracy belief *norm type	-0.11	0.02	-5.96	< .001	[-0.15; -0.07]
reasoning*norm type	-0.06	0.03	-2.20	.028	[-0.12; -0.01]
conspiracy belief *reasoning*norm type	0.00	0.02	0.20	.842	[-0.03; 0.04]

Figure 6.2

*Norm Adherence predicted by Conspiracy Belief (mean-centered, M=*2.82*) and Reasoning Condition (Merged Analysis)*



Note: Shaded areas represent fitted confidence intervals, vertical dotted lines show the standard deviations. The visualisation was done with sjPlot (Lüdecke, 2021) in R (R Core Team, 2020).

General Discussion

Across four studies, including 1,659 participants and 8,902 observations, we showed that the negative correlation between conspiracy belief and norm adherence can be mitigated by asking participants to reflect on the reason why a behaviour is normative. We hereby tested an approach that was tailored toward typical tendencies and characteristics of people believing in conspiracy theories, the tendency to deviate from a social norm and for intuitive (vs systematic) thinking. The overall effect size of this manipulation was small (d=0.16), but the effect was evident for norms related and not related to laws. Hence, the effect did hold across different norm types. The fact that the reliabilities for norm adherence per individual were between alpha = .48 and .69 forced us to deviate from the preregistration by running multilevel models rather than multiple regression models, but it again speaks to the fact that the norms covered in the studies were quite heterogeneous and that the reported effects apply to a wide range of social norms (for an overview, see Table 6.2).

Reasoning mitigated the negative relation between conspiracy belief and norm adherence with a similar effect size in all studies except Study 4. This study was different in that there was no conspiracy belief x reasoning interaction, and that conspiracy belief was not negatively related to norm adherence in the first place. Independent of the reasons for the lack of the expected reasoning x conspiracy belief interaction (for a discussion, see above), the lack of a negative relation between conspiracy belief and norm adherence in the control condition renders an intervention against the detrimental effects of conspiracy beliefs obsolete. In all studies in which conspiracy belief was negatively related to norm adherence, however, we consistently found this detrimental effect weakened by prompting participants to reason. This suggests to us that it is a starting point for interventions against the negative correlates of conspiracy believes, even though the effect is small.

A limitation of the current studies is that we measured norm adherence with self-reports rather than behaviour. This is common in research on conspiracy belief across domains (see e.g., Bierwiaczonek et al., 2020; Hornsey et al., 2021; Imhoff et al., 2021b; Jolley et al., 2019; Jolley & Douglas, 2014). Based on the methods applied here, it remains, however, open whether reasoning would also lead to actual changes in behaviour. One might argue that participants higher in conspiracy belief are easily affected by manipulations, given that they generally tend to process information more superficially (J.-W. van Prooijen, Cohen Rodrigues, et al., 2022), but this should apply to self-reports as well as actual behaviour.

Another open question is, up to what degree of conspiracy belief the current findings hold. Our samples mainly consisted of people not or only moderately believing in conspiracy theories ($M_{Overall}$=2.82, SD=1.54 on a 1-7 scale). These people might be more open to engaging in a reasoning task than individuals very high in conspiracy belief. Asking those who strongly believe in conspiracy theories to think about reasons why a behaviour is normative might backfire because prompting reasoning among these people might also lead to thoughts about reasons *not* to adhere to norms. As a result, they might deviate only more from the mainstream (cf. Supplement Study S3).

This suggests that the success of the reasoning intervention likely does not mechanically follow from prompting reasoning but from specific processes triggered by this prompt. In the introduction, we proposed that encouraging systematic thinking by prompting reasoning helps to connect the behaviour at stake to an individual or societal goal, which those high in conspiracy belief do not spontaneously consider. Thus, for the manipulation to work, it might require that reasoning about the normative behaviour elicits a focus on values and intentions (rather than intuitive uniqueness striving or spontaneous aversion against anything dominant or normative). Further research should test this possible underlying mechanism, about which we can only speculate at this point. We hope that the current studies are nonetheless helpful to inform the discussion about mechanisms underlying other interventions such as inoculation (Compton et al., 2021) or accuracy nudges (Pennycook et al., 2020; Roozenbeek et al., 2021).

To our knowledge, this is the first reported study trying to mitigate the *consequences* of conspiracy belief rather than the conspiracy belief itself with a cognitive manipulation. As social norms are not part of conspiracy theories and, thus, not part of the argumentations protecting against the attitude change among those strongly believing in conspiracy theories, an external prompt here can be successful even in cases where individuals already believe in conspiracy theories. The current results, thus, point to potential interventions tackling the consequences of conspiracy beliefs – an endeavour which so far has not been undertaken. The manipulation in our studies was pretty straightforward and simple to put into practice: Asking participants to name the reasons for the norms was enough to mitigate the negative relation between conspiracy belief and norm adherence. Future research should test whether similar prompts can be used to mitigate other correlates of conspiracy beliefs, such as distrust, prejudice against outgroups or detrimental health behaviors, as long as those are not connected to the conspiracy theories themselves.

The domain of the norms might constitute a potential limiting condition, as already implied above. In cases where the norms are directly related to conspiracy theories, prompting reflection on why the behaviour is normative likely also backfires for people high in conspiracy belief, because it is in stark contrast to their convictions and values. They will most likely neither be willing nor able to generate reasons they believe in to follow these norms. In the case of Covid-19 conspiracy theories, the social norms of physical distancing or mask-wearing are, for instance, a part of the conspiracy theory ("They are designed to limit our freedom and to create distance within the population").

To conclude, the current research sheds light on the relation between conspiracy belief and adherence to social norms governing everyday behaviour: In line with their tendency to go against the grain, people high in conspiracy belief are less likely to report adherence to social norms. However, once prompted to reason about the functions of norms, this negative relation is mitigated. By providing support for this effect, we pave the way for interventions against (potentially harmful) correlates of conspiracy beliefs.

Chapter 7 – General Discussion

The current dissertation set out to examine the relationship between conspiracy belief and norm adherence. More specifically, it examined (1) whether a higher conspiracy belief is related to lower norm adherence, (2) the causal direction of this relationship, and (3) different possibilities for interventions in order to increase norm adherence among people higher in conspiracy belief. The different manuscripts all contributed differently towards these goals.

Chapter 2 provided a theoretical review of previous literature on conspiracy belief and social norms. It hereby contributed to the first goal of examining the relationship between conspiracy belief and norm adherence by outlining different reasons why conspiracy belief is related to non-normative behavior. It argued that the non-normative behavior of people higher in conspiracy belief is a natural consequence of a different social reality that is accompanied by and results out of the different factual reality (i.e., the existence of secretive and malevolent forces) postulated by conspiracy theories. This social reality of people believing in conspiracy theories is characterized by (a) social relationships that are shaped by the tendency for distrust and for distinction, as expressed in the higher need for uniqueness and narcissism; (b) the perception of a lower descriptive norm for desirable behaviors; (c) the fact that the injunctive norm regarding specific behaviors is questioned by the postulation of an alternative factual reality; (d) lower trust in institutions and traditional authorities, as well as (e) new norms displayed by popular figures among people believing in conspiracy theories. While the latter point of orientation regarding new norms describes the adherence to *alternative* norms disregarded by the majority, the former points describe reasons for lower adherence regarding norms shared by the majority of society. Overall, this chapter argues that higher conspiracy belief is related to lower norm adherence and that this is due to a different social reality of people higher in conspiracy belief.

Chapter 3 contributed to the second goal of examining the causal direction of the relation between conspiracy belief and norm adherence. We here examined the impact of higher belief in a political Covid-19 conspiracy theory on four social norms at that time (support of governmental regulations, adoption of physical distancing, social engagement, and hygiene measures). A correlational analysis showed that there was a negative relation between the belief in the political Covid-19 conspiracy theory and lower support of governmental regulations, adoption of physical distancing, and social engagement, but no correlation between the belief in the political Covid-19 conspiracy theory and the adoption of hygiene measures. The experimental and longitudinal study then examined whether the belief in a political Covid-19 conspiracy theory leads to lower norm

adherence in a causal sense. Indeed, the belief in a political Covid-19 conspiracy theory led to a lower norm adherence in regard to the support of governmental regulations and adoption of physical distancing, though not social engagement and adoption of hygiene measures. Furthermore, we also examined the possibility of a reverse causality, but found no evidence that institutional trust or the support of governmental regulations at t1 predicted the belief in a political Covid-19 conspiracy theory at t2. Overall, this chapter established that a higher conspiracy belief leads to subsequent lower norm adherence. While conspiracy belief did not predict a lower adherence to all social norms examined in the study, it predicted the adherence to two social norms especially targeted by the political Covid-19 conspiracy theory, which were the adoption of physical distancing and the support of governmental regulations.

Chapter 4, 5 and 6 all contributed to the third goal of testing different possibilities for interventions with the goal to increase norm adherence among people higher in conspiracy belief. *Chapter 4* examined whether addressing Covid-19 vaccination conspiracy belief through a cognitive/emotional intervention is one way of increasing norm adherence, here in the form of vaccination intentions. Indeed, this was the case. When participants got information aimed at addressing uncertainty regarding a new vaccination method, their belief in a Covid-19 vaccination conspiracy theory was lower, which in turn predicted higher vaccination intentions. By providing explanations for topics of uncertainty, this study tested a cognitive/emotional intervention for decreasing conspiracy belief. Different than previous interventions that tried to prepare an individual for the encounter with a conspiracy theory by providing them with counter-arguments against the conspiracy theory during a time where the conspiracy theory was already circulating (Banas & Miller, 2013a; Jolley & Douglas, 2014a, 2017; Stojanov, 2015), individuals here received information that was aimed at addressing uncertainty regarding a new vaccination method at a time where conspiracy theories surrounding this new vaccination method were not yet wide spread. It thus tested whether it is possible to prepare against the encounter with a conspiracy theory by providing information addressing uncertainty, hereby supporting the injunctive norm of getting vaccinated. Overall, this study suggests that one method of increasing norm adherence regarding norms connected to a conspiracy theory is to address the respective conspiracy theories with a cognitive/emotional intervention at an early stage.

Chapter 5 examined another possibility of increasing norm adherence among people higher in conspiracy belief, here measured in the form of conspiracy mentality, through a social intervention. The studies showed that the subjective norm, that is, the expectation communicated

by people close to the individual, moderated the relationship between conspiracy belief and vaccination intentions. When people close to the individual expected them to get vaccinated, people higher in conspiracy belief were as likely as people lower in conspiracy belief to get vaccinated, while they were less likely to get vaccinated when the subjective norm of close people was low. This study underlines the importance of the social reality of conspiracy belief for norm adherence. Although the findings here are only correlational in nature, and not an intervention in the strict sense, they suggest that the subjective norm of people close to the individual can be one way of buffering lower norm adherence among people high in conspiracy belief.

Chapter 6 tested a cognitive/emotional intervention with the goal to increase norm adherence among people higher in conspiracy belief. The social norms in these studies were norms guiding everyday interactions such as to hold the door for a person that has a lot to carry, and norms related to the law, such as to not give alcoholic beverages to minors. In four studies, we tested whether prompting reasoning why a behavior is normative reduces the negative relationship between conspiracy belief and norm adherence; and whether this effect is dependent on whether the norm is related to the law or not. Merging the four studies, we found that the negative relation between conspiracy belief and norm adherence was reduced when participants were prompted to think about the reasons why a behavior is normative – an effect which was not moderated by the type of norm. These studies suggest that a cognitive/motivational intervention is another potential way of increasing norm adherence among people believing in conspiracy theories.

In the following, I will summarize the main conclusions of this dissertation, hereby also discussing strengths and limitations as well as potential future directions.

Relationship between conspiracy belief and norm adherence

This dissertation contributes to the understanding of conspiracy belief by examining the relationship between the concepts of conspiracy belief and social norms in a broader manner. As social norms have not been much discussed in the literature of conspiracy belief yet (for a recent exception, see Cookson et al., 2021a, 2021b), we so far only had knowledge about the relationship between conspiracy belief and norm adherence regarding single behaviors, most of them in some ways connected to conspiracy theories (Bierwiaczonek et al., 2020; Butler et al., 1995; Hornsey et al., 2018b; Imhoff et al., 2021; Jolley et al., 2020; Jolley & Douglas, 2014a; Jolley & Paterson, 2020; Lewandowsky, Oberauer, et al., 2013; van der Linden, 2015; van Mulukom et al., 2022).

This dissertation examined the relationship between different types of conspiracy belief (a Political Covid-19 Conspiracy theory, conspiracy mentality, and a measure comprised of six popular conspiracy theories), as well as different types of norms (norms related to Covid-19, vaccination intentions, norms guiding everyday interactions and norms related to the law, see Table 7.1). Overall, a higher conspiracy belief was related to lower norm adherence. This relation was mostly independent from the specific measurement for conspiracy belief (except for the correlation between conspiracy mentality and norms related to Covid-19) and supports the notion that higher conspiracy belief is characterized not only by the belief in a different factual reality, but also a different social reality, which is expressed in the lower adherence to a wide array of social norms.

Table 7.1

Correlation between the different types of conspiracy belief and norm adherence

Conspiracy	**norm**	**r_{meta}**	**Study**	**Country**	**N**	**r_{Study}**
PCC	Covid	-.20	Chapter 3, Study 1	Denmark	405	-.24
			Chapter 3, Study 3, t1	Germany	544	-.17
CM	Covid	-.05	Chapter 3, Study 3, t1	Germany	544	-.05
CM	vaccination intention	-.20[5]	Chapter 5, Study 1, Travel	Germany	186	-.27
			Chapter 5, Study 1, Child	Germany	186	-.28
			Chapter 5, Study 2, Travel	Germany	145	-.17
			Chapter 5, Study 2, Child	Germany	145	-.19
			Chapter 5, Study 3, Covid-19	Germany	378	-.28
			Chapter 5, Study 4, Influenza	Germany	197	-.05
			Chapter 5, Study 5, Travel	Germany	392	-.20
			Chapter 5, Study 5, Child	Germany	392	-.20
			Chapter 5, Study 5, Covid-19	Germany	392	-.32
			Chapter 5, Study 5, TBEV	Germany	392	-.11
CT	not law related	-.17	Chapter 6, Study 1, no reasoning	US	169	-.16
			Chapter 6, Study 2, no reasoning	US	233	-.23
			Chapter 6, Study 3, no reasoning	US	148	-.41
			Chapter 6, Study 4, no reasoning	US	97	.17
CT	law related	-.47	Chapter 6, Study 3, no reasoning	US	139	-.51
			Chapter 6, Study 4, no reasoning	US	88	-.39

Note. PCC = political covid-19 conspiracy theory; CM = conspiracy mentality; CT = belief in six popular conspiracy theories.

[5] Overall correlation was taken from Winter et al., (2022).

The negative correlation between conspiracy belief and norm adherence tended to be stronger and more consistent for norms directly targeted by the measured conspiracy theories (i.e., physical distancing and support of governmental regulations) and norms related to the law. For example, in Chapter 3, believing in the political Covid-19 conspiracy theory was related to lower physical distancing and lower support for governmental regulations with $r_{PhyscialDistancing}$ = - .23 and $r_{GovernmentalRegulations}$ = -.33. The correlation between conspiracy belief and adherence for norms related to the law in Chapter 5 even exceeded the negative correlations found for norms related to the conspiracy theories with r_{Law} = -.47. The negative correlations are confirmed by other studies reporting lower adherence to norms related to conspiracy theories (see e.g. Bierwiaczonek et al., 2020; Jolley & Douglas, 2014a; Jolley & Paterson, 2020; Van der Linden, 2015; van Mulukom et al., 2022), with correlations similar in size. Findings are also mirrored in other studies finding a correlation between the belief in conspiracy theories and (reported or intended) behaviors that go against the law (see e.g. Imhoff et al., 2021a; Jolley et al., 2019; Jolley & Paterson, 2020). Chapter 2 provided an explanation for the stronger correlations between conspiracy belief and norms related to conspiracy theories and norms related to law. By claiming a different factual reality, people believing in conspiracy theories question the injunctive norms regarding behaviors connected to conspiracy theories, here, the injunctive norms for physical distancing, support of governmental regulations and vaccinations. They further show lower trust in institutions and traditional authorities, which is expressed in lower respect towards the law, and likely also perceive to a greater extent that other people are not following the law.

While there overall also was a correlation between conspiracy belief and adherence to norms neither related to conspiracy theories nor the law, the correlations here tended to be smaller and not consistent across all single behaviors. For example, while there was a small but significant negative correlation in Chapter 3 between the belief in a Political Covid-19 conspiracy theory and social engagement ($r_{SocialEngagement}$ = -.11), there was no correlation between conspiracy mentality and social engagement, and no correlation between both types of conspiracy belief and adoption of hygiene measures. Chapter 6 constituted a more extended examination of the relation between conspiracy belief and adherence to norms neither related to the law nor to conspiracy theories. Here, the overall negative correlation between conspiracy belief and norm adherence was r = -.17, but the differences in studies (rs ranging from -.41 to .17) already indicate that the correlation between conspiracy belief and adherence to norms neither related to a conspiracy theory nor the law might be easily influenced by other factors (for a discussion of one factor that might have

contributed to the positive correlation between conspiracy belief and norm adherence in Study 4, see the discussion in Chapter 6). Future studies should further examine which contextual factors have an influence on the relationship between conspiracy belief and norm adherence.

One limitation of the studies is that they mainly included people scoring low to medium on conspiracy belief. This is certainly partly due to a lower prevalence of people scoring high in conspiracy belief, but likely also a decreased willingness to participate in scientific studies among this group. In line with ethical guidelines, our studies mentioned that individuals are taking part in a scientific study and they were given the option to disengage or to withdraw data at the end of the study. Given the negative attitude of some people believing in conspiracy theories towards science (Lewandowsky, Oberauer, et al., 2013), people high in conspiracy belief might have not participated in the studies to begin with, which might have led to a sampling bias throughout the studies. This might also affect conclusions, as people extremely high in conspiracy belief might have disengaged from society more or less completely (Franks et al., 2017), which in Germany seems to be the case for some groups such as Reichsbürger. As such, conclusions might apply to people somewhat scoring the middle, but not to people scoring very high in conspiracy belief.

The samples included in the manuscript were recruited using different platforms such as the university listserv (Chapter 2 and 4) and different online panels (Chapter 2, 4 and 5). It is positive to note that the samples were not only recruited from the student population and that they span data from three different countries (Germany, Denmark, and the United States). Furthermore, two studies (Chapter 2 and 3) included samples that were chosen based on quotas representative for the population. While this does not imply that results are generalizable to all countries and populations (Hornsey et al., 2018a, 2018b), it increases the chances that similar relations between conspiracy belief and norm adherence are also found in other countries (for similarities between countries regarding conspiracy belief and the adherence to Covid-19 protection measures, see Bierwiaczonek et al., 2022 and van Mulukom et al., 2022).

Overall, this dissertation shows that a higher conspiracy belief is related to lower norm adherence across different types of conspiracy belief and different types of social norms, with negative correlations being stronger for norms related to a conspiracy theory and norms related to the law. Overall, the lower norm adherence of people believing in conspiracy theories seems to be a consequence of their social reality, which generally is characterized by distrust and distinction (i.e., high need for uniqueness and narcissism), and is especially averse against institutions and traditional authorities, as well as against injunctive norms questioned by conspiracy theories.

Causal direction of the relationship between conspiracy belief and norm adherence

In a next step, this dissertation examined the causal direction of the relationship between conspiracy belief and norm adherence. In one study package combining correlational, experimental and longitudinal data (Chapter 2), we found that a belief in a Covid-19 conspiracy theory led to lower institutional trust, lower support of governmental regulations and – to some extent – lower adoption of physical distancing. As such, we were among the first to theoretically and empirically examine the directionality of the relationship between conspiracy belief and norm adherence. Albeit the fact that negative correlations between conspiracy belief and norm adherence regarding single behaviors were known long before this dissertation (e.g. Butler et al., 1995), there were only a few studies *experimentally* testing whether a higher conspiracy belief (operationalized through the confrontation with a conspiracy theory) leads to reported behavior changes (Butler et al., 1995; Einstein & Glick, 2015; Jolley et al., 2019; Jolley & Douglas, 2014b; van der Linden, 2015). Before the beginning of this dissertation, there had been no *longitudinal* study examining whether higher conspiracy belief actually leads to lower norm adherence over time. Around the same time as the study reported in Chapter 3, another longitudinal study by Bierwiaczonek (2022) examined the longitudinal effect of Covid-19 conspiracy theories on physical distancing, confirming the finding that believing in Covid-19 conspiracy theory predicted physical distancing one week later (spanning an overall time frame of 5 weeks).

Our studies showed that the belief in a political Covid-19 conspiracy theory led to a lower norm adherence in regard to the support of governmental regulations and adoption of physical distancing. These were also the two norms most questioned by the political Covid-19 conspiracy theory, which alleged that the powerful in society are purposefully exaggerating the pandemic for their advantage, but did not question hygiene measures or the existence of the virus per se. We found no causal effect of conspiracy belief on the two norms (social engagement, hygiene measures) less related to the conspiracy theory, albeit the fact that social engagement was negatively predicted by high conspiracy belief cross-sectionally. This, of course, does not rule out that higher conspiracy belief leads to lower adherence also regarding norms less related to conspiracy theories on the long term, which should be tested with future studies examining the causal effect of higher conspiracy belief on social norms over a time period capturing several months up to several years.

Future studies should also examine potential mediators of the effect of conspiracy belief on lower norm adherence. In our studies of Chapter 3, we tested institutional trust as one potential mediator. We found support for institutional trust as a mediator on the adoption of physical distancing, support of governmental regulations, and social engagement cross-sectionally, but when including it as a mediator on support of governmental regulations and physical distancing in the longitudinal study, it did not reach significance. However, due to the low power of the longitudinal study, this study was not ideally suited to test this relationship to begin with. Given that we found a longitudinal effect of higher conspiracy belief on institutional trust, and that there are other studies reporting an effect of low institutional trust on prosocial behaviors (Irwin, 2009), future studies should again test for this mediation, potentially also in longitudinal studies spanning more than 8 weeks.

One strength of the study in Chapter 3 is that we also tested for a reverse causality, examining whether conspiracy belief developed as a response to previous lower norm adherence, for example as a form of justification for previous low norm adherence. We found no evidence that lower norm adherence at t1 predicts conspiracy belief at t2. This analysis, however, was not preregistered. Furthermore, this is the first test of this kind and should, of course, be confirmed and replicated in other studies.

Overall, our studies suggest that low norm adherence is a consequence rather than a cause of conspiracy belief. Here, the combination of a correlational, experimental and longitudinal study provides a first test of the potential causal relationship (Shadish et al., 2002).

Interventions increasing norm adherence among people believing in conspiracy theories

Despite the negative relation between conspiracy belief and norm adherence found in our studies, Chapters 3 to 5 also shed a glimpse of hope, as they contain studies that can build a basis for later interventions trying to increase norm adherence among people high in conspiracy belief. More specifically, the studies successfully increased norm adherence a) by providing information decreasing the belief in a conspiracy theory related to the respective norm (cognitive/emotional intervention) b) when individuals perceived that people close to them expected them to follow the norm (social intervention), and c) by prompting reasoning why a behavior is normative (cognitive/motivational intervention). These studies indicate that people high in conspiracy belief

are neither deaf to arguments nor ignorant to social norms, but that their norm adherence increases when the social reality changes.

One thing that seemed to be important in the interventions was the source and salience of the norm. In Chapter 4, participants reported whether people close to them expected them to follow the norm. Given the lower trust in institutions and traditional authorities by people higher in conspiracy belief (see Chapter 2), norms communicated by friends and family likely carry more weight than those of institutions and traditional authorities. Likewise, the fact that the communication in Chapter 4 addressed uncertainties of the individuals, might have increased trust in this source. Social norms also seem to have more impact on people higher in conspiracy belief when they are made salient and when motivation to adhere to them is increased, such as in the reasoning condition of Chapter 6. Here, individuals were prompted to give reasons why a behavior is normative. Given that higher conspiracy belief is related to reactance (Hornsey et al., 2018b), it might be important that the reasons are generated by the individuals themselves, rather than being imposed from the outside. At this point, however, this remains speculative, and the unique effects of norms being communicated by people close to the individual (vs. by strangers vs. by institutions) and reasons being generated by the individuals themselves (vs. being imposed by strangers or institutions) should be tested in future studies. Such studies should also test the effects of framing, as one study reported in the supplement to Chapter 6 shows that a different framing of the questions can also have unintended consequences. Overall, these studies give support to the idea that changing the social reality of people believing in conspiracy theories can form the basis for interventions trying to increase norm adherence.

Chapter 2 proposes additional aspects of how the social reality of people higher in conspiracy belief might differ from the social reality of people lower in conspiracy belief, which provides additional leeway for interventions. Future interventions could, for example, test whether making the descriptive norm more salient increases norm adherence in cases where the norm is not directly related to (and, thus, not questioned by) a conspiracy theory. Additionally, interventions could try to increase trust in institutions and authorities, for example by emphasizing a larger shared group identification (Gaertner et al., 1996), such as the identification with one's nation.

One limitation is that all studies relied on reported behaviors and behavior intentions, and none of the studies included data actually observing a change in behavior. While this is common in research on conspiracy belief (e.g. Hornsey et al., 2021; Imhoff et al., 2021b; Jolley & Douglas, 2014), it still limits the validity of the conclusions, since it bears the possibility that a change in

behavior is only reported or intended, but not actually executed. Even more, as higher conspiracy belief is related to intuitive processing (Swami et al., 2014; J.-W. van Prooijen et al., 2018), impulsive behavior (Swami et al., 2016), and the willingness to deceive others (Douglas & Sutton, 2011), the discrepancy between reported and actual behavior might indeed be larger for people high (vs. low) in conspiracy belief. Thus, interventions addressing the consequences of conspiracy belief and observing an actual behavior change are urgently needed but were very hard to conduct during the time of the Covid-19 pandemic in which the research for this dissertation was conducted.

One strength of the potential social and cognitive/motivational interventions is that the studies did not only rely on addressing the conspiracy theories, but also their direct and indirect consequences by testing ways how to increase norm adherence especially among people high in conspiracy belief. Focusing on the consequences seems to be an uncommon route, as interventions typically try to address the actual source of the problem rather than its consequences. Focusing on the content of the conspiracy theory, however, has its limitations, as it will likely not work when individuals do not trust the source trying to debunk the conspiracy theory (Lewandowsky et al., 2015). Additionally, this approach seems to be rather cognitive, while not attending to the social reality accompanied, and caused by the belief in conspiracy theories. Given the severity of the consequences of high conspiracy belief, it seems justified and urgently necessary to complement cognitive approaches based on preparing individuals for an encounter with a conspiracy theory with approaches addressing the consequences of high conspiracy belief and approaches focusing on the social reality of conspiracy belief.

Overall, this dissertation included two studies that successfully demonstrated that norm adherence among people believing in conspiracy theories can be increased through a cognitive/emotional and cognitive/motivational intervention. While the studies in Chapter 5 are not an intervention in the strict sense, they suggest that norm adherence can also be increased through a social intervention based on the subjective norm of people close to the individual. The different theoretical and empirical manuscripts further have the potential to inspire new routes for interventions, by addressing conspiracy theories before they are widely spread, by including motivational and emotional aspects driving conspiracy beliefs, and by attending and appealing to the social reality of people believing in conspiracy theories.

Conclusion

This dissertation examined the relationship between conspiracy belief and norm adherence. The manuscripts showed that (1) higher conspiracy belief is related to lower norm adherence across different types of norms, (2) that higher conspiracy belief can lead to lower norm adherence regarding norms questioned by the conspiracy theory, and (3) that norm adherence among people higher in conspiracy belief potentially can be increased through a cognitive/emotional, social or cognitive/motivational intervention.

Overall, this dissertation suggests that the lower norm adherence among people believing in conspiracy theories is a result of a different social reality that is accompanied and caused by the belief in a different factual reality alleged by conspiracy theories. By describing and examining this social reality through the theoretical review as well as empirical studies and interventions, this dissertation makes an important contribution in understanding conspiracy belief. It further opens up new routes for interventions aimed at reducing conspiracy belief as well as increase norm adherence among people higher in conspiracy belief.

While the Covid-19 pandemic will end at some point, conspiracy theories will continue to exist (Butter, 2020), and there are new societal challenges already waiting, with climate change just being one of them. These global challenges require societal responses guided by social norms. This dissertation speaks of the danger of conspiracy theories to undermine such efforts. But it also points to the potential of social norms being part of the solution – especially when they are shared and communicated by significant others, and when the reasons for the norms are accessible and salient.

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Appendices

Appendix I: Supplement Chapter 3

Overview of preregistered analyses and deviations

Study	Deviation
Study 1	We deviate from the preregistration by not including age as a predictor in the multiple regression analyses testing the hypotheses, because this would have reduced the samples size by about 40% due to the missing data for age. We have added the preregistered hypotheses tests below (Table S2). Results do not differ except that social engagement is not predicted by the Political COVID-19 Conspiracy (PCC) when age is included in the regression analyses (and the sample size is thus reduced).
Study 2 & 3, time 1	We collected more observations (N = 261/546) than preregistered (N = 250/350) due to unexpectedly quick responses.
study 3, time 1	We preregistered assessing support of governmental regulations with three items, but the internal consistency for these 3 items was low (α = .51) and one item was clearly unrelated to the other two. However, the remaining two formed a highly internally consistent scale with the additional 9 items we assessed for exploratory purposes (α = .91). Therefore, we used all 11 items in the support for governmental regulations measure and preregistered this measure for t2. We report the analysis only using the two correlated preregistered items below (Table S11), resulting in the same conclusions than using the 11-item scale. In addition, we used 4 instead of 2 items (as preregistered) as index of institutional trust to increase the validity of the measure (i.e. including institutions like the German equivalent to the Centers for Disease Control and Prevention (CDC) instead of focusing only on governmental officials). Analyses using the 2 items only are reported in the supplement (Table S11). Results do not differ from those with the 4-item scale.

Concept labels in this article and preregistrations

Label in this article	Label in preregistration	
Institutional trust	Study 1, 2 & Study 3 t2: Trust in public institutions	
	Study 3, t1:	Trust in local and national government
Support of governmental regulations	Study 1:	Appropriateness of implemented policies against the Covid-19 pandemic
	Study 2:	Support of governmental regulations
	Study 3, t1:	restrictions involving personal liberties
	t2:	acceptance of governmental regulations
Adoption of physical distancing	Study 1:	Physical distancing
	Study 2 & 3, t2:	Adherence to social distancing guidelines.
	Study 3, t1:	included in the scale measuring behavior changes due to COVID-19
Adoption of hygiene measures	Study 1 & 3,t2:	Adherence to hygiene measures
	Study 3, t1:	included in the scale measuring behavior changes due to COVID-19
Social engagement	Study 1:	Pro-social behavior
	Study 2 & 3:	Social engagement
Adoption of complementary medicine	Study 3, t1:	Actionism
	t2:	behaviors related to complementary medicine

Overview of measures reported in the main text

Reasons for differences in measures between studies

(1) Study 1 was conducted in Denmark, whereas Studies 2 &3 were conducted in Germany,
(2) Study 1 is one instance of a weekly regular study with a fixed set of measures. Study 3, t1 had been conducted before the teams in Denmark and Germany started to cooperate. This led to different measures.
(3) Low internal consistency of measures in a preceding study motivated additional changes.

Concept		Confirmatory or exploratory	Items [reason for changes]
Institutional trust	Study 1	preregistered hypothesis	5 items (police, government, politicians, experts, health system) [COSMO-Denmark scale]
	Study 2 Study 3		4 items about trust in the federal/state ministries, federal institutions [adaptation to German context]
Support of governmental regulations	Study 1	preregistered hypothesis	18 items (e.g., travel restrictions, closing schools) [COSMO-Denmark scale]
	Study 2 Study 3		11 items (e.g. closing schools) [adaptation to German context]
Adoption of physical distancing	Study 1	preregistered hypothesis	2 items: (avoiding close contact, avoiding contact to people at risk)
	Study 2		2 items from Study 1 plus 4 additional items (e.g. not meeting in big groups) [better reliability]
	Study 3		t1: one item ("Do not meet other people"), t2: as in Study 2
Adoption of hygiene measures	Study 1	preregistered hypothesis	3 items (washing hands, coughing in the elbow, cleaning) [COSMO-Denmark scale]
	Study 3		t1: 3 items (similar to items from Study 1) t2: 5 items [better reliability]
Social engagement	Study 1	preregistered hypothesis	5 items (e.g. helping the elderly) [COSMO-Denmark scale]
	Study 2		7 items (e.g., helping people from the risk group; four of the items also included in Study 1) [adaptation to German context; better reliability]
	Study 3		t1: 4 items similar to those in Study 1 t2: 7 items as in Study 2 [better reliability, consistency with Study 2]
Adoption of complementary medicine	Study 3	t1: preregistered hypothesis t2: exploratory	8 items (e.g., "Drinking ginger tea").
PCC	Studies 1-3	preregistered hypothesis	5 items (e.g., "Powerful people are using COVID-19 in order to crash the economy.")
CM	Studies 2-3	exploratory	12-item scale (Imhoff & Bruder, 2014)

Measures relevant to the current research question not reported in the main text

A full list of measures, hypotheses and results is included in the description of each study.

In all studies we preregistered that trust mediates large parts of the effects. In Study 3, we preregistered to repeat the tests of the predictions while controlling for conspiracy mentality. The tests of these hypotheses are reported in this supplement (Table S15) and summarized in the main text.

Study	Construct	Confirmatory or exploratory	Items	Reported
Study 1	Vaccination intention	preregistered hypothesis	1 item	supplement (p. 13)
Study 3, t1	belief in a China conspiracy theory	preregistered hypothesis	5 items	supplement (p. 34)
	conspirational thinking	exploratory	3 items	not reported, because we reported three other measures
Study 3, t2	China Corona Conspiracy	exploratory	4 items (same scale as at t1, excluding one item)	not reported, because conspiracy measures at t2 were exclusively used in tests for causality
	new conspiracy theory surrounding the German movement called "Widerstand2020"	exploratory	5 items	not reported, due to focus on longitudinal analyses
	willingness to take a vaccination	exploratory	1 item	
	attitude towards wearing face masks	exploratory	6 items	

Study 1: Survey study

Preregistration

Preregistration is openly available at: https://aspredicted.org/ks4ch.pdf

Details on participants and procedure

Participants of the Danish sample in Study 1 were recruited as follows: In 2018, one of the authors received contact information on 100,136 Danish adult citizens from Statistics Denmark, the central Danish authority providing statistical information about Danish citizens and Denmark (https://www.dst.dk/en). These citizens were chosen per random, but so that they—at the time of contact information extraction—were representative for the Danish adult population with regard to age, gender, and place of residence. From this group, a random sample of 5,000 people was invited via Danish citizens' official digital mail, called e-Boks (https://www.e-boks.com/corporate/en/), on March 30, 2020 to participate in an online questionnaire study around the COVID-19 situation. Participation was possible until midnight at April 5, 2020, and 775 respondents (15.5%) completed the study. As preregistered, participants with an education in the health sector (N = 131), with a chronic illness (N = 213), or who had been infected with COVID-19 (N = 6) were excluded from the analyses. Participants filled out the online questionnaire study using the platform formr (Arslan et al., 2020). The mentioned items and scales were part of a bigger survey which, in turn, represented the respective weeks' assessment of the Denmark COVID-19 Snapshot MOnitoring (COSMO Denmark; see http://copsy.dk/cosmo/ and http://dx.doi.org/10.23668/psycharchives.2795). Participants were free (not) to respond to each item, resulting in different Ns for the different measures. In the analysis, education was coded as follows: 1 = primary education, 2 = upper secondary education, vocational education or short cycle higher education, 3 = vocational bachelor, bachelor or master, and 4 = Ph.D.

Correlations between all measures

Below is an overview over correlations between all measures (Table S1).

Table S1

Bivariate correlations between all measures

		(1)	(2)	(3)	(4)	(5)	Institutional Trust
Political COVID-19 Conspiracy (PCC)	*r*	-.152	-.062	-.323	-.162	-.130	-.278
	p	.002	.207	.000	.001	.008	.000
	N	415	412	392	415	409	413
	95%- CI	[-.245; -.057]	[-.158; .035]	[-.409; -.232]	[-.255; -.067]	[-.224; -.034]	[-.365; -.187]
Adoption of physical distancing (1)	*r*		.566	.258	.151	.130	.244
	p		.000	.000	.002	.008	.000
	N		418	397	421	415	419
	95%- CI		[.497; .628]	[.163; .347]	[.056; .243]	[.034; .223]	[.152; .332]
Adoption of hygiene measures (2)	*r*			.285	.162	.282	.184
	p			.000	.001	.000	.000
	N			395	419	413	417
	95%- CI			[.192; .373]	[.067; .253]	[.190; .368]	[.090; .275]
Support of governmental regulations (3)	*r*				.323	.131	.443
	p				.000	.009	.000
	N				398	393	396
	95%- CI				[.232; .409]	[.032; .227]	[.360; .519]
Willingness to take a vaccination (4)	*r*					.097	.209
	p					.047	.000
	N					416	420
	95%- CI					[.001; .192]	[.115; .298]
Social engagement (5)	*r*						.130
	p						.008
	N						414
	95%- CI						[.034; .223]

Note: Confidence intervals and effect sizes were calculated using the SPSS macro by Weaver & Koopman (2014)

Deviations from the preregistration

Variables (not) included as covariate. We predicted that PCC would predict less adoption of physical distancing (but not less adoption of hygiene measures, Hypothesis 1), less support for governmental measures (Hypothesis 2), less willingness to take a vaccination against COVID-19 (Hypothesis 3), less prosocial behavior (Hypothesis 4), and less institutional trust (Hypothesis 5).

We preregistered to test Hypotheses 1-5 with multiple regressions predicting the respective dependent variable by PCC, while controlling for participants age, gender, children (yes/no), and education. Given that 164 participants did not report their age, the sample would have been substantially reduced by including age as covariate into the analyses. Therefore, in the analyses reported in the manuscript, we tested all predictions without the covariate age, but report results including this covariate here (Table S2).

Table S2

Multiple regressions for all outcomes on Political COVID-19 Conspiracy (PCC) including age as covariate

	Institutional trust (df = 246)			Support of governmental regulations (df = 229)			Adoption of physical distancing (df = 247)			Adoption of hygiene measures (df = 245)			Social engagement (df = 245)		
Outcomes	*B (SE)*	*p*	95%-CI	*B (SE)*	*p*	95%-CI	*B (SE)*	*p*	95%-CI	*B (SE)*	*p*	95%-CI	*B (SE)*	*p*	95%-CI
PCC	-0.22 (0.07)	.003	[-0.360;-0.072]	-0.47 (0.07)	< .001	[-0.609; -0.328]	-0.17 (0.06)	.002	[-0.283; -0.063]	-0.02 (0.06)	.712	[-0.139; 0.095]	-0.05 (0.04)	.142	[-0.123; 0.018]
Gender	0.19 (0.11)	.090	[-0.029; 0.399]	-0.02 (0.11)	.855	[-0.231; 0.192]	-0.01 (0.08)	.956	[-0.167; 0.158]	0.18 (0.09)	.041	[0.007; 0.347]	0.06 (0.05)	.259	[-0.044; 0.164]
Children	0.04 (0.14)	.783	[-0.241; 0.319]	-0.06 (0.14)	.664	[-0.343; 0.219]	-0.14 (0.11)	.214	[-0.349; 0.078]	-0.16 (0.11)	.169	[-0.376; 0.067]	-0.09 (0.07)	.181	[-0.230; 0.044]
Education	0.07 (0.08)	.400	[-0.089; 0.222]	-0.18 (0.08)	.022	[-0.337; -0.027]	0.02 (0.06)	.718	[-0.097; 0.140]	0.01 (0.06)	.819	[-0.108; 0.137]	0.05 (0.04)	.159	[-0.021; 0.130]
Age	0.01 (0.00)	.200	[-0.003; 0.013]	0.00 (0.00)	.505	[-0.005; 0.010]	0.01 (0.00)	.106	[-0.001; 0.011]	0.02 (0.00)	<.001	[0.011; 0.023]	0.00 (0.00)	.954	[-0.004; 0.004]

Additional preregistered analyses

Scale reliability/Two subscales of social engagement. We had preregistered to reduce the number of items and/or to form subscales when the internal consistency of a measure is not satisfying (i.e., Cronbach's alpha < .70). In both cases, a removal of one item (for adoption of hygiene measures) or forming two subscales (for social engagement) would not have increased Cronbach's alpha substantially while at the same time reducing the theoretical width of the construct. For both constructs, reliability analysis (see tables S3, S4 and S5) as well as analyses (see table S6) with the reduced scale (hygiene measures) or the two subscales (social engagement) are reported below.

Table S3

Reliability analysis for the three items of the adoption of hygiene measures (α = .62)

	Item-Scale-Correlation	**Cronbach's alpha if deleted**
I wash my hands often or use hand disinfectant	.61	.37
I make sure to cough or sneeze in my sleeve rather than in my hands	.39	.59
I pay extra attention to cleaning at the moment	.47	.63

Table S4

Factor loadings from principle component factor analyses with varimax rotation for Social engagement

	Component	
	1	2
Helping elderly, sick or quarantined people with shopping or related tasks?	.25	**.59**
Looking after other people's children so that they can work?	.09	**.63**
Sharing information about the novel coronavirus (COVID-19) online?	-.05	**.73**

Donating money to initiatives combatting the spread of the novel coronavirus (COVID-19) and/or helping those affected by it?	**.79**	.16
Support others financially who need it due to the financial consequences of the current coronavirus (COVID-19) outbreak?	**.84**	.04

Table S5

Internal consistency, mean, and standard deviation for the social engagement subscales

	N	α	*M, SD*
Social Engagement (1-3), all 5 items	418	.48	1.46, 0.40
- Task-related Help	418	.35	1.45, 0.47
- Financial Help	420	.52	1.46, 0.57

Table S6

Multiple regressions for the adoption of hygiene measures (2 items) and social engagement subscales on PCC, gender, children, and education

	Hygiene measures (df = 403)			Social Engagement (df = 397)			Task-related Help (df = 397)			Financial Help (df = 399)		
Outcomes:	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
PCC	-.07	.04	.103	-.07	.03	.018	-.04	.03	.225	-.10	.04	.008
Gender	.16	.06	.008	.04	.04	.309	.06	.05	.183	.01	.06	.877
Children	-.28	.07	<.001	-.08	.05	.086	-.11	.05	.047	-.04	.06	.530
Education	-.04	.04	.368	.04	.03	.225	-.01	.04	.836	.11	.04	.012

Willingness to take a vaccination. The results for Hypotheses of the preregistration 1, 2, 4, and 5 are reported in the main text. Due to the focus of the manuscript and space restrictions, the

results for Hypothesis 3 were dropped from the main text. PCC predicted in line with the hypothesis less willingness to take a vaccination, (B = -0.34, SE = 0.10, p = .001).

Mediation via institutional trust. We further expected and tested if institutional trust mediated the effect of the Political COVID-19 Conspiracy on (a) adoption of physical distancing, (b) support of governmental regulations, (c) the willingness to get a vaccination, and (d) social engagement (Hypothesis 6). Tests were conducted using the package lavaan in R (for statistical details see Table S7). Analyses revealed that the Political COVID-19 Conspiracy had an indirect effect via institutional trust on (a) adoption of physical distancing, (b) support of governmental regulations, (c) willingness to take a vaccination, and (d) social engagement (see Table S7). However, these analyses should be treated with caution due to the cross-sectional nature of the study. Again, these analyses were not included in the main document due to space restrictions.

Table S7

Indirect effects of the Political COVID-19 Conspiracy via institutional trust on support of governmental regulations, adoption of physical distancing, willingness to take a vaccination and social engagement via lavaan in R.

	Political COVID-19 Conspiracy	
	B	95%-CI
Support of governmental regulations	B = -0.13	CI = [-0.231; -0.060]
Adoption of physical distancing	B = -0.06	CI = [-0.170; -0.011]
Willingness to take a vaccination	B = -0.10	CI = [-0.209; -0.026]
Social engagement	B = -0.02	CI = [-0.037; -0.002]

Analyses for the full sample

We preregistered to exclude people working in the medical sector, those who had been infected with Covid-19, and people with a chronic illness, because our preregistration included a prediction regarding vaccination intentions and all of these groups have a different status regarding vaccinations. For working in the medical sector, receiving a vaccination might be mandatory, people who had been infected might be immune, and people with a chronic illness might not be able to receive vaccination for health reasons. Similarly, the excluded groups might also differ regarding social engagement, because people in the medical sector might need to work more, and the chronically ill are rather the one's that should receive help. Therefore, and to stick to the preregistration, we report our results in the main text applying the preregistered exclusion criteria. Below, we report the findings for the full sample for the sake of transparency (see Table S8 & S9).

Table S8

Bivariate correlations between all measures, full sample

		(1)	(2)	(3)	(4)	(5)	Institutional Trust
Political COVID-19 Conspiracy (PCC)	*r*	-.097	-.081	-.280	-.150	-.076	-.257
	p	.008	.027	<.001	<.001	.039	<.001
	N	750	747	702	751	736	747
Adoption of physical distancing (1)	*r*		.602	.367	.235	.120	.334
	p		<.001	<.001	<.001	.001	<.001
	N		761	712	765	748	761
Adoption of hygiene measures (2)	*r*			.398	.203	.202	.301
	p			<.001	<.001	<.001	<.001
	N			708	763	745	759
Support of governmental regulations (3)	*r*				.373	.095	.503
	p				<.001	.012	<.001
	N				714	699	709
Willingness to take a vaccination (4)	*r*					.083	.221
	p					.024	<.001
	N					750	764
Social engagement (5)	*r*						.099
	p						.007
	N						746

Table S9

Multiple regressions for all outcomes on Political COVID-19 Conspiracy (PCC), gender, children, and education, full sample

	Institutional trust (*df* = 716)				Support of governmental regulations (*df* = 674)				Adoption of physical distancing (*df* = 719)				Adoption of hygiene measures (*df* = 718)				Social engagement (*df* = 705)			
Outcomes	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI	*B (SE)*	*β*	*p*	95%-CI
PCC	-0.31 (0.05)	-0.25	< .001	[-0.405; -0.221]	-0.37 (0.05)	-0.30	< .001	[-0.454; -0.275]	-0.10 (0.04)	-0.10	.010	[-0.176; -0.024]	-0.07 (0.04)	-0.07	.071	[-0.151; 0.006]	-0.04 (0.02)	-0.07	.064	[-0.083; .002]
Gender	0.16 (0.06)	0.09	.014	[0.032; 0.285]	0.11 (0.06)	0.07	.079	[-0.013; 0.236]	0.05 (0.05)	0.04	.328	[-0.052; 0.156]	0.17 (0.06)	0.11	.002	[0.060; 0.275]	0.05 (0.03)	0.07	.076	[-0.006; 0.113]
Children	-0.10 (0.07)	-0.05	.170	[-0.247; 0.044]	-0.09 (0.07)	-0.04	.229	[-0.229; 0.055]	-0.17 (0.06)	-0.10	.005	[-0.293; -0.052]	-0.41 (0.06)	-0.23	<.001	[-0.528; -0.281]	-0.06 (0.04)	-0.06	.095	[-0.127; 0.010]
Education	0.05 (0.05)	0.04	.262	[-0.040; 0.147]	-0.16 (0.05)	-0.13	.001	[-0.253; -0.067]	-0.01 (0.04)	-0.01	.901	[-0.082; 0.072]	-0.09 (0.04)	-0.08	.024	[-0.171; -.012]	0.03 (0.02)	0.05	.234	[-0.017; 0.070]

Research materials

Given that this was part of a larger study (http://dx.doi.org/10.23668/psycharchives.2795), we do not report all items assessed in this wave, but only the items relevant for the analyses and names of the otherwise assessed concepts.

Demographics

Infection of self and other

Perceived knowledge

Risk perception

Preparedness

Efficacy

Following recommendations

Perceived effectiveness of measures for oneself & for others

Adoption of hygiene measures

Adoption of hygiene and physical distancing measures were presented in one block. Order of items is indicated below.

Angiv venligst hvor uenig eller enig du er i følgende udsagn. *Please indicate the extent to which you disagree or agree with the following statements.*

1. Jeg vasker mine hænder tit eller bruger håndsprit *I wash my hands often or use hand disinfectant*
2. Jeg sørger for at hoste eller nyse i mit ærme i stedet for mine hænd *I make sure to cough or sneeze in my sleeve rather than in my hands*

4 Jeg er ekstra opmærksom på rengøring for tiden *I pay extra attention to cleaning at the moment*

Adoption of physical distancing

3. Jeg prøver at begrænse den fysiske kontakt med andre (f.eks. håndtryk, kindkys, kram) *I try to limit the amount of physical contact I have with others (e.g. handshakes, kisses on the cheek, hugs)*
5. Jeg holder afstand til de ældre og/eller folk som jeg ved lider af en kronisk sygdom. *I keep a distance to the elderly and/or people that I know to suffer from a chronic illness*

Perceived adoption of hygiene measures/physical distancing from family and friends

Affect

Trust in news sources

Media usage

Institutional trust

Hvor meget tillid har du til, at de følgende individer og institutioner er i stand til at håndtere den nye coronavirus (COVID-19) godt og korrekt? *How much confidence do you have in the below individuals and organisations that they are capable of handling the novel coronavirus well and correctly?*

1. Politiet *The police*
2. [Private virksomheder *Private businesses* - Item was included in the survey, but not in our scale on institutional trust.]
3. Hospitaler og læger *Hospitals and doctors*
4. Offentlige myndigheder *State authorities*
5. Eksperter (f.eks. forskere) *Experts (e.g. researchers)*
6. Politikere *Politicians*

Corona vaccination

The assessed item was part of the preregistration, but due to space limits not included in the paper and/or analyses.

Angiv venligst hvor uenig eller enig du er i følgende udsagn. *Please indicate the extent to which you disagree or agree with the following statements.*

Hvis en vaccine mod den nye coronavirus (COVID-19) bliver tilgængelig ville jeg tage den. *If a vaccine against the novel coronavirus (COVID-19) becomes available, I would get it.*

Role of the government

Support of governmental regulations

Angiv venligst hvor uenig eller enig du er i følgende udsagn. *Please indicate the extent to which you disagree or agree with the following statements.*

1. Det er fornuftigt at arrangementer og begivenheder med flere end ti personer forbydes *It makes sense that functions and events with more than 10 people are prohibited*
2. Det er fornuftigt at storcentre, natklubber, diskoteker, barer og værtshuse lukkes *It makes sense that malls, night clubs, discos, bars and pubs are closed*
3. Det er fornuftigt at forbyde gæster på restauranter og caféer *It makes sense to ban guests in restaurants and cafes*
4. Det er fornuftigt at holde de danske grænser lukket *It makes sense to keep the Danish borders closed*
5. Det er fornuftigt at fly fra de områder i Verden, der er hårdest ramt af den nye coronavirus (COVID-19) forbydes at lande i Danmark *It makes sense to ban planes from parts of the World badly affected by the novel coronavirus (COVID-19) from landing in Denmark*
6. [Det er fornuftigt at fly fra de områder i Verden, der er hårdest ramt af den nye coronavirus (COVID-19) forbydes at lande i Danmark *It makes sense to ban planes from parts of the World badly affected by the novel coronavirus (COVID-19) from landing in Denmark.* - Item was included in the survey, but not in the preregistered scale]

7. Det er fornuftigt at skoler og dagtilbud holder lukket *It makes sense that schools and day-care institutions are closed*
8. Det er fornuftigt at alle offentligt ansatte, der ikke varetager kritiske funktioner, er sendt hjem *It makes sense that all public employees who do not serve critical societal functions are sent home*
9. [Det er fornuftigt at alle private arbejdsgivere opfordres til at sørge for, at flest muligt arbejder hjemmefra *It makes sense that all private employers are encouraged to ensure that as many employees as possible work from home* - Item was included in the survey, but not in the preregistered scale]
10. Det er fornuftigt at aflyse alle ikke-akutte operationer på landets sygehuse, således at man kan prioritere patienter smittet med den nye coronavirus (COVID-19) *It makes sense to cancel all non-emergency operations at hospitals across country so that patients infected with the novel coronavirus (COVID-19) can be given priority*
11. Det er fornuftigt at garantier for behandling og udredning i sundhedsvæsenet er blevet suspenderet ved lov *It makes sense that guarantees for treatment and examination within the health care system has been suspended by law*
12. Det er fornuftigt at epidemilovgivningen er skærpet, således at myndighederne har ret til at indføre sanktioner i forhold til enkeltpersoner, der skønnes at kunne sprede smitte *It makes sense that epidemic legislation has been tightened so that the authorities have the right to impose sanctions on individuals they believe might spread infection*
13. Det er fornuftigt at apoteker kun må sælge en pakke medicin per kunde for at undgå hamstring *It makes sense that pharmacies are only allowed to sell one package of medication per customer to avoid hoarding*
14. Det er fornuftigt at forsøge at begrænse brugen af den kollektive trafik *It makes sense to try to limit the use of public transport*
15. [Det er fornuftigt at sygehuse og plejehjem opfordres til at indføre skærpede restriktioner i forhold til besøg *It makes sense that hospitals and nursing homes are encouraged to impose stricter restrictions regarding visitors* - Item was included in the survey, but not in the preregistered scale]
16. Det er fornuftigt at myndighederne har beføjelse til at tvangsbehandle folk, hvis der er mistanke om smitte af den nye coronavirus (COVID-19) *It makes sense that the authorities have the power to coerce people to compulsory treatment if there is suspicion of infection with the novel coronavirus (COVID-19)*
17. Det er fornuftigt at myndighederne har beføjelse til at tvangsvacciner folk mod den nye coronavirus (COVID-19) *It makes sense that the authorities have the power to force people to get vaccinated against the novel coronavirus (COVID-19)*
18. Det er fornuftigt at myndighederne har beføjelse til at tvangsundersøge folk, hvis der er mistanke om smitte af den nye coronavirus (COVID-19) *It makes sense that the authorities have the power to forcibly examine people if there is suspicion of infection with the novel coronavirus (COVID-19)*
19. Det er fornuftigt at myndighederne har beføjelse til at sætte folk i tvangskarantæne, hvis der er mistanke om smitte af den nye coronavirus (COVID-19) *It makes sense that the authorities have the power to force people to quarantine if there is suspicion of infection with the novel coronavirus (COVID-19)*
20. Det er fornuftigt at politiet har beføjelse til at bruge den fornødne magt for at sikre de nye love der er vedtaget i kampen mod den nye coronavirus (COVID-

19) overholds *It makes sense that the police has the power to use the necessary power to enforce the new legislations adopted in the fight against the novel coronavirus (COVID-19)*

21. Det er fornuftigt at myndighederne har mulighed for at forbyde adgang til offentlige institutioner, supermarkeder og butikker, offentlige og private plejehjem og sygehuse, samt restriktioner på transportmidler *It makes sense that the authorities have the possibility to ban access to public institutions, supermarkets and shops, public and private nursing homes and hospitals, as well as the possibility to put restrictions on transportation*

Hoarding behavior

Fear/Worries concerning COVID-19

Empathy

Social Engagement

Hvilke af følgende handlinger har du gjort eller planlægger du at gøre for at hjælpe andre i forbindelse med udbruddet af den nye coronavirus (COVID-19).
Which of the following actions have you taken or are you planning to take to in order to help others in relation to the novel coronavirus (COVID-19) outbreak?

1. Hjælpe ældre, syge eller mennesker i karantæne med indkøb eller lignende opgaver? *Helping elderly, sick or quarantined people with shopping or related tasks?*
2. Passe andres børn, så de kan arbejde? *Looking after other people's children so that they can work?*
3. Dele informationer om den nye coronavirus (COVID-19) online? *Sharing information about the novel coronavirus (COVID-19) online?*
4. Donere penge til initiativer der bekæmper spredning af den nye coronavirus (COVID-19) og/eller hjælper dem der er berørt af den? *Donating money to initiatives combatting the spread of the novel coronavirus (COVID-19) and/or helping those affected by it?*
5. Støtte andre økonomisk som har brug for det pga. de økonomiske konsekvenser som følger af det aktuelle udbrud af coronavirus (COVID-19)? *Support others financially who need it due to the financial consequences of the current coronavirus (COVID-19) outbreak?*

[Participants additionally were given the option to write in other options of helping behavior. Answers were, however, excluded from the scale.]

Solidarity

Resilience

PCC

Angiv venligst hvor uenig eller enig du er i følgende udsagn. *Please indicate the extent to which you disagree or agree with the following statements.*

1. Nyhederne overdriver tallene og faren ved den nye coronavirus (COVID-19) N*ews outlets are exaggerating numbers and danger of COVID-19.*

2. Magtfulde personer bruger den nye coronavirus (COVID-19) til at køre økonomien i sænk *Powerful people are using COVID-19 in order to crash the economy.*
3. Panikken omkring den nye coronavirus er til dels skabt af folk som prøver at skade det politiske system *The panic about COVID-19 is partly caused by people trying to hurt the political system.*
4. Det er vigtigt at tænke på økonomien i stedet for at gå i panik over en virus som alligevel ikke er så farlig *It is important to think about the economy rather than to panic about a virus that is not so dangerous after all.*
5. Den nye coronavirus (COVID-19) bruges af magtfulde personer til at skade den almindelige borger *COVID-19 is just one way of the government to restrict the power of the small people.*

Psychological state

HEXACO

Risk taking

Resilience

General Trust

Study 2: Experimental study

Preregistration is openly available at: https://aspredicted.org/hg5a7.pdf

Details on participants and procedure

Based on preregistered inclusion criteria we excluded two students who indicated to not have answered honestly and attentively, three students who wanted to withdraw their data, and 14 students who did not spend enough time reading the conspiracy theory in the beginning (as checked in a pretest and preregistered).

Details regarding the hypothesis testing

In order to test underlying statistical assumptions, we conducted Levene-tests of homogeneity of variances. The test turned significant for institutional trust, F (1, 240) = 6.85, p = .009, and adoption of physical distancing, F (1, 240) = 4.44, p = .036. We, thus, conducted Welch-tests for unequal variances and report the results from this test in the manuscript.

Additional preregistered analyses

Like in the first study, we hypothesized and preregistered that the effect of PCC (as measured in the manipulation check) on support of governmental regulations, adoption of physical distancing and social engagement is mediated by institutional trust. Results (see Table S10) revealed a mediation of institutional trust on the support of governmental regulations as well as adoption of physical distancing. Again, due its correlational design, results should be treated with caution.

Table S10

Indirect effects of the Political COVID-19 Conspiracy via institutional trust on support of governmental regulations, adoption of physical distancing and social engagement using PROCESS (Model 4)

	Political COVID-19 Conspiracy	
	B	95%-CI
Support of governmental regulations	-0.10	[-0.164; -0.046]
Adoption of physical distancing	-1.51	[-2.631; -0.558]
Social engagement	-0.91	[-2.157; 0.308]

Additional analyses

Given that participants in the control condition off Study 2 did not read a text, the effects of the experimental manipulation could be attributed to other factors than the conspiracy theory. In order to rule out alternative interpretations, we tested whether the effect of the experimental condition on the outcomes is mediated by PCC, which was assessed as manipulation check, using the same scale as in Studies 1 and 3. Mediation analysis was conducted using PROCESS (Model 4). Results (see Table S11) revealed a mediation of PCC on institutional trust, support of governmental regulations as well as adoption of physical distancing. More importantly, the direct effect was in all three cases not significant and the indirect effect carried 50-70% of the total effect, which clearly indicates that the effects of the manipulation were mostly driven by differences in the belief in a political conspiracy theory.

Table S11

Indirect effects of experimental condition via PCC on institutional trust, support of governmental regulations and adoption of physical distancing using PROCESS (Model 4; Hayes, 2013)

	Indirect effect	*Direct effect*	Total effect
	B (SE) [CI]	*B (SE) [CI]*	*B (SE) [CI]*
Institutional trust	0.18 (0.07) [0.056; 0.329]	0.08 (0.11) [-0.146; 0.302]	0.26 (0.13) [0.008; 0.509]
Support of governmental regulations	0.18 (0.07) [0.051; 0.326]	0.18 (0.11) [-0.031; 0.398]	0.36 (0.12) [0.122; 0.607]
Adoption of physical distancing	1.97 (0.82) [0.573; 3.780]	1.54 (1.64) [-1.698; 4.783]	3.51 (1.74) [0.077; 6.950]

Research materials

All material and assessed items are reported here. We first display the original wording and then the English translation in italics.

1) Conspiracy theory presented in the experimental condition

Im Folgenden sehen Sie eine Interpretation der gegenwärtigen Ereignisse.
Bitte lesen Sie den Text bevor Sie mit der Umfrage beginnen, so dass Sie später generelle Fragen dazu beantworten können.
Below is an interpretation of current events.
Please read the text before you start the survey in such a way that you are able to answer general questions about it later

German (original). Seit einigen Wochen mehren sich Zweifel an der Rechtmäßigkeit der von der Bundesregierung erlassenen Maßnahmen zur Eindämmung der SARS-CoV-2 Pandemie. In den Medien kamen lange Zeit nur solche Experten zu Wort, welche den Kurs der Bundesregierung ausdrücklich befürworteten. Wissenschaftliche Diskussion und ausgeglichene Berichterstattung war de facto nicht gegeben. Experten, welche berechtigte Kritik übten - wie bspw. Prof. Dr. Sucharit Bhakdi oder Prof. Dr. Hendrick Streek - wurden von den staatlichen Medien lange als „Corona Leugner" diffamiert.

Mittlerweile wissen wir, dass das Coronavirus weit ungefährlicher ist als zu anfangs befürchtet. Die Mortalitätsrate, welche zu Beginn der Pandemie noch mit 2-5% beziffert wurde, ist laut den neuesten Ergebnissen der Heinsberg-Studie wohl kaum höher als 0,37% und schon vor Beginn des Lock-Downs in Deutschland war die Basisreproduktionsrate auf einem Wert stabil unter 1.

Wieso wurden die Maßnahmen trotz alledem eingeführt und für so lange Zeit aufrechterhalten? Wer könnte von alledem einen Nutzen haben? Diese Fragen werden klar, wenn man den Blick auf das große Ganze wagt.

Seit ihrer Gründung berät und beeinflusst die neoliberale XXX-Stiftung die Bundesregierung in wichtigen gesellschaftlichen Fragen zu Sozial-, Gesundheits- und Wirtschaftspolitik. Viele der von ihr erarbeiteten Konzepte, wie beispielsweise "Hartz 4" oder die "Privatisierung des Pflegesektors", sind heute Teil unserer politischen Realität und tragen erheblich zur sozialen Ungerechtigkeit in Deutschland bei. Auch das Robert Koch Institut arbeitet bei einer Vielzahl von Forschungsprojekten mit der XXX-Stiftung zusammen und bezieht teilweise erhebliche Fördergelder von ihr.

Die Corona-Pandemie wurde von der XXX-Stiftung gezielt dafür genutzt, um ein weiteres ihrer Projekte schnell und unbemerkt durch den Bundestag zu bringen.

Mit der Berichterstattung durch die Medien und durch das Robert-Koch-Institut, beide von der XXX-Stiftung beeinflusst, wurde in der Bevölkerung und im Bundestag schnell Einigkeit darüber erzeugt, dass zeitnah Maßnahmen getroffen werden mussten, um die Ausbreitung des Virus einzudämmen. Diese überstürzte Handlungsbereitschaft wurde von der Bundesregierung dazu genutzt, um das *erweiterte Immunitätsgesetz* zu verabschieden.

Dieses schließt den Gesetzesentwurf zur digitalen Patientenakte ein. Ein Konzept, welches unter dem Namen "der digitale Patient" von der XXX-Stiftung erarbeitet wurde und dafür sorgen soll, dass sämtliche Gesundheitsinformationen eines Menschen zentral gespeichert werden können. Der entsprechende Passus wurde in der Diskussion um die Verabschiedung des erweiterten Immunitätsgesetzes im Bundestag nicht erwähnt.

Dringende Datenschutzbedenken, die bisher immer gegen eine solche digitale Patientenakte gesprochen haben, wurden so geschickt umgangen und der Anspruch an Transparenz, den wir an unsere demokratischen Entscheidungsprozesse haben sollten, wurde hier ein weiteres Mal nicht erfüllt.

Die XXX-Stiftung finanziert sich im Wesentlichen über die Dividenden des XXX-Konzerns. Zu diesem gehören neben einigen der größten deutschen Medienhäuser auch das Dienstleistungsunternehmen Arvato. Dieses verdient sein Geld mit der Bereitstellung von IT-Systemen und deren Verwaltung, und profitiert seit Jahren von der Privatisierung öffentlicher Dienstleistungen.

Es ist sehr unwahrscheinlich, dass die XXX-Stiftung die Etablierung solcher Datenstrukturen so entschieden vorantreibt, ohne dabei ein eigenes Interesse zu verfolgen. Arvato wäre einer der bestgeeignetsten Dienstleister für die Umsetzung der digitalen Patientenakte. Zudem sind die dort gespeicherten Daten von größtem Interesse für weitere Wirtschaftszweige...

English (translation). For some weeks now, doubts about the legitimacy of the measures taken by the federal government to contain the SARS-CoV-2 pandemic have been increasing. For a long time, only those experts supporting the decisions of the federal government were featured in the media. Scientific discussion and balanced reporting was de facto non-existent. Experts who voiced critical opinions- such as Prof. Dr. Sucharit Bhakdi or Prof. Dr. Hendrick Streek - were long villainized by the state media as "Corona deniers".

We now know that the corona virus is far less dangerous than initially thought. According to the latest results of the Heinsberg study, the mortality rate, which was still estimated at 2-5% at the beginning of the pandemic, is hardly higher than 0.37%; and even before the start of the lockdown in Germany, the basic reproductive rate was consistently below 1.

Why have the measures been introduced despite all criticism and maintained for such a long time? Who could benefit from all of this? The answers to those questions become clear when looking at the bigger picture.

Since its foundation, the neoliberal XXX foundation has advised and influenced the federal government on important societal issues regarding social, health and economic policies. Many of the concepts developed by the foundation, such as "Hartz 4"[German unemployment and welfare package] or "Privatization of the care sector", are now part of our political reality and contribute significantly to the social injustice in Germany. The Robert-Koch-Institute [German institute for the identification, surveillance and prevention of diseases] also works with the XXX Foundation on a large number of research projects and in some cases receives substantial funding from it.

The corona pandemic was specifically used by the XXX Foundation to get another one of its projects through the parliament quickly and unnoticed: With the media and the Robert-Koch-Institute both being influenced by the XXX Foundation, the population and federal government quickly came to believe that measures had to be taken promptly to curb the spread of the virus. This willingness to act was used by the federal government to pass the *expanded immunity law*.

This includes the implementation of a law for digital patient records - a concept that was developed by the XXX Foundation under the name "the digital patient" and which is intended to ensure that all personal health information is stored centrally. However, the relevant passage was not mentioned in the discussion about the adoption of the extended immunity law in the Bundestag.

Important data protection concerns, which speak against the introduction of such a digital patient record, have been skillfully avoided and the goal of transparency which should be part of our democratic decision-making processes was not met once again.

The XXX Foundation is financed primarily through the dividends of the XXX Group, which consists not only of some of the largest German media companies, but also the service company

Arvato. The latter earns its money from the provision and management of IT systems and has benefited from the privatization of public services for years.

It is very unlikely that the XXX Foundation pushed ahead with this project, which includes the establishment of critical data structures, without pursuing its own interest. Arvato would be one of the most suitable service providers for the implementation of the digital patient file. In addition, the data stored there is of great interest for other economic sectors, too ...

Institutional Trust

Wie sehr vertrauen Sie den unten genannten Personen und Organisationen, dass sie mit dem Coronavirus gut umgehen
How much do you trust the people and organizations below to handle the situation with the Coronavirus well?

1. Robert-Koch-Institut [*German institute for the identification, surveillance and prevention of diseases*]
2. Bundeszentrale für gesundheitliche Aufklärung *Federal Centre for Health Education*
3. Länderministerien *State Ministries*
4. Bundesministerien *Federal Ministries*

Support of Governmental Regulations

Bei einer erneuten starken Ausbreitung des Coronavirus fände ich die folgenden Maßnahmen …
In case of another rapid spread of the coronavirus I think that the following measures are…

1. Quarantäne für Infizierte *quarantine for those infected*
2. Schließung von Schulen *school closures*
3. Absage von Großveranstaltungen *cancellation of big events*
4. Verbot von Großveranstaltungen *prohibition of big events*
5. Einreisende aus Risikogebieten unter Quarantäne stellen *putting people entering from risk areas into quarantine*
6. Schließung von Grenzen für Personen *closing borders for people*
7. Schließung von Restaurants *closure of restaurants*
8. Schließung von Kleidungsgeschäften *closure of clothing stores*
9. Regelungen für den Abstand zwischen Personen in Lebensmittelgeschäften *rules about the distance between people in food stores*
10. persönliche Freiheitsrechte einschränken *restricting personal liberty rights*
11. Verbot, das Haus ohne triftigen Grund zu verlassen *prohibition to leave the house without good reason*

Adoption of Physical Distancing

Bei einer erneuten starken Ausbreitung des Coronavirus: Welche der folgenden Maßnahmen würden Sie (teilweise) unternehmen, um die Ansteckung mit dem und/oder die weitere Ausbreitung des Coronavirus zu verhindern?
In case of another rapid spread of the coronavirus: Which of the following measures

would you (partially) take in order to prevent the infection with or spread of the novel Corona virus?

1. Sich nicht mit anderen Leuten treffen *Not meeting other people*
2. Einen Sicherheitsabstand von mindestens 1,5 m zu Fremden einhalten *Keeping a safety distance of at least 1.5 m*
3. Sich nicht in größeren Gruppen treffen *Do not meet in bigger groups of people*
4. Sich mit anderen Personen weniger in Innenräumen, sondern vor allem draußen treffen *Trying to meet other people outside instead of inside*
5. Andere Menschen nicht mit Umarmungen oder Handschlag begrüßen *Not greeting other people with a hug or handshake*
6. Leute nicht besuchen, die älter sind oder eine chronische Krankheit haben *Not visiting older people or people with a chronic disease*

Social Engagement

Bei einer erneuten starken Ausbreitung des Coronavirus: Wie wahrscheinlich wäre es, dass Sie sich sozial engagieren?
In case of another rapid spread of the coronavirus: How likely would you engage socially?

1. Gesprächsangebote für Mitglieder einer Risikogruppe *Offering to talk with people at risk*
2. Botengänge für Mitglieder einer Risikogruppe *Running errands for people at risk*
3. Hilfe in der Landwirtschaft *Helping in agriculture/farming*
4. Freiwillige Mitarbeit im Gesundheitssystem *Voluntary work in the health system*
5. Sich um die Kinder anderer Leute kümmern, damit diese arbeiten können *Taking care of others´ children so that the parents can go to work.*
6. Geld spenden an Initiativen, die die Ausbreitung des neuen Virus bekämpfen bzw. Betroffenen helfen *Donating money to organizations fighting the spread of the virus or helping people affected by it.*
7. Andere finanziell unterstützen, die es aufgrund der finanziellen Folgen des aktuellen Ausbruchs des Coronavirus benötigen *Supporting other people financially which are struggling with the financial consequences of the coronavirus.*

Political COVID-19 Conspiracy

Bitte geben Sie an, inwiefern Sie den folgenden Aussagen über das Coronavirus zustimmen.
Please indicate your agreement with the following statements about the coronavirus.

1. Die Nachrichten übertreiben die Zahlen und die Gefahr von COVID-19. *News outlets are exaggerating numbers and danger of COVID-19.*
2. Mächtige Leute benutzen COVID-19, um der Wirtschaft zu schaden. *Powerful people are using COVID-19 in order to crash the economy.*

3. Die Panik über COVID-19 wird teilweise durch Menschen verursacht, die dem politischen System schaden wollen. *The panic about COVID-19 is partly caused by people trying to hurt the political system.*
4. Es ist wichtiger, an die Wirtschaft zu denken statt Panik zu machen wegen eines Virus, das letztlich nicht so gefährlich ist. *It is important to think about the economy rather than to panic about a virus that is not so dangerous after all.*
5. COVID-19 ist nur eine Möglichkeit der Regierung, die Macht der kleinen Leute einzuschränken. *COVID-19 is just one way of the government to restrict the power of the small people.*

Conspiracy Mentality (complete original scale by Imhoff & Bruder, 2014)

Plausability Check

Bitte denken Sie an den Text, den Sie ganz zu Anfang gelesen haben.
Please think about the text you read in the beginning of the study.

Wie plausibel fanden Sie den Text? … überhaupt nicht (1) vs. voll und ganz (7)
How plausible was the text for you? ... not at all (1) vs. totally (7)
Wie sehr würden Sie den Aussagen aus dem Text zustimmen? … überhaupt nicht (1) vs. voll und ganz (7)
How much would you agree with the statements in the text? ... not at all (1) vs. totally (7)

Demographics

Debriefing

Debriefing Question

Für wie wahrscheinlich halten Sie es, dass die XXX Stiftung mit dem RKI und der
Bundesregierung zusammenarbeitet, um digitale Patientenakten zu erstellen und davon
gegebenenfalls zu profitieren? …auschlossen (0%) vs. absolut wahrscheinlich (100%) *How likely do you think it is that the XXX Foundation works together with the RKI and the Federal government to create digital patient records for their own profit? ... not possible (0%) vs. very likely (100%)*

Study 3: Longitudinal Study

Preregistrations are openly available at: https://aspredicted.org/w5hf5.pdf (t1) https://aspredicted.org/m6pg3.pdf (t2)

Details on participants and procedure

At t1, six participants were excluded for not submitting their data. At t2, 14 people were excluded for not approving the use of their data either at t1 or t2. Two people were excluded due to the preregistered outlier analysis.

Participants taking part in the second survey and approving the use of their data did not differ from the final sample in respect to age, $t(543) = 0.241$, $p = .810$, 95%-CI = [-0.874; 1.118], $d = 0.02$; PCC, $t(544) = 1.451$, $p = .147$, 95%-CI = [-0.053; 0.355], $d = 0.14$; CM, $t(544) = 1.067$, $p = .286$, 95%-CI = [-0.102; 0.346], $d = 0.11$; support of governmental regulations, $t(544) = -1.624$, $p = .105$, 95%-CI = [-0.346; 0.033], $d = 0.16$; institutional trust, $t(544) = -1.621$, $p = .106$, 95%-CI = [-0.371; 0.035], $d = 0.16$; adoption of hygiene measures, $t(544) = -0.466$, $p = .641$, 95%-CI = [-6.555; 4.040], $d = 0.05$; adoption of physical distancing, $t(544) = -1.599$, $p = .110$, 95%-CI = [-8.047; 0.825], $d = 0.16$; social engagement, $t(542) = -0.818$, $p = .414$, 95%-CI = [-7.181; 2.960], $d = 0.08$, or adoption of complementary medicine, $t(544) = 1.268$, $p = .205$, 95%-CI = [-0.889; 4.131], $d = 0.13$. Participants taking part in the second survey were also more likely to be female ($\chi 2_{2, N = 546} = 16.99$, p = <.001, $\phi = .176$) than male or other, which is a difference that seemed less relevant to us.

Correlations between all measures

Below is an overview over correlations between all measures (Table S12).

Table S12

*Bivariate correlations between all scales of Study 3 (*N *= 546) at t1.*

	China COVID-19 Conspiracy	Conspiracy mentality	Adoption of hygiene measures	Adoption of physical distancing	Institutional trust	Support of governmental regulations	Social engagement	Adoption of complementary medicine
Political COVID-19 Conspiracy	.50***	.51***	.05	-.30***	-.39***	-.33***	-.09*	.20***
China COVID-19 Conspiracy		.58***	.09*	-.16***	-.24***	-.05	-.05	.19***

Conspiracy mentality	.07	-.17***	-.30***	-.11*	-.01	.22***
Adoption of hygiene measures		.14**	.03	.08	.11*	.42***
Adoptin of physical distancing			.21***	.29***	.06	-.08
Institutional trust				.33***	.18***	-.14**
Support of governmental regulations					.11*	-.07
Social engagement						.11**

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Deviations from the preregistration

Support of governmental regulations was preregistered in t1 as only three items that seemed as specifically extreme examples of governmental regulations, namely restrictions of personal liberties, restrictions on leaving the house or news embargos in order to avoid panic. However, correlation and scale reliability between those three items was low (α = .51) and the item-total correlation for one item about news embargoes was very low (r = .10). Additionally, the item in question – about the news embargo – was ambiguously worded, which we only noted after data collection. Thus, this item was excluded from the analyses. Instead of using the resulting two item measure, we decided to make use of all items regarding governmental regulation (except for the uncorrelated news embargo item). This led to an 11-item scale with an internal consistency of α = .91. Consequently, we preregistered the full 11-item scale at t2. However, for full transparency, we report the analysis using the two correlated preregistered items below in table S13. Results were the same when taking the two-item measure.

Institutional trust. We also preregistered a two-item measure (consisting of only the two items asking about federal ministries) at t1 but assessed it with four items (additionally including two German institutions that work closely together with the government). Since the four-item measure had a good reliability (α = .87), and since we administered and preregistered the same four items at t2 as well as in the experimental study, we here report the analyses at t1

with the four-item-measure. Again, we report the analysis using the two-item measure below (see Table S13). Overall, the results for the four items measure were the same as taking the two-item measure.

Table S13

Bivariate correlations between the Political COVID-19 Conspiracy (PCC) scale as well as Conspiracy Mentality (CM) scale for Support of governmental regulations (2 item version) and Institutional trust (2 item version)

	PCC t1		CM t1	
	r	*p*	*r*	*p*
Institutional trust (2 items)	-.33	<.001	-.28	<.001
Support of governmental regulations (2 items)	-.29	<.001	-.09	.041

Adoption of Hygiene Measures and Physical Distancing. The three items about adoption of hygiene measures were assessed at t1 together in a block with one item about adoption of physical distancing and complementary medicine practice, but not preregistered at t1 as a scale. Later analyses revealed that relations between PCC and adoption of the three hygiene measures were different from PCC and the one item regarding adoption of physical distancing. Thus, for t2, we extended both scales, assessing adoption of hygiene measures with five items (analyses were preregistered as exploratory) and adoption of physical distancing with six items.

Complementary Medicine. For t2, we preregistered to assess behaviors related to complementary medicine with 9 items for exploratory analyses. However, one item from this scale (about mask wearing) was later excluded as mask wearing became a recommended behavior, whereas the initial communication indicated that face masks are not useful. We thus reported results with 8 items.

Additional preregistered analyses

China COVID-19 Conspiracy. Originally, we also included a *China COVID-19 Conspiracy* consisting of five items suggesting that China itself developed the coronavirus (e.g. "Covid-19 was developed by the Chinese as a bioweapon"), based on news articles (Gogarty & Hagle, 2020; Stevenson, 2020; Barclay, 2020) and tweets (Cotton, 2020; Mitchell, 2020). The

reverse-coded item no. 3 later was excluded because of low scale reliability. For space reasons, we only report the results for this scale very briefly in the discussion of Study 3 (main text). Correlations between the China COVID-19 Conspiracy (Items 1, 2, 4, & 5) and measures are reported in table S12 above.

Mediation analyses. In the preregistration we also hypothesized that the effects of PCC on support of governmental regulations, adoption of physical distancing and social engagement are mediated by trust in public institutions, as this mediation was found cross-sectionally in study 1. Analyses using the longitudinal design showed, however, that this is not the case, and that the cross-sectional effects found in study 1 indeed should be treated with caution. Below (see Table S14) are the results of the tests conducted using PROCESS (Hayes, 2013) V.3.3, Model 4. For each test, trust at t2 was analyzed as mediator, while trust at t1 was entered as covariate.

Longitudinal analyses with PCC and CM as predictor. We expected that the effects of PCC on institutional trust, support of governmental regulations, adoption of physical distancing, and social engagement even hold when controlling for a general conspiracy mentality (CM). However, when entering both, PCC and CM, at t1 as predictors, conspiracy mentality significantly predicted support for governmental regulations and institutional trust at t2 (see Table S15). As in the analyses with PCC as only predictor, conspirational thinking at t1 did not predict adoption of physical distancing and social engagement.

Table S14

Indirect effects of the Political COVID-19 Conspiracy via institutional trust on support of governmental regulations, adoption of physical distancing and social engagement using PROCESS (Model 4)

	Political COVID-19 Conspiracy (t1)	
	B	95%-CI
Support of governmental regulations (t2)	B = -0.07	CI = [-0.160; 0.015]
Adoption of physical distancing (t2)	B = -0.39	CI = [-1.428; 0.264]
Social engagement (t2)	B = <-0.01	CI = [-0.022; 0.006]

Table S15

Longitudinal analysis with PCC and CM as predictor in the longitudinal Study (N = 134).

	PCC (t1)				CM (t1)				Outcome (t1)			
	B	*SE*	*p*	95%-CI	*B*	*SE*	*p*	95%-CI	*B*	*SE*	*p*	95%-CI
Institutional trust	-0.07	0.09	.411	[-0.248; 0.102]	-0.15	0.07	.047	[-0.290; 0.002]	0.56	0.07	<.001	[0.417; 0.710]
Support of governmental regulation	-0.01	0.10	.922	[-0.207; 0.188]	-0.26	0.08	.002	[-0.418; 0.097]	0.41	0.10	<.000	[0.211; 0.616]
Adoption of physical distancing	-1.79	1.58	.258	[-4.915; 1.329]	-0.18	1.31	.891	[-2.763; 2.404]	0.14	0.06	.020	[0.023; 0.264]
Adoption of hygiene measures	-0.10	2.28	.965	[-4.603; 4.401]	0.16	1.90	.935	[-3.604; 3.914]	0.46	0.07	<.001	[0.329; 0.588]
Social engagement	0.02	0.03	.540	[-0.037; 0.071]	-0.03	0.02	.265	[-0.071; 0.020]	0.01	0.00	<.001	[0.004; 0.007]
Adoption of complementary medicine	1.64	1.49	.271	[-1.296; 4.578]	1.08	1.32	.414	[-1.527; 3.682]	0.67	0.09	<.001	[0.502; 0.847]

Analyses with non-extended measures. For three concepts (adoption of physical distancing; adoption of hygiene measures, social engagement), scales have been extended for t2 from one to six items (adoption of physical distancing), three to five items (adoption of hygiene measures) and from four to seven items (social engagement) in order to increase scale reliability. For transparency, we also preregistered to conduct and report the longitudinal analyses using the non-extended measures, i.e. using the exact same item(s) as at t1 (see Table S16, S17 and S18).

Table S16

Internal consistency, mean, and standard deviation for the non-extended scales at t2 (N = 134) in Study 3

Variable (possible response range)	α	*M* (*SD*)
Adoption of physical distancing, 1 item (1-100)	-	78.69 (24.48)
Adoption of hygiene measures, non-extended (1-100)	.55	60.47 (26.08)
Social engagement, non-extended (1-3)	.33	1.82 (0.33)

Table S17

Multiple regression analyses in rows with Political COVID-19 Conspiracy (PCC) (t1) and criterion (t1) as predictors of the non-extended measures at t2 (N = 134) in Study 3

	PCC (t1)				Criterion (t1)			
	B	*SE*	*p*	95%-CI	*B*	*SE*	*p*	95%-CI
Adoption of physical distancing (t2)	-2.09	2.33	.371	[-6.706; 2.517]	0.31	0.10	.003	[0.108; 0.519]
Adoption of hygiene measures (t2)	-0.33	2.17	.879	[-4.623; 3.963]	0.51	0.07	<.001	[0.363; 0.651]
Social engagement (t2)	.02	0.03	.562	[-0.039; 0.071]	0.01	0.00	<.001	[0.004; 0.008]

Table S18

Multiple regression analyses in rows with Conspiracy Mentality (CM) (t1) and criterion (t1) as predictors of the non-extended measures at t2 (N = 134) in Study 3

	CM (t1)				Criterion (t1)			
	B	*SE*	*p*	95%-CI	*B*	*SE*	*p*	95%-CI
Adoption of physical distancing (t2)	-3.64	1.91	.059	[-7.415; 0.137]	0.30	0.10	.004	[0.100; 0.503]
Adoption of hygiene measures (t2)	0.20	1.81	.912	[-3.383; 3.786]	0.51	0.07	<.001	[0.362; 0.650]
Social engagement (t2)	-0.01	0.02	.552	[-0.060; 0.032]	0.01	0.00	<.001	[0.004; 0.008]

Research Materials

All assessed items are reported here. In case scales changed between t1 and t2, changes are reported below. We first display the original wording and then the English translation in italics.

Support of Governmental Regulations

In der aktuellen Situation finde (t1)/Bei einer erneuten starken Ausbreitung des Coronavirus fände (t2) ich die folgenden Maßnahmen … völlig angemessen vs. absolut unangemessen
In the current situation (t1)/ In case of another rapid spread of the coronavirus (t2) I think that the following measures are…absolutely appropriate vs. absolutely inappropriate

1. Quarantäne für Infizierte *quarantine for those infected*
2. Schließung von Schulen *school closures*
3. Absage von Großveranstaltungen *cancellation of big events*
4. Verbot von Großveranstaltungen *prohibition of big events*
5. Einreisende aus Risikogebieten unter Quarantäne stellen *putting people entering from risk areas into quarantine*
6. Schließung von Grenzen für Personen *closing borders for people*
7. Schließung von Restaurants *closure of restaurants*
8. Schließung von Kleidungsgeschäften *closure of clothing stores*
9. Regelungen für den Abstand zwischen Personen in Lebensmittelgeschäften *rules about the distance between people in food stores*
10. persönliche Freiheitsrechte einschränken *restricting personal liberty rights*
11. Verbot, das Haus ohne triftigen Grund zu verlassen *prohibition to leave the house without good reason*
12. Nachrichtensperre zu COVID-19 zur Verbreitung von Panik in der Bevölkerung *news embargo on COVID-19 to avoid panic in the population* [Item was excluded from analyses at t1 and not part of the survey at t2]

Institutional Trust

Wie sehr vertrauen Sie den unten genannten Personen und Organisationen, dass sie mit dem Coronavirus gut umgehen
How much do you trust the people and organizations below to handle the situation with the Coronavirus well?

1. Robert-Koch-Institut [*German institute for the identification, surveillance and prevention of diseases*]
2. Bundeszentrale für gesundheitliche Aufklärung *Federal Centre for Health Education*
3. Länderministerien *State Ministries*
4. Bundesministerien *Federal Ministries*

Media Use

The following items were measured only at t1, but not included in any analyses.

Wie oft nutzen Sie die folgenden Quellen, um sich über das Coronavirus zu informieren? [Nie vs. Sehr oft]
How often do you use the following source in order to inform yourself about the Corona virus? [Never vs. Very often]

1. Öffentlich-rechtliche Fernsehsender *public television stations*
2. Private Fernsehsender *private television stations*
3. (Online) Zeitungen *(online) journals*
4. Soziale Netzwerke *social media*
5. Gespräche mit Familie und Freunden *conversations with family and friends*

Adoption of Hygiene Measures

Welche der folgenden Maßnahmen haben Sie bereits unternommen, um die Ansteckung mit dem und/oder Ausbreitung des neuartigen Coronavirus zu verhindern?
Bitte geben Sie hier nur an, welche Maßnahmen Sie unternommen haben, um die Ausbreitung des Virus zu verhindern, nicht Tätigkeiten, die Sie in Ihrem Alltag auch umsetzen.
Which of the following measures have you taken in order to prevent the infection with or spread of the novel Corona virus?
Please only indicate those measures, that you took in order to prevent the spread of the virus, not actions that you take in everyday life.

1. Häufiger Hände waschen *Washing hands more frequently*
2. Mund beim Husten bedecken *Covering the mouth when coughing*
3. Grippeimpfung *flu vaccination*
   [This item was measured only at t1, but not included in the final scale as recommendations from official entities about flu vaccinations changed in the course of events]
4. Augen, Nase und Mund mit ungewaschenen Händen nicht berühren *Not touching one's eyes, nose or mouth with unclean hands*

Additional items at t2:

5. Gegenstände vermeiden, die von vielen Menschen berührt werden (z.B. Haltegriffe oder Bargeld) *Avoiding objects that are touched by many people (e.g. handles in public transport or cash)*
6. Hände mindestens 20s lang waschen *Washing your hands at least 20s*

Adoption of Physical Distancing

The following items were presented in the preceding block

1. Sich nicht mit anderen Leuten treffen *Not meeting other people*

Additional items at t2:

2. Einen Sicherheitsabstand von mindestens 1,5 m zu Fremden einhalten *Keeping a safety distance of at least 1,5 m*
3. Sich nicht in größeren Gruppen treffen *Do not meet in bigger groups of people*

4. Sich mit anderen Personen weniger in Innenräumen, sondern vor allem draußen treffen *Trying to meet other people outside instead of inside*
5. Andere Menschen nicht mit Umarmungen oder Handschlag begrüßen *Not greeting other people with a hug or handshake*
6. Leute nicht besuchen, die älter sind oder eine chronische Krankheit haben *Not visiting older people or people with a chronic disease*

Adoption of Complementary Medicine

The following items were presented in the preceding block

1. Ausgewogene Ernährung *Well-balanced nutrition*
2. Körperliches Training *Physical exercise*
3. Ingwer-Tee trinken *Drinking ginger-tea*
4. Nahrungsergänzungsmittel *Food supplements*
5. Vorsicht bei Postsendungen *Being careful when receiving mail*
6. Naturheilmittel *Plant remedies*
7. Verzicht auf Fleisch *Not eating meat*
8. Tragen von Gesichtsmasken *Wearing face masks* [item included in the questionnaire, but later excluded from the scale as wearing of face masks became recommended]
9. Einnahme homöopathischer Mittel *Taking homoeopathic drugs*

Wearing Masks

The following items were measured only at t2, but not included in any analyses.

Bitte geben Sie an, inwiefern Sie folgenden Aussagen über das Maskentragen zustimmen. [Stimme überhaupt nicht zu vs. Stimme voll und ganz zu]
Please indicate your agreement with the following items about wearing masks. [Do not at all agree vs. Totally agree]

1. Das Maskentragen in Einkaufsläden finde ich sinnvoll. *I think it is useful to wear masks in shops.*
2. Das Maskentragen im öffentlichen Nahverkehr finde ich sinnvoll. *I think it is useful to wear masks in public transport.*
3. Ich bin grundsätzlich gegen das Tragen von Masken. (R) *I am generally against wearing masks.*
4. Das Tragen einer Maske schränkt meine Freiheit stark ein. (R) *Wearing masks limits my personal freedom.*
5. Ich trage eine Maske auch in Situationen, wo dies nicht explizit vorgeschrieben ist, aber ein Mindestabstand von 1,5m nicht eingehalten werden kann. *I am wearing a mask in situations where the minimum safety distance of 1,5 m cannot be guaranteed, even when it is not officially demanded.*
6. Ich trage eine Maske wirklich nur dann, wenn ich es muss. (R) *I am really only wearing mask when I have to.*

Social Engagement

Können Sie sich vorstellen, sich während der Corona Pandemie sozial zu engagieren, z.B. durch…

Could you imagine being socially engaged during the Corona Pandemic, for example through…

1. Gesprächsangebote für Mitglieder einer Risikogruppe *Offering to talk with people at risk*
2. Botengänge für Mitglieder einer Risikogruppe *Running errands for people at risk*
3. Hilfe in der Landwirtschaft *Helping in agriculture/farming*
4. Freiwillige Mitarbeit im Gesundheitssystem *Voluntary work in the health system*

Additional items at t2:

5. Sich um die Kinder anderer Leute kümmern, damit diese arbeiten können *Taking care of others´ children so that the parents can go to work.*
6. Geld spenden an Initiativen, die die Ausbreitung des neuen Virus bekämpfen bzw. Betroffenen helfen *Donating money to organizations fighting the spread of the virus or helping people affected by it.*
7. Andere finanziell unterstützen, die es aufgrund der finanziellen Folgen des aktuellen Ausbruchs des Coronavirus benötigen *Supporting other people financially which are struggling with the financial consequences of the coronavirus.*

Risk perception

The following items were measured only at t1, but not included in any analyses.

1. Als wie anfällig schätzen Sie sich für eine Infektion mit dem neuartigen Coronavirus ein? [überhaupt nicht anfällig vs. sehr anfällig] *How vulnerable do you think you are to be infected with the new coronavirus? [not vulnerable at all vs. very vulnerable]*
2. Wie hoch schätzen Sie Ihre Wahrscheinlichkeit ein, dass Sie sich mit dem neuartigen Coronavirus infizieren? [extrem unwahrscheinlich vs. extrem wahrscheinlich] *How likely do you think it is that you will become infected with the new corona virus? [extremely unlikely vs. extremely likely]*
3. Wie gefährlich schätzen Sie eine Infektion mit dem neuartigen Coronavirus für sich selbst ein? [völlig harmlos vs. extrem gefährlich] *How dangerous do you think an infection with the new corona virus would be for yourself? [completely harmless vs. extremely dangerous]*

Media Hype

The following item were measured only at t1, but not included in any analyses.

Das neuartige Virus ist für mich... [nicht medial aufgeblasen vs. medial aufgeblasen] *For me, the novel virus is ... [not exaggerated by the media vs. exaggerated by the media]*

Vaccination

The following item was measured only at t2, but not included in any analyses.

1. Ich würde mich gegen das Coronavirus impfen lassen, wenn eine Impfung verfügbar ist. [Stimme überhaupt nicht zu vs. Stimme voll und ganz zu] *I would get vaccinated against the coronavirus once/in case a vaccine becomes available. [Do not agree at all vs. Totally agree]*

Political COVID-19 Conspiracy

Bitte geben Sie an, inwiefern Sie den folgenden Aussagen über das Coronavirus zustimmen.
Please indicate your agreement with the following statements about the coronavirus.

1. Die Nachrichten übertreiben die Zahlen und die Gefahr von COVID-19. *News outlets are exaggerating numbers and danger of COVID-19.*
2. Mächtige Leute benutzen COVID-19, um der Wirtschaft zu schaden. *Powerful people are using COVID-19 in order to crash the economy.*
3. Die Panik über COVID-19 wird teilweise durch Menschen verursacht, die dem politischen System schaden wollen. *The panic about COVID-19 is partly caused by people trying to hurt the political system.*
4. Es ist wichtiger, an die Wirtschaft zu denken statt Panik zu machen wegen eines Virus, das letztlich nicht so gefährlich ist. *It is important to think about the economy rather than to panic about a virus that is not so dangerous after all.*
5. COVID-19 ist nur eine Möglichkeit der Regierung, die Macht der kleinen Leute einzuschränken. *COVID-19 is just one way of the government to restrict the power of the small people.*

China COVID-19 Conspiracy

Bitte geben Sie an, inwiefern Sie den folgenden Aussagen über das Coronavirus zustimmen. *Please indicate your agreement with the following statements about the coronavirus.*

1. Ich finde es sehr verdächtig, dass COVID-19 zum ersten Mal in der Region auftrat, wo Chinas einziges Level-4 Hochsicherheitslabor steht, in welchem die tödlichsten aller Viren untersucht werden. *I think it is highly suspicious that COVID-19 originated in the same city as Chinas only Level 4 laboratory, the highest-level classification of labs that study the deadliest viruses.*
2. Ich habe das Gefühl, dass die chinesische Regierung Informationen über den Ursprung von COVID-19 zurückhält. *I feel like the Chinese Government is hiding something about the origins of COVID-19.*
3. (R): Es ist eindeutig so, dass COVID-19 zum ersten Mal in der Tierwelt auftrat. [This item was later removed due to low item-scale-correlation and therefore also not included at t2] *It is perfectly clear that COVID-19 originated in wildlife.*
4. Chinesischen Laboren kann man im Umgang mit tödlichen Substanzen nicht trauen. *Chinese labs' handling with deadly substances can't be trusted.*
5. COVID-19 wurde von Chinesen als Biowaffe entwickelt. *COVID-19 was developed by the Chinese as a bioweapon.*

Agreement with statements from Widerstand2020 (German Protest Group)

The following items were measured only at t2, but not included in the analyses due to space limits.

1. Bill Gates ist der wahre Strippenzieher hinter den Geschehnissen rund um COVID-19. *Bill Gates is the puppet master controlling the events around COVID-19.*
2. Die Corona-Krise wird dafür benutzt, einen Impfzwang einzuführen. *The corona-crisis is just a cover to implement compulsory vaccination.*
3. Die anhaltende Einschränkung der Grundrechte ist Ausdruck davon, dass wir auf eine Diktatur zusteuern. *The continuing restriction of fundamental rights shows that we are heading towards a dictatorship.*
4. Der Lockdown Mitte März wäre nicht nötig gewesen, um die Verbreitung des Virus einzudämmen. *The lockdown mid-March would not have been necessary to curb the spread of the virus.*
5. Es sollte ein Notstandsparlament aus bisher nicht politisch aktiven BürgerInnen errichtet werden, welches politische Entscheidungen anstelle der zur Zeit im Parlament sitzenden Abgeordneten bestimmt. *An emergency parliament should be formed out of citizens who have not been politically active so far, which determines political decisions instead of the deputies currently sitting in parliament.*

Conspiracy Mentality (complete original scale by Imhoff & Bruder, 2014)

Additional conspiracy items

At t1, we also included some items about conspiracy theories taken from Bruder et al. (2013, see also German COVID-19 Snapshot Monitoring; Betsch et al., 2020) directly after the conspiracy mentality scale. However, items were not analyzed.

1. Politiker erwähnen meistens nicht die wahren Motive für ihre Entscheidungen. [trifft nicht zu vs. trifft zu] *Politicians most of the time don't mention the real motives for their decisions. [Disagree vs. Agree]*
2. Die Regierung überwacht alle Bürger sehr genau. [trifft nicht zu vs. trifft zu] *The government monitors all citizens very closely. [Disagree vs. Agree]*
3. Ereignisse, die oberflächlich betrachtet keinen Zusammenhang ergeben, sind oft das Ergebnis geheimer Aktivitäten. [trifft nicht zu vs. trifft zu] *Events that seem unrelated on the surface are often the result of secret activities. [Disagree vs. Agree]*

After the reported items of t1, the following concepts were assessed:

Norm perception

Identification

Motivations for adhering to guidelines

After the reported items at t2, data for three additional unrelated studies were assessed with the following concepts:

Identification

Attitudes about a tracing app

Purpose of tracing app

Competence evaluations

Attitudes about refugees

Trust in politicians

Efficacy beliefs

Writing task (Promotion/Prevention Focus)

Study 1-3: Moderation of effects by gender

One reviewer made us aware that some of the effects of PCC on the outcomes (Institutional trust, Support of governmental regulations, Adoption of physical distancing, Social engagement)
are potentially moderated by gender. We again tested for such a moderation: In four out of 16 regressions, the interaction between PCC and gender was significant. We report correlations below (see Table S19 and S20).

Table S19

Gender Moderations Study 1

		Support of governmental regulations			Adoption of physical distancing		
		N	*r*	*p*	*N*	*r*	*p*
female	PCC	200	-.42	<.001	211	-.22	.001
male		191	-.20	.007	203	-.05	.481

Table S20

Gender Moderations Study 3

		Support of governmental regulations			Social Engagement		
		N	*r*	*p*	*N*	*r*	*p*
female	PCC	380	-.40	<.001	378	-.16	.002
male		164	-.18	.022	164	.07	.396

Appendix II: Supplement Chapter 4

Additional Analyses

Analysis excluding outliers, participants with medical conditions and/or people who already had a Covid-19 infection

Table S1. *Multiple regressions for Vaccination Conspiracy Theories and Vaccination Intention as preregistered, excluding outliers, participants with medical conditions and people who already had a Covid-19 infection (N = 348)*

	Vaccination Conspiracy Theories (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.64 (0.05)	-	67.05	< .001	[3.53; 3.75]	57.88 (1.51)	-	38.33	< .001	[54.91; 60.85]
CM (mean-centered)	0.76 (0.04)	0.72	20.42	< .001	[0.69; 0.83]	-15.21 (1.04)	-0.61	-14.60	< .001	[-17.25; -13.16]
Focal contrast	-0.10 (0.04)	-0.09	-2.67	.008	[-0.18; -0.03]	3.03 (1.07)	0.12	2.82	.005	[0.92; 5.13]
Residual contrast	-0.11 (0.07)	-0.06	-1.64	.101	[-0.24; 0.02]	2.23 (1.84)	0.05	1.21	.228	[-1.39; 5.85]
Interaction term (CM x focal contrast)	0.03 (0.03)	0.4	1.00	.316	[-0.03; 0.08]	0.16 (0.73)	0.01	0.22	.827	[-1.27; 1.59]
Interaction term (CM x residual contrast)	0.00 (0.05)	0.00	-0.01	.995	[-0.09; 0.09]	-0.88 (1.29)	-0.03	-0.68	.495	[-3.43; 1.66]

Analysis controlling for age and gender

Table S2. *Multiple regressions for Vaccination Conspiracy Theories and Vaccination Intention (N = 382) controlling for age and gender*

	Vaccination Conspiracy Theories (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.21 (0.26)	-	12.23	<.001	[2.70; 3.73]	52.34 (6.96)	-	7.53	<.001	[38.67; 66.02]
Age	0.00 (0.00)	.04	1.01	.313	[-0.00; 0.01]	0.31 (0.11)	.11	2.68	.008	[0.08; 0.53]
Gender	0.15 (0.11)	.05	1.33	.184	[-0.07; 0.36]	-5.36 (2.89)	-.08	-1.85	.065	[-11.05; 0.33]
CM (mean-centered)	0.75 (0.04)	.71	19.92	<.001	[0.67; 0.82]	-14.73 (0.99)	-.60	-14.84	<.001	[-16.68; -12.78]
Focal contrast	-0.11 (0.04)	-.11	-2.97	.003	[-0.19; -0.04]	3.08 (1.02)	.12	3.02	.003	[1.08; 5.08]
Residual contrast	-0.11 (0.07)	-.06	-1.66	.097	[-0.25; 0.02]	1.43 (1.82)	.03	0.79	.433	[-2.14; 4.99]
Interaction term (CM x focal contrast)	0.01 (0.03)	.01	0.35	.724	[-0.04; 0.06]	0.20 (0.68)	.01	0.30	.765	[-1.13; 1.54]
Interaction term (CM x residual contrast)	0.00 (0.05)	.00	0.02	.983	[-0.09; 0.09]	-0.69 (1.26)	-.02	-0.55	.581	[-3.17; 1.78]

Analysis with the full sample

Table S3. *Multiple regressions, full representative sample (N = 504)*

	Vaccination Conspiracy Theories (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.66 (0.05)	-	78.01	<.001	[3.57; 3.76]	58.52 (1.33)	-	44.15	<.001	[55.92; 61.13]
CM (mean-centered)	0.75 (0.03)	.70	22.14	<.001	[0.68; 0.81]	-13.82 (0.95)	-.55	-14.55	<.001	[-15.68; -11.95]
Focal contrast	-0.08 (0.03)	-.07	-2.29	.023	[-0.14; -0.01]	2.34 (0.93)	.09	2.51	.013	[0.51; 4.17]
Residual contrast	-0.09 (0.06)	-.05	-1.57	.118	[-0.20; 0.02]	1.59 (1.63)	.04	0.98	.330	[-1.62; 4.80]
Interaction term (CM x Focal contrast)	0.03 (0.02)	.04	1.24	.214	[-0.02; 0.07]	-0.30 (0.65)	-.02	-0.46	.649	[-1.57; 0.98]
Interaction term (CM x Residual contrast)	0.01 (0.04)	.01	0.31	.754	[-0.07; 0.10]	-1.13 (1.20)	-.04	-0.94	.346	[-3.50; 1.23]

Additional preregistered analysis

We additionally preregistered to test the effect of the *no explanation* condition compared to the two conditions that received a text (*relevant* and *irrelevant explanation*).

Table S4. *Multiple regressions for Vaccination Conspiracy Theories and Vaccination Intention (N = 382) comparing the two text (irrelevant and relevant explanation) conditions to the no explanation conditions.*

	Vaccination Conspiracy Belief (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.63 (0.06)	-	66.28	<.001	[3.52; 3.74]	57.57 (1.47)	-	39.16	<.001	[54.68; 60.46]
CM (mean-centered)	0.75 (0.04)	.71	20.01	<.001	[0.67; 0.82]	-14.76 (1.00)	-.60	-14.76	<.001	[-16.73; -12.79]
Focal contrast	-0.11 (0.04)	-.10	-2.80	.005	[-0.19; -0.03]	2.66 (1.06)	.10	2.51	.012	[0.58; 4.73]
Residual contrast	-0.11 (0.07)	-.06	-1.74	.084	[-0.24; 0.02]	3.64 (1.78)	.08	2.05	.041	[0.16; 7.12]
Interaction term (CM x focal contrast)	0.01 (0.03)	.01	0.24	.807	[-0.05; 0.06]	-0.03 (0.72)	-.00	-0.04	.967	[-1.45; 1.39]
Interaction term (CM x residual contrast)	0.02 (0.05)	.02	0.45	.650	[-0.07; 0.11]	0.52 (1.20)	.02	0.43	.666	[-1.84; 2.88]

Analyses dummy-coded

Table S5. *Regressions only including the no explanation and relevant explanation condition (N = 250)*

	Vaccination Conspiracy Belief (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.63 (0.07)	-	55.52	<.001	[3.50; 3.76]	58.06 (1.73)	-	33.58	<.001	[54.65; 61.46]
CM (mean-centered)	0.75 (0.04)	.73	17.29	<.001	[0.67; 0.84]	-14.49 (1.15)	-.62	-12.58	<.001	[-16.76; -12.22]
condition (relevant explanation +1, no explanation -1)	-0.22 (0.07)	-.15	-3.43	.001	[-0.35; -0.10]	5.80 (1.73)	.16	3.36	.001	[2.39; 9.21]
Interaction term (CM x condition)	-0.02 (0.04)	.02	0.46	.646	[-0.07; 0.11]	0.22 (1.15)	.01	0.19	.852	[-2.05; 2.48]

Table S6. *Regressions only including the irrelevant and no explanation condition (N = 251)*

	Vaccination Conspiracy Belief (1-7)					Vaccination Intention (0-100)				
Predictors	*B (SE)*	*β*	*t*	*p*	95%-CI	*B (SE)*	*β*	*t*	*p*	95%-CI
Constant	3.74 (0.07)	-	54.96	<.001	[3.61; 3.88]	54.42 (1.84)	-	29.62	<.001	[50.80; 58.04]
CM (mean-centered)	0.73 (0.05)	.70	15.42	<.001	[0.64; 0.83]	-15.01 (1.28)	-.60	-11.71	<.001	[-17.53; -12.48]
condition (irrelevant explanation +1, no explanation -1)	-0.11 (0.07)	-.07	-1.61	.108	[-0.24; 0.02]	2.17 (1.84)	.06	1.18	.240	[-1.45; 5.78]
Interaction term (CM x condition)	0.00 (0.05)	.00	-0.01	.996	[-0.09; 0.09]	-0.30 (1.28)	-.01	-0.24	.813	[-2.83; 2.22]

Research Material

All material and assessed items are reported here. We first display the original wording and then the English translation in italics.

No explanation condition

Bitte lesen Sie den folgenden Text sorgfältig und aufmerksam durch. Am Ende der Studie werden Ihnen dazu ein paar Fragen gestellt.

Please read the following text carefully and attentively. You will be asked some questions about it at the end.

Seit 9 Monaten bestimmt die SARS-CoV-2 Pandemie das Leben aller Menschen in Deutschland. Bisher konnten wir dem neuartigen Erreger nur mit persönlicher Hygiene und Physical Distancing begegnen. Ein Impfstoff könnte die Situation verändern. Dies wissen wir über die Impfstoffe, die momentan im Gespräch sind:

For 9 months now, the SARS-CoV-2 pandemic is having a huge impact on the lives of all people in Germany. So far, we can only counter the novel pathogen with personal hygiene and physical distancing. A vaccine could change the situation. This is what we know about the vaccines that are currently discussed:

1. Der Corona-Impfstoff basiert auf der Technik der Messenger-RNA.

1. The Covid-19 vaccine is based on the technique of messenger RNA.

2. Dieses ist eine neue Technik, die in dieser Form zum ersten Mal eingesetzt wird.

2. This is a new technique, which is used for the first time in this form.

3. Die Zulassung des Impfstoffs geht deutlich schneller als sonst üblich.

3. The approval of the vaccine is much faster than usual.

Relevant explanation condition

Bitte lesen Sie den folgenden Text sorgfältig und aufmerksam durch. Am Ende der Studie werden Ihnen dazu ein paar Fragen gestellt.

Please read the following text carefully and attentively. You will be asked some questions about it at the end.

Seit 9 Monaten bestimmt die SARS-CoV-2 Pandemie das Leben aller Menschen in Deutschland. Bisher konnten wir dem neuartigen Erreger nur mit persönlicher Hygiene und Physical Distancing begegnen. Ein Impfstoff könnte die Situation verändern. Dies wissen wir über die Impfstoffe, die momentan im Gespräch sind:

For 9 months now, the SARS-CoV-2 pandemic is having a huge impact on the lives of all people in Germany. So far, we can only counter the novel pathogen with personal hygiene and physical distancing. A vaccine could change the situation. This is what we know about the vaccines that are currently discussed:

1. Der Corona-Impfstoff basiert auf der Technik der Messenger-RNA. Während bei bisherigen Impfungen meist ein abgeschwächter/toter Krankheitserreger gespritzt wird, wird bei der Impfung mit Messenger-RNA dem Körper der Bauplan zur Herstellung von einem Protein - hier: das Spike-Protein - zur Verfügung gestellt. Mit Hilfe dieses Bauplans stellt der Körper das Spike-Protein selber her und entwickelt dann Antikörper gegen dieses Protein. Da Corona-Viren wie Sars-CoV-2 auch aus diesem Spike-Protein bestehen, werden diese abgewehrt, ohne dass man komplette Corona-Viren spritzen muss. Weiterhin erfolgt kein Eingriff in die Erbsubstanz unserer Zellen. Die Messenger-RNA baut sich nach einigen Tagen wieder ab, während der Impfschutz bleibt.

1. The Covid-19 vaccine is based on the technique of messenger RNA. *In previous vaccinations, usually, an attenuated/dead pathogen is injected. In the case of the vaccination with messenger RNA, the body is provided with a blueprint for the production of a protein - in*

this case: the spike protein. Using this blueprint, the body itself produces the spike protein and then develops antibodies against this protein.
Since corona viruses such as Sars-CoV-2, among other things, consist of the same spike protein, they are fended off without having to inject complete corona viruses. Furthermore, there is no interference with the genetic substance of our cells. The messenger RNA decomposes itself after a few days, while the protection through the vaccine remains.

2. Dieses ist eine neue Technik, die in dieser Form zum ersten Mal eingesetzt wird. Die Technik der MessengerRNA ist eine neue Technologie. Diese wird aber seit über drei Jahrzehnten intensiv beforscht. Gerade in den letzten Jahren sind dabei einige bedeutende Fortschritte erzielt worden, unter anderem in Studien, die diese Technologie in der Krebstherapie einsetzen. MessengerRNA gilt gegenüber konventionellen Impfmethoden als sehr sichere Technologie. So scheiterten frühere Studien vor allem an mangelnder Wirkung des Impfstoffes und nicht an zu hohen Nebenwirkungen. Auch bei den Testungen des Corona-Impfstoffs wurden keine schweren Nebenwirkungen festgestellt, bei gleichzeitiger Wirksamkeit von bis zu 95%.
2. This is a new technique, which is used for the first time in this form. *The technique using messenger RNA is a new technology. However, it has been subject of intensive research for over three decades. In recent years particularly, some significant progress has been made, including studies using this technology in cancer therapy. Messenger RNA is considered a very safe technology compared to conventional vaccination methods. For example, earlier studies failed mainly because the vaccine was not effective, rather than because of serious side effects. Likewise, studies using the new Covid-19 vaccines did not reveal any serious side effects, with efficacy rates of up to 95%.*

3. Die Zulassung des Impfstoffs geht deutlich schneller als sonst üblich. Normalerweise beträgt die Zulassung mehrere Jahre. Aufgrund der hohen Relevanz einer Impfung für die Weltbevölkerung, der Bereitstellung riesiger finanzieller Mittel und dem Vorwissen aus ähnlichen Projekten (SARS, MERS) kann der Zulassungsprozess für den Impfstoff gegen SARS-CoV-2 allerdings deutlich schneller ablaufen. Alle zur Verfügung stehenden Ressourcen werden momentan auf die Entwicklung eines Impfstoffs gebündelt. Damit können bürokratische Prozesse beschleunigt und Stichproben schneller rekrutiert werden. An dem Zeitraum und dem Umfang der einzelnen Studienphasen hingegen ändert sich nichts. Werden Impfstoffe im Ausland zugelassen, müssen sie erst von der Europäischen Arzneimittelagentur überprüft werden, bevor sie in Deutschland auf den Markt kommen können.

3. The approval of the vaccine is much faster than usual. *Normally, the process of approving a vaccine takes several years. However, due to the high relevance of a vaccine for the world population, the fact that there is a lot of funding, and since there is existing knowledge from similar projects (SARS, MERS), the approval process for the vaccine against SARS-CoV-2 can be much faster. In the development of a vaccine, all available resources are activated. This will allow bureaucratic processes to be expedited and samples to be recruited more quickly. Different to that, no changes are made regarding the length and scope of the single study phases. If vaccines are approved abroad, they must first be reviewed by the European Medicines Agency before they can be marketed in Germany.*

Zusammenfassend lässt sich also sagen:
In summary, therefore:

1. Der Corona-Impfstoff basiert auf der Technik der Messenger-RNA.

1. The Corona vaccine is based on the technique of messenger RNA.

2. Dieses ist eine neue Technik, die in dieser Form zum ersten Mal eingesetzt wird.

2. This is a new technique, which is used in this form for the first time.

3. Die Zulassung des Impfstoffs geht deutlich schneller als sonst üblich.

3. The approval of the vaccine is much faster than usual.

Irrelevant explanation condition

Bitte lesen Sie den folgenden Text sorgfältig und aufmerksam durch. Am Ende der Studie werden Ihnen dazu ein paar Fragen gestellt.

Please read the following text carefully and attentively. You will be asked some questions about it at the end.

Informationen zur Herstellung und Verwendung eines Hefeteigs

Information on the preparation and use of a yeast dough

1. Hefeteig kann leicht oder schwer sein.

Hefeteige werden normalerweise aus Weizenmehl, Wasser oder Milch, Fett und Hefe zubereitet. Die Menge an Fett in einem Hefeteig ist ausschlaggebend für seine "Schwere". Ein leichter Hefeteig enthält bis zu 150g Fett pro Kilogramm Mehl, ein mittelschwerer Hefeteig bis zu 250g und ein schwerer Hefeteig über 250g Fett pro Kilogramm Mehl. Leichte Hefeteige werden beispielsweise zu der Herstellung von Broten und Brötchen verwendet, mittelschwere Hefeteige kommen bei der Herstellung von Hefezopf zum Einsatz und schwere Hefeteige werden zu der Herstellung von französischer Brioche oder Christstollen verwendet.

1. Yeast dough can be light or heavy.

Yeast dough is usually prepared from wheat flour, water or milk, fat and yeast. The amount of fat in a yeast dough determines its "heaviness". A light yeast dough contains up to 150g of fat per kilogram of flour, a medium yeast dough up to 250g, and a heavy yeast dough over 250g of fat per kilogram of flour. Light yeast dough is used, for example, in the production of bread and buns, medium yeast dough is used in the production of braided yeast bread [a common recipe in Germany], and heavy yeast doughs are used in the production of the French brioche or Christmas stollen [again, a typical meal in Germany around Christmas].

2. Die Teigführung eines Hefeteigs kann direkt oder indirekt erfolgen.

Hefeteige können direkt oder indirekt geführt werden. Bei der direkten Teigführung werden alle Zutaten gleich zu Anfang miteinander verknetet und danach zum Aufgehen ruhen gelassen. Bei der indirekten Teigführung wird anfangs nur ein Teil des Mehls mit der Flüssigkeit und der Hefe vermischt und ruhen gelassen. In dieser Zeit kann sich die Hefe vermehren. Sie bildet hierbei einen intensiveren Geschmack aus und entwickelt eine größere Triebfähigkeit. Die indirekte Teigführung hat zwar den Nachteil, dass sie länger dauert, dafür haben die Gebäckstücke danach eine feinere Porung, ein intensiveres Aroma und bleiben länger frisch.

2. The yeast dough process can be direct or indirect.

The process of creating a yeast dough can be directly or indirectly. In the case of the direct dough process, all the ingredients are kneaded together at the very beginning and then left to rise. In the indirect method, only a part of the flour is mixed with the liquid and yeast and then left to rest. During this time, the yeast can rise. It develops a more intense flavour and a greater leavening. The disadvantage of the indirect dough process is that it takes longer, but the pastries have a finer texture, a more intense aroma, and they stay fresh longer.

3. Plunderteig ist eine besondere Form des Hefeteigs.

Eine ganz besondere Form des Hefeteigs ist der Plunderteig. Hierbei wird ein direkt geführter, leichter Hefeteig dünn ausgerollt und mit einer Schicht Butter belegt. Anschließend wird der Teig so gefaltet, dass mehrere Schichten aus Teig und Butter entstehen, welche sich beim Backen voneinander lösen. Diesen Vorgang nennt man Tourieren. Ein Plunderteig wird in der Regel so oft touriert, dass das fertige Gebäckstück aus 27 Teigschichten besteht. Gebäckstücke aus Plunderteig sind besonders luftig und knusprig. Häufig wird Plunderteig mit Blätterteig verwechselt, dieser wird zwar nach demselben Prinzip hergestellt und ebenfalls touriert, allerdings enthält Blätterteig keine Hefe. Das französische Croissant besteht

zum Beispiel aus Plunderteig.

3. Danish pastry is a special form of yeast dough.

A very special form of yeast dough is Danish pastry. Here, a directly guided, light yeast dough is rolled out thinly and covered with a layer of butter. Then the dough is folded, and several layers of dough and butter are formed, which separate themselves from each other during baking. This process is called touring. A Danish pastry is usually toured so many times that the finished pastry consists of 27 layers of dough. Pastries made from Danish pastry are particularly airy and crispy. Danish pastry is often confused with puff pastry, which is made the same way and is also toured, but puff pastry does not contain yeast. The French croissant, for example, is made of Danish pastry.

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For 9 months now, the SARS-CoV-2 pandemic is having a huge impact on the lives of all people in Germany. So far, we can only counter the novel pathogen with personal hygiene and physical distancing. A vaccine could change the situation. This is what we know about the vaccines that are currently discussed:

1. Der Corona-Impfstoff basiert auf der Technik der Messenger-RNA.

1. The Covid-19 vaccine is based on the technique of messenger RNA.

2. Dieses ist eine neue Technik, die in dieser Form zum ersten Mal eingesetzt wird.

2. This is a new technique, which is used for the first time in this form.

3. Die Zulassung des Impfstoffs geht deutlich schneller als sonst üblich.

3. The approval of the vaccine is much faster than usual.

Measurements & Procedure

Text according to condition

Vaccination Conspiracy Theories (adapted from Shapiro et al., 2016)

Bitte geben Sie an, wie sehr Sie den folgenden Aussagen über die Impfung gegen SARS-CoV-2 zustimmen: (1 – stimme ganz und gar nicht zu; 7 – stimme voll und ganz zu)
Please indicate how much you agree with the following statements about the vaccine against SARS-CoV-2: (1 - strongly disagree; 7 - strongly agree)

1. Die Daten zur Sicherheit des neuen SARS-CoV-2 Impfstoffes werden zu positiv interpretiert.
   Data on the safety of the new SARS-CoV-2 vaccine is interpreted too positively.

2. Die Pharmaunternehmen, die an dem neuen SARS-CoV-2 Impfstoff arbeiten, verheimlichen die Gefahren dieses Impfstoffes.
   Pharmaceutical companies working on the new SARS-CoV-2 cover up the dangers of the vaccine.

3. Die Menschen werden über die Wirksamkeit des neuen SARS-CoV-2 Impfstoffes getäuscht.
   People are deceived about the vaccine efficacy of the new SARS-CoV-2 vaccine.

4. Die Daten zur Wirksamkeit des neuen SARS-CoV-2 Impfstoffes sind so positiv, dass man ihnen nicht vertrauen kann.
   Vaccine efficacy data of the new SARS-CoV-2 vaccine is so positive that it cannot be trusted.

5. Die Verbindungen zwischen einer Impfung mit dem neuen SARS-CoV-2 Impfstoff und schweren Nebenwirkungen werden vertuscht.
   Links between a vaccination with the new SARS-CoV-2 vaccine and severe side effects are being covered up.

6. Die Zusammenarbeit von Regierungen mit Pharmakonzernen im Fall vom Impfstoff gegen SARS-CoV-2 ist verdächtig eng.
   The cooperation of governments with pharmaceutical companies in the case of the SARS-CoV-2 vaccine is suspiciously close.

Conspiracy Mentality (complete original scale by Imhoff & Bruder, 2014)

Demographics

Debriefing

Appendix III: Supplement Chapter 5

(1) Research materials Study 1 (original materials were in German)

Complete list of variables assessed in this study:

- Belief in conspiracy theories (5 items; Lewandowsky et al., 2013)
- Conspiracy mentality (12 items)
- Political ideology (6 items)
- Need for uniqueness (10 items)
- Attitude toward the travel vaccination (3 items)
- Subjective norm for the travel vaccination (1 item)
- Perceived behavioral control for the travel vaccination (2 items)
- Vaccination intention for the travel vaccination (1 item)
- Attitude toward the child vaccination (3 items)
- Subjective norm for the child vaccination (1 item)
- Perceived behavioral control for the child vaccination (2 items)
- Vaccination intention for the child vaccination (1 item)
- General attitude toward vaccinations (5 items)

Assessment of conspiracy mentality

(complete original scale from Imhoff & Bruder, 2014)

- There are many very important things happening in the world about which the public is not informed.
- Those at the top do whatever they want.
- A few powerful groups of people determine the destiny of millions.
- There are secret organizations that have great influence on political decisions.

- I think that the various conspiracy theories circulating in the media are absolute nonsense. (R)
- Politicians and other leaders are nothing but the string puppets of powers operating in the background.
- Most people do not recognize to what extent our life is determined by conspiracies that are concocted in secret.
- There is no good reason to distrust governments, intelligence agencies, or the media. (R)
- International intelligence agencies have their hands in our everyday life to a much larger degree than people assume.
- Secret organizations can manipulate people psychologically so that they do not notice how their life is being controlled by others.
- There are certain political circles with secret agendas that are very influential.
- Most people do not see how much our lives are determined by plots hatched in secret.

(1 = does not apply, 7 = does apply)

Assessment of vaccination-related concepts

(items adapted from Schifter & Ajzen, 1985)

In this part we would like to know more about your attitudes toward vaccination. To do this, we would first like you to imagine the following situation.

Instruction for the travel vaccination

You have planned a holiday trip to a less developed country. In this country there have been some cases of an infectious disease in recent years, which is curable but usually results in permanent health damage. You can be vaccinated against this disease.

Attitude

For me the vaccination against this disease would be…

- 1 = bad, 7 = good
- 1 = detrimental, 7 = beneficial
- 1 = undesirable, 7 = desirable

Subjective norm

- People I care about probably think I should get vaccinated

(1 = do not agree at all, 7 = fully agree)

Perceived behavioral control

- Whether I get vaccinated or not depends solely on me
- What I intend to do has no influence on whether I would get vaccinated (R)

(1 = do not agree at all, 7 = fully agree)

Vaccination intention

- How likely do you think it is that you would see a doctor to get vaccinated before traveling? (0%, 100%)

Instruction for the child vaccination

Imagine that you are going to have a child. Among many other things, parents must decide against which diseases their children will be vaccinated. Vaccinations against tetanus, diphtheria, pertussis, polio and Haemophilus influencae b (Hib) are currently given to almost all children. There are other vaccinations, however, where parents' decisions vary widely. For example, hepatitis B can be vaccinated when the child is only a few months old. However, this vaccination can also be given later. In infancy, diseases are very rare, but then almost

always become chronic. Hepatitis B is widespread worldwide. In Germany, around 300,000 to 650,000 people are chronically - i.e. permanently - infected with hepatitis B. Among other things, this liver inflammation usually leads to flu-like symptoms that can be accompanied by nausea and vomiting. Hepatitis B can take a severe course and sometimes takes months to heal, or even becomes chronic. Hepatitis B infection can only be treated with medication to a limited extent.

Attitude

For my child the vaccination against hepatitis B in infancy would be…

- 1 = bad, 7 = good
- 1 = detrimental, 7 = beneficial
- 1 = undesirable, 7 = desirable

Subjective norm

- People I care about probably think I should get my child vaccinated

(1 = do not agree at all, 7 = fully agree)

Perceived behavioral control

- Whether I get my child vaccinated or not depends solely on me
- What I intend to do has no influence on whether my child would get vaccinated (R)

(1 = do not agree at all, 7 = fully agree)

Vaccination intention

- How likely do you think it is that you would get your child vaccinated against hepatitis B in infancy? (0%, 100%)

Assessment of the general attitude toward vaccinations

(complete original scale from Lewandowsky et al., 2013)

- I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases.
- I believe that vaccines have negative side effects that outweigh the benefits of vaccination for children. (R)
- Vaccines are thoroughly tested in the laboratory and wouldn't be made available to the public unless it was known that they are safe.
- The risk of vaccinations to maim and kill children outweighs their health benefits. (R)
- Vaccinations are one of the most significant contributions to public health.

(1 = do not agree at all, 7 = fully agree)

(2) Research materials Study 2 (original materials were in German)

Complete list of variables assessed in this study and preceding manipulations:

- Manipulation on minority vs. majority influence (unrelated study in the same lab session)
- Manipulation including a political speech on immigration (unrelated study)
- Belief in conspiracy theories (see Study 1)
- Conspiracy mentality (see Study 1)
- Political ideology (see Study 1)
- Need for uniqueness (see Study 1)
- Societal norm for the travel vaccination (1 item)
- Subjective norm for the travel vaccination (see Study 1)
- Perceived behavioral control for the travel vaccination (see Study 1)
- Attitude toward the travel vaccination (see Study 1)
- Vaccination intention for the travel vaccination (see Study 1)

- Societal norm for the child vaccination (1 item)
- Subjective norm for the child vaccination (see Study 1)
- Perceived behavioral control for the child vaccination (see Study 1)
- Attitude toward the child vaccination (see Study 1)
- Vaccination intention for the child vaccination (see Study 1)
- General attitude toward vaccinations (see Study 1)

(3) Research materials Study 3 (original materials were in German)

Complete list of variables assessed in this study and preceding manipulation:

- Manipulation including recall of a negative event (unrelated study in the same session)
- Conspiracy mentality (see Study 1)
- Societal norm for the COVID-19 vaccination (1 item)
- Subjective norm for the COVID-19 vaccination (1 item)
- Perceived behavioral control for the COVID-19 vaccination (2 items)
- Vaccination intention for the COVID-19 vaccination (1 item)
- General attitude toward vaccinations (see Study 1)
- Self-reported critical thinking (3 items; Lantian et al., 2020)
- Political orientation (1 item)

Assessment of vaccination-related concepts

(items adapted from Schifter & Ajzen, 1985)

In this part, we would like to know more about your attitudes toward vaccination. To do this, we would first like to ask you to imagine the following situation:

In the near future, a vaccine against the currently prevalent coronavirus (COVID-19) is likely to be developed. This vaccine will be available to the general population and will make people immune to the virus for a certain period of time.

Please answer all questions assuming that a vaccine against the new coronavirus is successfully developed.

Societal norm

- Most people would probably get vaccinated

(1 = do not agree at all, 7 = fully agree)

Subjective norm

- People I care about probably think I should get vaccinated

(1 = do not agree at all, 7 = fully agree)

Perceived behavioral control

- Whether I get vaccinated or not depends solely on me
- If I want, it will be easy for me to get vaccinated

(1 = do not agree at all, 7 = fully agree)

Vaccination intention

- How likely do you think it is that you will get vaccinated against the new coronavirus? (0%, 100%)

(4) Research materials Study 4 (original materials were in German)

Complete list of variables assessed in this study:

- Conspiracy mentality (see Study 1)
- Societal norm for the influenza vaccination (1 item)
- Subjective norm for the influenza vaccination (1 item)

- Perceived behavioral control for the influenza vaccination (1 item)
- Attitude toward the influenza vaccination (3 items)
- Vaccination intention for the influenza vaccination (1 item)
- General attitude toward vaccinations (see Study 1)
- Attitude toward societal change in response to the corona-crisis (6 items)
- Traditionalism in response to the corona-crisis (3 items)
- Need for security (5 items)
- Risk attitudes (5 items)
- Self-reported critical thinking (see Study 3)
- Conspiracy mentality (see Study 1)
- Political orientation (see Study 3)

Assessment of vaccination-related concepts

(items adapted from Schifter & Ajzen, 1985)

In this part, we would like to know more about your attitudes toward vaccination.

First, we would like to know your opinion on the seasonal influenza vaccination (i.e., the annual vaccination against the current influenza viruses).

Societal norm

- Most people are probably getting vaccinated against influenza this season

(1 = do not agree at all, 7 = fully agree)

Subjective norm

- People I care about probably think I should get vaccinated against influenza this season

(1 = do not agree at all, 7 = fully agree)

Perceived behavioral control

- Whether I get vaccinated against influenza this season or not depends solely on me

(1 = do not agree at all, 7 = fully agree)

Attitude

For me getting vaccinated against influenza this season would be…

- 1 = bad, 7 = good
- 1 = detrimental, 7 = beneficial
- 1 = undesirable, 7 = desirable

Have you already been vaccinated against influenza this season?

- Yes
- No

Vaccination intention (if No was selected previously)

- How likely do you think it is that you will get vaccinated against influenza this season?

(0% = I certainly do not get vaccinated against influenza, 100% = I certainly get vaccinated against influenza)

(5) Deviation from the preregistration Study 5

We would like to note that we additionally predicted and preregistered that the moderating effect of conspiracy mentality on the relation between subjective norm and vaccination intention might be stronger for realistic vaccinations (i.e., COVID-19, TBEV) as compared to fictitious vaccinations (i.e., travel and child vaccination). However, as it turned out that this within-subjects factor did not moderate the primarily predicted effect, we did not include it in the analyses reported in the main manuscript.

(6) Research materials Study 5 (original materials were in German)

Complete list of variables assessed in this study and manipulation:

- Manipulation of order: realistic first (TBEV, COVID-19, travel, child) vs. fictitious first (travel, child, TBEV, COVID-19)
- Societal norm for the TBEV vaccination (1 item)
- Subjective norm for the TBEV vaccination (1 item)
- Perceived behavioral control for the TBEV vaccination (1 item)
- Attitude toward the TBEV vaccination (3 items)
- Vaccination intention for the TBEV vaccination (1 item)
- Societal norm for the COVID-19 vaccination (see Study 3)
- Subjective norm for the COVID-19 vaccination (see Study 3)
- Perceived behavioral control for the COVID-19 vaccination (see Study 3, item 1)
- Attitude toward the COVID-19 vaccination (3 items)
- Vaccination intention for the COVID-19 vaccination (see Study 3)
- Societal norm for the travel vaccination (see Study 2)
- Subjective norm for the travel vaccination (see Study 2)
- Perceived behavioral control for the travel vaccination (see Study 2, item 1)

- Attitude toward the travel vaccination (see Study 2)
- Vaccination intention for the travel vaccination (see Study 2)
- Societal norm for the child vaccination (see Study 2)
- Subjective norm for the child vaccination (see Study 2)
- Perceived behavioral control for the child vaccination (see Study 2, item 1)
- Attitude toward the child vaccination (see Study 2)
- Vaccination intention for the child vaccination (see Study 2)
- General attitude toward vaccinations (see Study 1)
- Conspiracy mentality (see Study 1)
- Self-reported critical thinking (see Study 3)

Assessment of vaccination-related concepts

(items adapted from Schifter & Ajzen, 1985)

In the first part of the study, we would like to learn more about your attitudes toward vaccinations. To this end, we would like to ask you about four different vaccinations in more detail.

Instruction for the TBEV vaccination

Now it's about your opinion on the TBEV vaccination. TBEV is a pathogen that is transmitted by tick bites and can cause inflammation of the meninges, among other things. Large parts of Southern Germany are considered risk areas for infection with the TBE virus.

Societal norm

- Most people are probably getting vaccinated against TBEV

(1 = do not agree at all, 7 = fully agree)

Subjective norm

- People I care about probably think I should get vaccinated against TBEV

(1 = do not agree at all, 7 = fully agree)

Perceived behavioral control

- Whether I get vaccinated against TBEV or not depends solely on me

(1 = do not agree at all, 7 = fully agree)

Attitude

For me getting vaccinated against TBEV would be…

- 1 = bad, 7 = good
- 1 = detrimental, 7 = beneficial
- 1 = undesirable, 7 = desirable

Have you been vaccinated against TBEV within the last five years?

- Yes
- No
- I don't know

Vaccination intention (if No or I don't know was selected previously)

- How likely do you think it is that you will get vaccinated against TBEV?

(0% = I certainly do not get vaccinated against TBEV, 100% = I certainly get vaccinated against TBEV

(7) Mediation analyses based on combined dataset

We preregistered an interaction of conspiracy mentality and subjective norm on vaccination intention as our main hypothesis in all studies. However, based on the negative correlations of conspiracy mentality and subjective norm that occurred in Studies 2 and 3 (Table 2), we became interested in the potential mediating role of subjective norm and preregistered this analysis for Study 4. Therefore, we conducted a mediation analysis with the same combined dataset as for the main analysis. The merged analysis across all studies and vaccinations revealed indirect effects of conspiracy mentality on vaccination intentions via general attitude toward vaccinations, B = -1.36, SE = 0.21, 95% CI [-1.81, -0.99], and subjective norm, B = -1.34, SE = 0.41, 95% CI [-2.20, -0.59]. No indirect effect was observed for behavioral control, B = -0.02, SE = 0.02, 95% CI [-0.08, 0.02]. The indirect effects via subjective norm and the general attitude toward vaccinations for all single vaccinations are presented in Table S1.

Table S1

Overview of indirect effects of conspiracy mentality on vaccination intention via subjective norm and general attitude toward vaccinations resulting from mediation analyses with PROCESS macro for SPSS (Hayes, 2013; model 4); presented for the single vaccinations and for the merged analysis.

	Subjective norm		Attitude toward vaccination	
	B (SE)	95% CI	*B (SE)*	95% CI
Travel	-0.17 (0.20)	[-0.60, 0.17]	-1.74 (0.28)	[-2.34, -1.25]
Child	-0.88 (0.30)	[-1.51, -0.32]	-2.04 (0.34)	[-2.79, -1.44]
COVID-19	-2.38 (0.53)	[-3.46, -1.38]	-2.32 (0.39)	[-3.15, -1.62]
Influenza	0.18 (1.62)	[-4.45, 2.78]	-0.90 (0.63)	[-2.32, 0.24]
TBEV	-1.28 (0.73)	[-2.76, 0.14]	-2.34 (0.54)	[-3.56, -1.41]
Merged analysis	-1.34 (0.41)	[-2.20, -0.59]	-1.36 (0.21)	[-1.80, -0.99]

Appendix IV: Supplement Chapter 6

Deviations from the preregistration

For the sake of clarity, we do not report all analyses in the manuscript that were preregistered, but all of them are included here in the supplement. In all studies, we deviate from the preregistration by conducting multilevel analyses rather than linear multiple regressions due to heterogeneity of norms in some studies (see Table S1). The results from the linear multiple regressions are reported here and do not differ from the results of the multilevel analyses.

Study 1. Counter to our predictions, there was no 3-way interaction between conspiracy belief, reasoning condition, and norm security, indicating that the interaction between conspiracy belief and reasoning was not dependent on the ability of the norm to provide security. We thus removed the factor "security" from the analyses in the manuscript, but report them here.

Study 2. We preregistered to repeat analyses for norm importance, predicting the same effect as for norm adherence. We preregistered to additionally do the analyses not excluding participants who did not follow the instructions. Both analyses are reported below.

Table S1

Cronbach's Alpha, Mean and Standard Deviance for Norm Adherence when averaged across norms per individual

	Norms (condition)	***N***	***Cronbach's Alpha***	***M (SD)***
Study 1	security-related	180	.63	10.06 *(0.81)*
	not security-related	163	.66	9.48 *(0.98)*
Study 2		395	.69	9.58 *(0.94)*
Study 3	law-related	264	.48	9.88 *(1.16)*
	not law-related	277	.61	9.81 *(1.06)*
Study 4	law-related	186	.51	9.89 *(1.37)*
	not law-related	194	.52	9.77 *(1.06)*

Study 1

(1) Preregistered multiple regression analysis

We predicted a negative relation between conspiracy belief and norm adherence when norms are weakly related to security and participants do not reflect about the reason for the normative behavior; and a positive relation between conspiracy belief and norm adherence when norms are strongly related to security and participants reflect about the reason a behavior is normative. Thus, we predicted a three-way interaction between conspiracy belief, reasoning condition and norm type. Analyses revealed a marginal interaction between conspiracy belief and reasoning, hinting at the possibility that reasoning has an effect on the relation between conspiracy belief and reported norm adherence (see Table S2). Counter to our predictions, there was no 3-way interaction between conspiracy belief, reasoning condition, and norm security, indicating that the interaction between conspiracy belief and reasoning was not dependent on the ability of the norm to provide security.

Table S2

Multiple regression analyses Study 1

	Norm Adherence				
	B	*SE*	*t*	*p*	*95%-CI*
CB	-0.07	0.04	-1.84	.066	[-.137; .004]
reasoning (1/-1; 1 = reason condition)	0.12	0.05	2.53	.012	[.027; .216]
norm security (1/-1; 1 = security)	0.30	0.05	6.14	<.001	[.200; .389]
CB*reasoning	0.07	0.04	1.92	.056	[-.002; .140]
CB*norm security	0.00	0.04	0.02	.985	[-.070; .072]
reasoning*norm security	-0.03	0.05	-0.6	.582	[-.121; .068]
CB*reasoning*norm security	-0.03	0.04	-0.77	.439	[-.099; .043]

(2) Research Materials

All norms were pretested. The following norms were considered low and high security by the participants.

Norms – Low Security

1. Be quiet in a library.
2. Do not talk during a movie.
3. Do not lie to a friend.
4. When at someone else's home, ask permission to do things such as turning on the television or using the bathroom.
5. Call to let someone know you will be late or are not going to show up for an appointment.
6. Do not interrupt others.

Norms – High Security

7. React if someone cries “help”.
8. If there is a line, go to the back of the line instead of pushing or cutting your way to the front.
9. Do not share private information with people that you don’t know.
10. When you are about to bump into someone walking in the opposite direction, move to the right.
11. Flush the toilet after use.
12. Hold the door for a person that has a lot to carry.

Conspiracy Theories (conspiracist ideation subscale from Lewandowsky, Gignac, & Oberauer, 2013)

1. The Apollo moon landings never happened and were staged in a Hollywood film studio.
2. The assassination of John F. Kennedy was not committed by the lone gunman Lee Harvey Oswald but was rather a detailed organized conspiracy to kill the President.
3. The U.S. government allowed 9-11 attacks to take place so that it would have an excuse to achieve foreign (e.g., wars in Afghanistan and Iraq) and domestic (e.g. attacks on civil liberties) goals that had been determined prior to the attacks.
4. Princess Diana’s death was not an accident but rather an organised assassination by members of the British royal family who disliked her.
5. A powerful and secretive group known as the New World Order are planning to eventually rule the world through an autonomous world government which would replace sovereign governments.
6. The assassination of Martin Luther King Jr. was the result of an organized conspiracy by U.S. government agencies such as the CIA and FBI.

Need for Uniqueness (Snyder & Fromkin,1977; as reported in: Lynn & Harris, 1997)

Demographics

Study 2

(3) Preregistered multiple regression analysis

We predicted that thinking about the reasons for norm adherence mitigates the negative relation between conspiracy belief and norm adherence, which is what we found.

Table S3

Multiple regression analyses Study 2

	Norm Adherence				
	B	*SE*	*t*	*p*	*95%-Interval*
CB	-0.08	0.03	-2.93	.004	[-.134; -.026]
reasoning (1/-1; 1 = reason given)	0.23	0.05	4.92	<.001	[.136; .318]
CB*reasoning	0.06	0.03	2.04	.042	[.002; .110]

(4) Additional preregistered analyses

We also preregistered that a higher conspiracy belief predicts more perceived norm *importance* when participants think about reasons for a norm, but less so when they do not think about reasons, which was not confirmed.

Table S4

Multiple regression analyses in rows with conspiracy belief (CB) and reasoning condition as predictors and norm importance as criterion.

	Norm Importance				
	B	*SE*	*t*	*p*	*95%-Interval*
CB	0.00	0.04	0.08	.938	[-.069; .075]
reasoning (1/-1; 1 = reason given)	0.15	0.06	2.48	.013	[.032; .275]
CB*reasoning	0.05	0.04	1.28	.200	[-.025; .120]

Also, we preregistered to additionally do analyses on a sample excluding participants in the reasoning condition who did not write at least two plausible keywords. Different to Study 3 and Study 4 reported in the manuscript, only participants in the reasoning condition completed the writing task, resulting in a slightly imbalanced sample ($N_{reasoning}$ = 147; $N_{no\text{-}reasoning}$ = 233). Analyses using this sample (N = 380, 57.1% male, 42.1% female; M_{age} = 37.39, range = 19–89) confirmed findings reported in the manuscript regarding norm adherence (see Table S5). The

interaction between conspiracy belief and reasoning condition for norm *importance* again was not significant (see table S6).

Table S5

Multiple regression analyses in rows with conspiracy belief (CB) and reasoning condition as predictor and norm adherence as criterion, different sample (N = 380).

	Norm Adherence				
	B	*SE*	*t*	*p*	95%-CI
CB	-0.08	0.03	-2.52	.012	[-.135; -.017]
reasoning (1/-1; 1 = reason given)	0.23	0.05	4.85	<.001	[.138; .326]
CB*reasoning	0.06	0.03	2.00	.046	[.001; .120]

Table S6

Multiple regression analyses in rows with conspiracy belief (CB) and reasoning condition as predictor and norm importance as criterion, different sample (N = 380).

	Norm Importance				
	B	*SE*	*t*	*p*	95%-CI
CB	0.00	0.04	-.03	.977	[-.081; .078]
reasoning (1/-1; 1 = reason given)	.15	0.06	2.30	.022	[.022; .274]
CB*reasoning	0.04	0.04	1.07	.287	[-.036; .123]

(5) Research materials

Intro

Norms

1. Do not talk during a movie
2. Do not lie to a friend
3. When at someone else's home, ask permission to do things such as turning on the television or using the bathroom.
4. Call to let someone know you will be late or are not going to show up for an appointment.
5. Do not interrupt others.
6. React if someone cries "help"
7. Do not share private information with people that you don't know

8. When you are about to bump into someone walking in the opposite direction, move to the right

Security Motive (adapted from Sokolowski et al., 2000)

Conspiracy Theories (equivalent to study 1)

[Norm Rating for exploratory analysis, only in no-reasoning condition]

Demographics

Study 3

(6) Preregistered multiple regression analysis

Given the literature showing that conspiracy belief is related to a willingness to break the law in certain situations (Imhoff et al., 2021; Jolley et al., 2019), we expected that a reasoning manipulation would only work for norms not related to the law, and worsen the relation between conspiracy belief and norm adherence for norms related to the law. Thus, we expected a three-way interaction between conspiracy belief, reasoning condition and norm type, which was not confirmed.

Table S7

Multiple regression analyses Study 3

	Norm Adherence				
		SE	*t*		*95%-CI*
CB	- 0.22	0.03	- 7.90	<.001	[-.277; -.167]
reasoning (1/-1; 1 = reason condition)	.10	0.04	2.21	.027	[.011; .186]
norm type (1/-1; 1 = not law-related)	0.03	0.04	- 0.75	.455	[-.121; .054]
CB*reasoning	.11	0.03	4.05	<.001	[.059; .169]
CB*norm type	.03	0.03	1.17	.245	[-.022; .088]
reasoning*norm type	.07	0.04	1.46	.144	[-.022; .152]
CB*reasoning*norm type	.00	0.03	0.16	.874	[-.051; .060]

(7) Research Materials

Intro

Norms – Not related to the law

1. Dress formally when attending a wedding.
2. Hold the elevator for someone approaching.
3. Hold the door for a person that has a lot to carry.
4. When agreed to meet, stick to the arranged time.

Norms – Law

1. Do not defraud the government on taxes.
2. Complete jury duty when asked to do so.
3. In a restaurant, pay for your meal, even if it didn't taste well.
4. Do not assault people who say mean things to you.

[writing task in the no-reasoning condition]

Conspiracy Theories (equivalent to Study 1 and 2)

Regulatory Mode Questionnaire incl. Socially Desirable Tendencies (Kruglanski et al., 2000)

Demographics

Study 4

(8) Preregistered multiple regression analysis

We wanted to confirm the findings of Study 3, this time preregistering that the reasoning manipulation would have an effect on norms related to the law as well as norms not related to the law. This prediction was not confirmed.

Table S8

Multiple regression analyses Study 4

	Norm Adherence				
	B	*SE*	*t*	*p*	*95%-CI*
CB	-0.14	0.04	-3.55	<.001	[-.224; -.064]
reasoning (1/-1; 1 = reason condition)	0.16	0.06	2.60	.010	[.038; .272]
norm type (1/-1; 1 = not law-related)	-0.06	0.06	-0.92	.359	[-.172; .062]
CB*reasoning	-0.03	0.04	-0.63	.530	[-.105; .054]
CB*norm type	0.23	0.04	5.62	<.001	[.148; .307]
reasoning*norm type	0.04	0.06	0.68	.496	[-.077; .158]
CB*reasoning*norm type	-0.02	0.04	-0.50	.618	[-.100; .059]

(9) Research Materials

Intro

Norms – General (Respect)

1. Say please and thank you.
2. Help the elderly if you see they need help.
3. Say "excuse me" if you're in someone's way or you need to get past.
4. Chew with your mouth closed.

Norms – Law

1. Do not sleep or camp overnight in national parks except in designated areas.
2. Do not pay bribes, even if it hurts your chances of success.
3. Do not give alcoholic beverages to minors.
4. Do not assume another person's identity to get benefits.

[writing task in the no-reasoning condition]

Conspiracy Theories (equivalent to Studies 1-3)

Regulatory Mode Questionnaire incl. Socially Desirable Tendencies (Kruglanski et al., 2000)

Demographics

Study S1

First evidence for the impact of reasoning on norm adherence stems from two earlier studies, here reported as Additional Study S1 and S2. In those studies, participants indicated their adherence to the same 11 norms either spontaneously (Study S1) or after thinking about the reasons why a behaviour is normative (Study S2). While both studies included the same norms, the same sampling pool (MTurk), and were conducted around the same time (June and October 2019), they both only contain one of the two conditions and thus are reported here as additional studies.

Method

Participants and procedure

We collected data from 266 people via Amazon Mechanical Turk who received $ 1.50 for compensation. Forty-one participants were excluded for (a) failing one of the attention checks ($N = 36$) and (b) being statistical outliers (i.e., cases with an absolute studentized deleted residual > 2.69 or a Cook's d > .1 in the regression testing Hypothesis 1; $N = 5$). The remaining sample consisted of $N = 225$ (52.9% male, 46.2 % female; $M_{age} = 35.91$, range = 21–68 years). After providing consent, participants first indicated their norm adherence and then their conspiracy belief.

Measures

Norm adherence was measured as self-report with 11 items ($\alpha = .71$, $M = 5.87$, $SD = 0.63$) representing social norms (sample items: "Switch off or ignore your cell phone during important conversations"; "Wash your hands after visiting the bathroom"). For each norm, participants were asked to indicate whether they comply with the norm on a 7-point scale from *1: Never* to 7: *Always.*

Conspiracy belief (CB) was assessed with the same 6 items ($\alpha = .89$, $M = 2.72$, $SD = 1.54$) reported in the manuscript, rated from *1: Strongly disagree* to 7: *Strongly agree.*

Results

To test the prediction that a stronger conspiracy belief is related to less norm adherence, we computed a bivariate correlation. Results indicated that conspiracy belief was negatively correlated with norm adherence, $r\ (225) = -.19$, $p = .004$.

Study S2

In this study, all participants were asked about the function of a norm before reporting their adherence, hereby lacking a control condition which did not engage in the reasoning task. In these studies, no correlation between conspiracy belief and norm adherence was found, thus paving the way for the reasoning intervention.

Method

Participants and procedure

We collected data from 161 people via Amazon Mechanical Turk who received $ 1.50 for compensation. Twenty-nine participants were excluded for saying that they did not respond honestly (N = 12) or failing an attention check (N = 17), leaving a final sample of 132 participants (58% male, 42% female; M_{age} = 37.01, range = 21–70). Participants in total saw 33 norms (sample items: “Bring a gift when you are invited for dinner”; “Wash your hands after visiting the bathroom”), including the exact same norms as in the additional study S1. For each norm, they were asked whether this norm provides safety, whether it helps to make the world more predictable, and whether they adhere to this norm. At the end of the survey, conspiracy belief (CB) was assessed.

Measures

Norm adherence indicated the adherence to the norms measured on a 7-point scale from 1: *Never* to 7: *Always* for the statement “I follow this ‘norm’” in Study B (α = .86, M = 5.94, SD = 0.53).

Belief in conspiracy theories (CB) was assessed with the same 6 items as in the studies reported in the manuscript (α = .89, M = 2.56, SD = 1.54).

Results

In line with the subsequent studies reported in the manuscript, correlations between norm adherence and conspiracy belief were not significant, r (132) = .03, p = .705. Results showed that the negative correlation between conspiracy belief and norm adherence was not there when participants thought about the reasons to show behaviour in line with a norm before indicating whether they adhere to the norm. This effect was also found when analysing adherence to the exact eleven norms used in Study 1 reported in the manuscript (instead of the full set of 33 norms). Here, likewise, no relationship between conspiracy belief and norm adherence was found, r(132) = .01, p =.935.

Study S3

We also conducted a study in which we had a reasoning manipulation, but the dependent variable differed from the studies reported in the manuscript in two regards: First, we did not ask about social norms, but intentions to engage in everyday crimes (see Jolley et al., 2014). Second, participants did not indicate their *adherence to the norms*, but whether they would *consider to show the behaviour*. While the manipulation overall is similar to the one reported in the manuscript, it differed from the reported manipulation in that it included a negation, which might have confused some participants or might have also inspired thinking of reasons to show the deviant (rather than the non-deviant) behaviour.

Method

Participants and procedure

Participants were recruited via Amazon MTurk for an 6-8-minutes-survey in exchange for 1 $. Overall, 1116 participants finished the survey, we excluded participants for (a) not responding honestly according to a self-report ($N = 13$), (b) filling out the questionnaire multiple times ($N = 26$), (c) not completing the survey in one sitting ($N = 4$), and/or (d) for not complying with the writing task (i.e. writing random letters or copy-pasting content, $N = 391$). From the remaining sample (N = 725) we further exluded participants (e) who scored too high on six items measuring socially desirable tendencies ($N = 124$) and (f) based on an outlier analysis excluding all cases with an absolute studentized deleted residual > 2.59 ($N = 5$), leaving a final sample size of $N = 596$ (54% male, 45.5 % female; $M_{age} = 39.2$, range = 19-72).

Participants all saw four behaviours considered everyday crimes (e.g. to add items during an insurance claim which had not been lost, damaged or stolen, or increase the value of any items claimed) and were asked whether they would consider such a behaviour. Participants in the reasoning condition did so after responding to the open-ended question: “What is the reason it is normative to <u>not</u> show this behaviour?”, whereas participants in the no-reasoning condition did so without responding to this question.

Measures

Considering Everyday Crimes indicated whether participants would consider behaviours indicating an “everyday crime” (sample item: Would you consider during an insurance claim to add items which had not been lost, damaged or stolen, or increase the value of any items claimed?), averaged across 4 items measured on a 11-point scale from 1: *I would never consider* to 7: *I would consider* ($\alpha = .85$, $M = 5.50$, $SD = 2.90$).

Belief in conspiracy theories (CB) was assessed with the same 6 items as in the studies reported in the manuscript ($\alpha = .90$, $M = 3.47$, $SD = 1.63$).

Results

Results showed that when participants were asked whether they would consider conducting such a crime in the future, the willingness to do so decreased in the reasoning condition for people low in conspiracy belief (Simple Comparison: B = -0.58, SE = 0.13, t = -4.42, p = <.001), but increased for participants high in conspiracy belief (B = 0.45, SE = 0.13, t = 3.44, p = .001), resulting in a Conspiracy Belief x Reasoning interaction (see Table S9 and Figure S1).

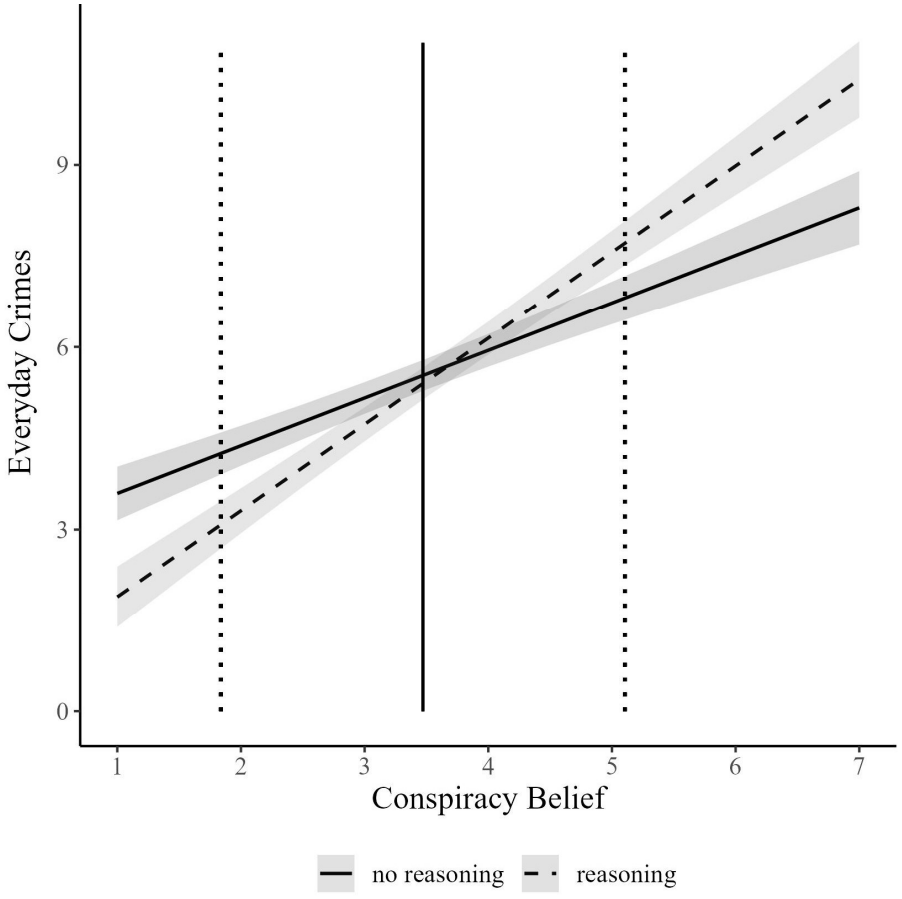
Table S9

Multiple regression analyses Additional Study C

	Considering Everyday Crimes			
	B	*SE*	*t*	*p*
Conspiracy Belief (mean-centered)	1.10	0.06	19.24	<.001
reasoning (-1 control, 1 reasoning)	-0.07	0.09	-0.72	.475
Conspiracy Belief*reasoning	0.32	0.06	5.55	<.001

Figure S1

Conspiracy Belief and Reasoning Condition Predicting the Consideration of Everyday Crimes



Summary

Conspiracy theories were already around before the Covid-19 pandemic, but public attention to this topic increased during that time (Eysenbach, 2020; Grodzicka & Harambam, 2021), potentially also due to the lower adherence to norms ensuring public safety among people believing in conspiracy theories (Pummerer, Böhm, et al., 2022). Conspiracy theories are explanations for societal and political events that allege secret, yet harmful, arrangements by a powerful individual or group (Douglas et al., 2017; Goertzel, 1994). In addition to lower adherence to safety-measures regarding Covid-19, believing in conspiracy theories has also been related to other behaviors that go against the accepted social norm, for example a greater willingness to engage in everyday crimes and violent political action, and lower prosocial engagement and intentions to vote in public elections (Imhoff et al., 2021; Jolley et al., 2019; Jolley & Douglas, 2014b; van der Linden, 2015). Despite many examples linking the belief in conspiracy theories to single non-normative behaviors, a broader examination of the relationship between and causality of a conspiracy belief and norm adherence so far is missing.

This dissertation examines the relationship between conspiracy belief and adherence to social norms. It reports that higher conspiracy belief is related to lower norm adherence across different kinds of social norms, and that a higher conspiracy belief subsequently leads to lower adherence to norms questioned by the conspiracy theory. In a second step, it also examines different ways of how norm adherence among people believing in conspiracy theories might be increased. Studies reported in this dissertation suggest that norm adherence can be increased by addressing conspiracy theories early on, through social interventions based on the expectations of people close to the individual, and by prompting reasoning why a behavior is considered normative. Overall, this dissertation suggests that the lower norm adherence among people believing in conspiracy theories is a result of a different social reality that is accompanied and caused by the belief in conspiracy theories. By describing and examining this social reality through one theoretical and four empirical manuscripts, this dissertation makes an important contribution in understanding conspiracy belief. It further opens up new routes for interventions aimed at reducing conspiracy belief as well as increasing norm adherence among people higher in conspiracy belief.

Deutsche Zusammenfassung

Verschwörungstheorien gab es bereits vor der Covid-19-Pandemie. Dennoch hat die öffentliche Aufmerksamkeit für dieses Thema in letzter Zeit zugenommen (Eysenbach, 2020; Grodzicka & Harambam, 2021), möglicherweise auch aufgrund der Tatsache, dass sich Menschen, die an Verschwörungstheorien glauben, weniger an die Sicherheitsmaßnahmen zur Einschränkung der Pandemie gehalten haben (Pummerer, Böhm, et al., 2022). Verschwörungstheorien sind Erklärungen für gesellschaftliche und politische Ereignisse, die einer mächtigen Person oder Gruppe geheime und böse Absichten unterstellen (Douglas et al., 2017; Goertzel, 1994). Neben einer geringeren Einhaltung von Sicherheitsmaßnahmen in Bezug auf Covid-19 wurde der Glaube an Verschwörungstheorien auch mit anderen Verhaltensweisen in Verbindung gebracht, die der sozialen Norm widersprechen. Zum Beispiel gibt es einen Zusammenhang zwischen dem Glauben an Verschwörungstheorien und der Bereitschaft zu "Kavaliersdelikten" und gewaltvollem politischem Protest, sowie einer geringeren Bereitschaft zu sozialem Engagement und der Beteiligung an politischen Wahlen (Imhoff et al., 2021; Jolley et al., 2019; Jolley & Douglas, 2014b; van der Linden, 2015). Trotz zahlreicher Beispiele, die den Glauben an Verschwörungstheorien mit einzelnen Verhaltensweisen in Verbindung bringen, die den gängigen sozialen Normen widersprechen, fehlt bislang eine umfassende Untersuchung des Zusammenhangs und der Kausalität vom Glauben an Verschwörungstheorien und sozialen Normen.

In der vorliegenden Dissertation wird der Zusammenhang zwischen dem Glauben an Verschwörungstheorien und der Einhaltung sozialer Normen untersucht. Es wird gezeigt, dass ein höherer Glaube an Verschwörungstheorien mit einer geringeren Einhaltung verschiedener Arten sozialer Normen zusammenhängt, und dass ein höherer Glaube an Verschwörungstheorien nachfolgend zu einer geringeren Befolgung der Normen führt, die von der Verschwörungstheorie in Frage gestellt werden. In einem zweiten Schritt werden verschiedene Möglichkeiten untersucht, wie man die Einhaltung von Normen unter Menschen, die an Verschwörungstheorien glauben erhöhen kann. Die in dieser Dissertation vorgestellten Studien deuten darauf hin, dass die Einhaltung von Normen erhöht werden kann, indem Verschwörungstheorien frühzeitig addressiert werden; durch soziale Interventionen, die auf Erwartungen von Personen aufbauen, die dem Individuum nahe stehen; und durch die Reflektion darüber, warum ein Verhalten allgemein als normativ angesehen wird. Die Ergebnisse dieser Dissertation legen nahe, dass die geringere Einhaltung von Normen das Ergebnis ist einer anderen sozialen Realität, die mit dem Glauben an Verschwörungstheorien einhergeht und durch diesen verursacht wird. Durch die Beschreibung und Untersuchung dieser

sozialen Realität in einem theoretischen und vier empirischen Manuskripten leistet diese Dissertation einen wichtigen Beitrag zum Verständnis des Glaubens an Verschwörungstheorien. Darüber hinaus eröffnet sie neue Wege für Interventionen, die den Glauben an Verschwörungstheorien reduzieren und die Einhaltung von Normen von Menschen, die an Verschwörungstheorien glauben, steigern können.