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Spite and Science-Denial: Exploring the Role of Spitefulness in Conspiracy Ideation and COVID-19 Conspiracy Beliefs

David S. Gordon[1] | Megan E. Birney[2]

[1]School of Health, Education, Policing, & Sciences, Staffordshire University, Stoke-on-Trent, UK | [2]Department of Education and Social Justice, University of Birmingham, Birmingham, UK

Correspondence: David Gordon (david.gordon@staffs.ac.uk)

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ABSTRACT

Science denialism is at the heart of many conspiracy theory beliefs. We propose that such beliefs are manifestations of a distal social process: spite. In three pre-registered studies, we test the hypothesis that established predictors of these beliefs (epistemic, existential, and social motives) are specific cues of competitive disadvantage that provoke a common facultative "spiteful" psychological response, making a person more open to believing in conspiracy theories. Study 1 (N = 301; UK representative Prolific sample), found that spite mediated the relationship between realistic threat and in-group narcissism (social motives), political powerlessness (existential motive), and intolerance for uncertainty (epistemic motive), and conspiracy theory belief and COVID-19 conspiracies. This pattern was replicated in Study 2 (N = 405; UK representative Prolific sample). In Study 3 (N = 405; UK representative Prolific sample), we found that those who engaged in a spite-inducing task reported higher levels of spite which indirectly resulted in stronger beliefs in conspiracy theories. The overall pattern of results provides initial evidence that spite may play a role in why people engage with false information. Research and policy implications of these findings are discussed.

1 | Introduction

Conspiracy theories can be defined as beliefs about important events that reject well-evidenced or parsimonious explanations in favor of implausible, illogical, or fantastical ones involving secret plots by preternaturally powerful and malevolent group.[1] The denial of science is at the heart of many of these beliefs, from the specific rejection of Anthropogenic Climate Change and the efficacy of vaccination to a general rejection of "experts," There is also a strong and consistent association between conspiracy theory ideation and science denialism (Lewandowsky et al. 2013; Rutjens et al. 2018). Scientific findings are perhaps uniquely placed to be the subject of conspiracy theory beliefs: findings from the scientific method often lack intuitive and emotional appeal (Clearly et al. 2025) and can feel distant from day-to-day life (Rutjens and Hornsey Forthcoming). However, because the findings are both demonstrable and evident in everyday life (e.g., vaccinations and disease prevalence), they cannot be easily dismissed as "an opinion." Hence, to reject findings without engaging in valid scientific endeavors oneself, one recourse is to accuse the scientists of acting on behalf of a sinister all-powerful conspiracy.

The subjects of conspiracy theories are often broader than just science denial, for example, conspiracy theories can focus on minority groups (e.g., Salvati et al. 2024) or malevolent forces behind the deaths of prominent individuals (Douglas and Sutton 2008, Goertzel 1994). However, conspiracy theory believers and science deniers share common cognitive characteristics (see Rutjens and Većkalov 2022), and at some point, an illogical

and unfounded idea or suspicion will be challenged by experts and expert-derived evidence (a challenge that might be required for a conspiracy theory to form, Van Prooijen 2020). Thus, to understand science denialism within specific conspiracy theories, it is important to understand conspiracy theory beliefs in general.

Research has highlighted three broad motives that predict such conspiracy theory beliefs (Douglas et al. 2019): a need to explain the world (i.e., epistemic motives), a need for security (i.e., existential motives), and a need to feel valued in society (i.e., social motives). Although these motives are likely interconnected (van Prooijen 2017), there have so far been limited attempts to establish a theoretical framework that considers this (Pierre 2020, but see van Prooijen 2020). Considering that conspiracy theory beliefs appear to be a universal human phenomenon (van Prooijen and van Vugt 2018), it seems logical to explore whether such beliefs are a cultural manifestation of distal evolutionary processes that have shaped social behavior. With these beliefs being common across the world and impacting responses to world events (Douglas and Sutton 2023), determining whether they are related to core human cognitive biases will help both explain the pattern of belief (and its predictors), highlight the ecological factors driving belief, and potentially point toward effective interventions to diminish belief. In the current paper, we investigate the hypothesis that the psychology driving conspiracy theory beliefs is underpinned by such a core behavior: spite.

It is important to clarify what we mean by spite in this context. Conspiracy theories themselves can be holistically understood as a cultural product, or a "meme" (Dawkins 1976); a unit of meaning constructed from a collective and reflective attempt to fulfill the aforementioned epistemic, existential, and social motives (Douglas and Sutton 2023). Yet, cultural products are not random; evolutionary models have provided robust explanations for patterns in the "design" of culture (see Laland and Brown 2011; Singh 2022). For example, local ecological conditions are reflected in culture through necessary clothing or available food (e.g., Ready and Price 2021), with some suggesting that current and historic ecology also predicts broader differences in cultural norms and values (Learmouth et al. 2024; Gelfand et al. 2011). Equally, other researchers have explained similarities and differences between cultures with reference to how evolved human cognitive processes interact with the local environment (see Sperber and Hirschfeld 2004). Examples include common attitudes to cooperation and social behaviors (Curry et al. 2019), and explanations for the universal presence of, but great diversity in, supernatural beliefs (Boyer 2008).

Although culture does produce unique local solutions to common adaptive problems, it also produces neutral, inefficient, or harmful products (Giphart and Van Vugt 2018; Singh 2021; 2022). For example, human social cognitive biases toward successful individuals leads to copying of behaviors not responsible for that success (e.g., fashion choices, Jiménez and Mesoudi 2019). It has been suggested that if a cultural product makes an individual *subjectively* believe it satisfies a need or goal, and the product is cheap, it will be adopted regardless of whether it provides any tangible benefit (Singh 2022). Conspiracy theory beliefs certainly fall into the category of a harmful cultural product: theorists might erroneously insist they have discovered some hidden malevolent explanation for an event or phenomenon but, as well as being false, these beliefs are harmful to the individual believer and to the society (Douglas and Sutton 2023). The current study investigates whether such a harmful, but ubiquitous, culture product can be seen as an expression of a core, evolved, bias in human cognition.

1.1 | The Utility of Spite

Spite is one of four basic social behaviors in the natural world (along with mutualism, selfishness, and altruism; Gardner and West 2004) and is harmful to both the actor and the recipient. Although the exact nature of the costs and benefits of spite are not agreed upon, spiteful behavior derives its function through changing the competitive differences between the actor and the target(s) in favor of the former (see Foster et al. 2001; Gardner and West 2004; Jensen 2010; Johnstone and Bshary 2004; Krupp 2013; Lehmann et al. 2006, Lehmann et al. 2009). It is argued that spite, as an evolved socio-cognitive system, has played a vital role in the evolution of the human capacity for cooperation and fairness (Forber and Smead 2014, Jensen 2010; Johnstone and Bshary 2004; Marlowe et al. 2010; Rand et al. 2013). Proximate spiteful behavior can be difficult to define but for simplicity we consider spite to be a behavior where the primary intention is to harm the target (see Gardner and West 2006; Jensen 2010).

Spiteful behaviors are triggered by competition, especially when individuals are—or are in danger of—being disadvantaged (Balafoutas et al. 2012; Deutchman et al. 2021; Jensen 2010; Lehmann et al. 2009). The effect of competition on inciting spiteful human behaviors can be seen across several domains. Rejection of unfair or unfavorable offers in the Ultimatum Game[2] is typically seen as an act of spite (Fehr and Fischbacher 2004; Jensen 2010; Raihani and Bshrary 2019), and local competition has been shown to increase sensitivity, and therefore offer rejection, in such games (Barclay and Stoller 2014). Equally, studies using the Joy of Destruction Game,[3] where participants can pay a cost to destroy the resources of others for no benefit to themselves, show this behavior to be common (Gordon and Birney 2024) and increase when there is greater environmental scarcity and competition (Barker and Barclay 2016; Prediger et al. 2014). Furthermore, while revenge can take many forms (McCullough et al. 2013), certain types are spiteful. For example, in covert revenge, (e.g., secret malicious gossip), the aim is to inflict harm on a perceived past antagonist to satisfy emotional desires rather than to change that antagonist's future behaviour (Jackson et al. 2019; Langlois and Slane 2017; Raihani and Bshsary 2019). Importantly, low-status individuals (i.e., those at a competitive disadvantage) are more likely to engage in such covert revenge because it allows harm to be inflicted while avoiding retaliation (Jackson et al. 2019).

The threat of (perceived) potential competitors can also motivate spiteful behavior. For example, resource-poor individuals have been shown to behave more spitefully when interacting with a wealthier opponent (Nishimura et al. 2011), and recent studies have shown that "incel" culture—in which men blame women and stereotypically successful men for their celibacy leading to spiteful online misogynistic abuse and acts of real-world violence—is predicted by local economic competition (Brook

et al. 2022). Additionally, while altruistic individuals are valued as friends and romantic partners (Arnocky et al. 2017), they are also derogated (Dores Cruz et al. 2021; Minson and Monin 2011,) and spitefully punished for their pro-social behavior (Pleasant and Barclay 2018; Sylwester et al. 2013). Spiteful behavior also occurs when those in an advantaged position fear competition (Deutchman et al. 2021; Ding et al. 2017; Engler and Weisstanner 2021; Leheta et al. 2017); people earning just above the minimum wage will reject welfare policies that would benefit them but would also raise those on the lowest rung of the economic ladder closer to the former's economic position (Engler and Weisstanner 2021; Kuziemko et al. 2014). Finally, Reactance Theory (Rosenberg and Siegel 2018) suggests that individuals spitefully reject neutral or beneficial advice as a way of rejecting the power and authority the source is perceived to have (Tetlock 2002; Thomason 2020), including rejecting health advice from medical professionals (Hajek and Häfner 2021). In sum, spite—that is, desires and behaviors where the intention is to harm the target—is a core part of human social behavior, and spiteful psychological motives are a facultative response to perceived competition and disadvantage.

1.2 | The Link Between Spite and Conspiracy Theory Beliefs

We hypothesize that the spiteful psychological motives that result from feelings of competition and disadvantage make a person more vulnerable to belief in conspiracy theories. As a framework for explaining conspiracy theory beliefs, this is not the first hypothesis to be derived from an evolutionary framework. The Adaptive-Conspiracism Hypothesis (van Prooijen and van Vugt 2018) posits that conspiracy theory beliefs are a maladaptive outcome of cognitive mechanisms designed to detect genuine conspiracies. Although it is likely that the highly social nature of our species plays a prominent role in the tendency to form conspiracy theory beliefs (or any belief, e.g., Boyer 2008), our hypothesis differs from the above in two ways.

First, our hypothesis does not rely on a specific adaption for advanced coalitional psychology, but rather is grounded in a more general evolutionary biological concept (see Lewis et al. 2017; Muthukrishna and Henrich 2019). Facultative spiteful responses to cues of competitive disadvantage are found across the natural world: bacteria will explode in a flood of toxic chemicals to kill genetically dissimilar competitors (Gardner and West 2006), nesting gulls will attack the eggs of neighbors if their own have been lost to predation (Pierotti 1980), and, beyond the behavior already described, in humans our culture provides a powerful avenue for expressing spite. As mentioned, culture can be seen as reflecting current ecological conditions; for example, pre-modern societies interpreted sleep paralysis as a demonic incursion whereas modern sufferers often interpret the experience as extra-terrestrial abduction (Holden and French 2002; Molendijk et al. 2017). Thus, in smaller-scale societies spiteful cultural actions against local competitors might take the form of disrespectful funeral practices and accusations of sorcery (Alterauge et al. 2020; Boehm 2012; Mace et al. 2018; Schimmelpfennig and Muthukrishna 2021, Singh 2021). However, the larger and more socio-ecologically complex societies that we find ourselves in today allow grander cultural products to be created by feelings of disadvantage, that is, today's globalized world and the increased connectivity of people through social media has contributed toward the production of elaborate globe-spanning conspiracy theories (see Shahsavari et al. 2020; Singh 2022).

Second, and related to the above, we suggest that conspiracy theories can have a (spiteful) utility rather than being entirely maladaptive. Conspiracy theory beliefs are harmful to society because they have consequences for their targets: institutions, ideas, groups, and individuals that enjoy or are perceived to enjoy power and admiration in wider society (Barnes et al. 2018; Jolley et al. 2022). Conspiracy theories negatively affect individuals in targeted groups (Jolley et al. 2024), weaken trust in public bodies and civic society (Einstein and Glick 2015), and undermine initiatives that tackle critical problems such as climate change (Lewandowsky et al. 2013) or global health emergencies (Grebe and Nattrass 2012; Romer and Jamieson 2020). For those who feel disadvantaged, accepting and propagating conspiracy theories can and does undermine the status of professionals and institutions, while at the same time maintaining the theorists' own ego, identity, and autonomy when these might otherwise feel challenged (Barnes et al. 2018; Douglas et al. 2019; Lantian et al. 2017; van Prooijen 2020). Thus, while conspiracy theory beliefs can harm their adherents (Douglas et al. 2019; Romer and Jamieson 2020), the "cost" of this spiteful behavior is nevertheless beneficial to the theorist because, for them, the belief and the societal fallout from their actions lowers the (perceived) competitive differences that exist between themselves and their target.

The fact that envying others is a prime motivator in spiteful acts (Wobker 2015) and that conspiracy theorists are driven by selfish rather than pro-social concerns (Enders et al. 2021; Hornsey et al. 2021) further support our suggestion that conspiracy theory beliefs may be underpinned by spite. Indeed, experimental work shows that spiteful antisocial behaviors (e.g., the punishment of pro-social individuals or the destruction of resources) are more sensitive to cost ratios (i.e., the cost to the target vs. the cost to the actor) than pro-social behavior (see Abbink and Herrmann 2011; Sylwester et al. 2013; Gordon and Puurtinen 2020), and modern communication technology makes conspiracy theories cheap to produce and spread. Furthermore, individuals with a "need for chaos" (NFC)—a desire to disrupt the established order—are more likely to endorse anti-science conspiracy theories (Alam et al. 2025). At present, no research has directly investigated a relationship between NFC and spite. However, the fact that both are predicted by perceived disadvantage, both share relationships with the Dark Triad of personality traits (see Alam et al. 2025; Martínez and Maner 2024), and both are indicative of a desire to "level the playing field", suggests they would be closely associated with one another.

In sum, while conspiracy theories might eventually harm their adherents, they can materially diminish their targets (Barnes et al. 2018; Chen et al. 2021; Jolley et al. 2024, van Prooijen et al. 2022). Thus, rather than a maladaptive response from a psychology "designed" specifically to detect rival human coalitions, we suggest conspiracy theories may act as a manifestation of more generalized spiteful psychological motives that occur in response to cues of individual competitive disadvantage.

1.3 | Conspiracy Theory Beliefs as an Expression of Spite

In this section, we theorize how each of the broad intercorrelating motives that predict conspiracy theory beliefs (see Douglas and Sutton 2017) result in spiteful motivation. The social motive (i.e., a need to feel valued in society) is perhaps the most straightforward; humans readily make social comparisons (Festinger 1954), and cues of the status and prestige of other individuals or out-groups are readily available in the environment. Thus, it follows that such comparisons might trigger a spiteful desire to diminish the competition (Jensen 2010; Minson and Monin 2011; Wobker 2015). We argue that existential concerns (i.e., a need for security) also parsimoniously intersect with competitive disadvantage: to be in a state of powerlessness or fear is to be in a position of supplication to another entity (e.g., Imhoff and Lamberty 2020). If one can reclaim or otherwise express agency by spitefully rejecting what is offered, (e.g., by rejecting expert medical advice during a pandemic; Hajek and Häfner 2021), this might help offset feelings of disadvantage.

With regard to epistemic motives (i.e., a need to explain the world), behaving effectively in an environment requires the organism to understand what has occurred (Nguyen 2021; Vives et al. 2023); not understanding puts one at a disadvantage (Neuberg et al. 2011). The desire to understand the world around us draws individuals to the less complex and less ambiguous explanations that conspiracy theories offer (Douglas et al. 2017; Graeupner and Coman 2017; Nguyen 2021, Vives et al. 2023). In an analogy to the Ultimatum Game, conspiracy theorists are rejecting a disadvantageous distribution of understanding in favor of a situation where anyone or anything could be equally correct (see Wood et al. 2012).

Such discussion of epistemic explanations highlights the inherent interrelatedness of the motives; by "choosing" to accept a simplified and erroneous explanation of reality one is inherently rejecting expertise, which in turn intersects with both social motives (e.g., one's status or prestige compared to others), and existential motives (e.g., anxiety from a lack of knowledge) or a desire to reclaim autonomy. The holistic consensus on conspiracy theory belief and its predictors is that these beliefs are an attempt by individuals to address troubles and frustrations in their lives (Douglas and Sutton 2017, 2023). Spite provides a possible cognitive mechanism that unites these three domains.

To be clear, we are not suggesting that the typical individual is making an intentional choice to act spitefully by believing and spreading conspiracy theories. Rather, we hypothesize that the epistemic, existential, and social motives that have been identified as key to predicting conspiracy theory beliefs each act as an implicit cue that one is at a competitive disadvantage: It is hard to competently navigate or respond to important events if you do not understand them (epistemic), events can create crises for one's own ego or identities (social). and powerlessness in itself is a disadvantage (existential). Thus, we propose that specific epistemic, existential, and social cues elicit a generalized facultative spiteful psychological motivational state. A consequence of this is a greater vulnerability to conspiracy theories because the act of rejecting "the official narrative" is a manifestation of this spiteful motivation (see Figure 1). Across three studies, we investigate this hypothesis.

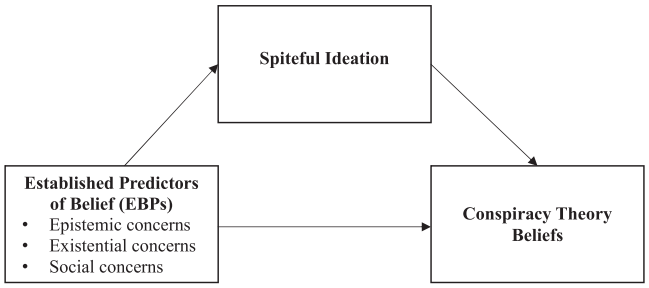

FIGURE 1 | Conceptual model summarizing process analysis for the independent indirect effects of spite on the relationship between EPBs and conspiracy beliefs key.

2 | Study 1

The conceptual model of our hypothesis is that established predictors of conspiracy theory beliefs (that is, epistemic, existential, and social concerns; henceforth, EPBs) act as cues to (potential) competitive disadvantage, with conspiracy theory beliefs being a result of the degree to which such cues result in a spiteful ideation (see Figure 1). In line with this, Study 1 tested whether spite indirectly affects the relationship between each EPB and belief in conspiracy theories. The design and analysis of Study 1 were pre-registered (see OSF link in the Open Practice section).

2.1 | Method

2.1.1 | Pilot Study

A pilot study was conducted to investigate whether measures of spite correlated with conspiracy theory belief and with the EPB measures. Participants were recruited (N = 114) from a university's research participation system and through social media. All measures positively correlated with one another (see Supporting Information A).

2.1.2 | Participants

UK residents were recruited from Prolific (N = 301) to take part in a study ostensibly about people's attitudes and beliefs toward others. In terms of age, gender, and ethnicity, the sample was representative of UK demographic statistics (Table 1), achieved through Proflic's "representative sample" algorithm. Although the sample size was chosen due to funds available, post-hoc power analyses (Monte Carlo Power Analysis for Indirect Effects, Schoemann et al. 2017; alpha = 0.05 and beta = 0.8) based on the correlations in the pilot study, suggested a sample size of at least 300 was necessary to detect a mediation effect. Each participant was paid £2.50.

2.2 | Materials and Procedure

After clicking on the study link, participants were asked to read an information sheet and give their consent. They were then given measures of spite, conspiracy beliefs, and a series of items

TABLE 1 | Demographic data for Studies 1–3.

	Age		Gender			Ethnicity				
	Mean (SD)	Range	Female	Male	Non-binary	White	Asian	Black	Mixed ethnicity	Other
Study 1 ($N = 301$)	45 (16)	18–82	154	146	1	231	30	17	16	7
Study 2 ($N = 406$)	45 (15)	18–88	206	195	3	320	36	20	18	9
Study 3 ($N = 406$)	47 (16)	18–87	202	191	3	319	38	18	14	7

measuring epistemic, existential, and social motives (i.e., EPBs): The order of scales were randomized. Unless otherwise stated, all measures used a 7-point Likert-scale from 1 (disagree strongly) to 7 (agree strongly).

2.2.1 | Measures

Conspiracy Theory ideation. The Generic Conspiracist Beliefs scale (Brotherton et al. 2013) was used to measure conspiracy theory ideation. Between 1 (definitely not true) and 5 (definitely true), participants were asked to indicate how much truth they attributed to each of 15 statements (e.g., "Technology with mind-control capacities is used on people without their knowledge" $\alpha = 0.92$).

Belief in COVID-19 Conspiracy Theories. As the COVID-19 pandemic began prior to data collection, we added a novel 10-item scale that asked participants to indicate from 1 (completely false) to 9 (completely true) their perceptions of conspiracy theories specific to COVID-19 (e.g., "A cure exists for COVID-19, but special interest groups are suppressing it"; $\alpha = 0.91$). The scale was modeled after Swami et al.'s (2010) General Conspiratorial Beliefs measure. Exploratory factor analysis revealed that two items did not load onto a single factor, both concerning conspiracy theories around Bill Gates (see Supporting information). These items were removed from all subsequent analyses, leaving eight items in the final scale.

Spite. Spite was measured using Marcus et al.'s (2014) 17-item Spitefulness Scale (e.g., "Part of me enjoys seeing the people I do not like fail even if their failure hurts me in some way" $\alpha = 0.87$).

Epistemic Concerns. The Intolerance of Uncertainty Scale-short (Carleton et al. 2007) was used to measure epistemic concerns. Across 12 statements (i.e., "I can't stand being taken by surprise" $\alpha = 0.87$) participants were asked to indicate the relevance of each from 1 (not characteristic of me at all) to 5 (entirely characteristic of me).

Existential Concerns. The Political Powerlessness scale (Jolley and Douglas 2014), which contains three items (i.e., "It's foolish to vote as it won't make a difference"; $\alpha = 0.55$) was used to measure existential concerns.

Social Concerns. Three separate scales measured social concerns. Nine items measured Collective Narcissism (De Zavala et al. 2009) from 1 (disagree strongly) to 6 (agree strongly, for example, "My group deserves special treatment"; $\alpha = 0.94$) while 14 items measured Realistic Threat (adapted from Maddux et al. 2008; e.g., "non-British people have more economic power than they deserve in this country", $\alpha = 0.81$).

Subjective Social Status. Participants' perceptions of their social status were measured by asking participants to imagine society as a ladder where those at the top are the people who are the best off—those who have the most money, the most education, and the best jobs (Singh-Manoux et al. 2003). At the bottom are the people who are the worst off—who have the least money, the least education, and the worst or no jobs. The ladder has 10 rungs, and participants indicate which rung most accurately represents their social standing.

After completing the questionnaire, participants were asked to give demographic information before being debriefed.

2.2.2 | Ethics

All studies reported in this paper were granted ethical approval by the Psychology Ethics Committee at the University of Chester, the previous institution of both authors.

2.3 | Results and Discussion

Data from the spitefulness scale, conspiracy theory scales, and the EPBs were positively skewed, so a log transformation was applied to allow for a more accurate estimation of the relationship between variables. Means are reported for the raw data (Table 2), but all analyses use the log data. As expected, the positive correlations found in the pilot study were replicated: higher levels of spite were associated with a stronger belief in conspiracy theories, and both were positively associated with three EBPs (i.e., realistic threat, in-group narcissism, and an intolerance for uncertainty; see Table 2). Spite was positively associated with political powerlessness, and conspiracy theory beliefs were positively associated with political powerlessness and SES. Beliefs in COVID-specific conspiracies were positively related to both spite and all the EPBs (except for SES). As shown in Table 2, conspiracy theory ideation and COVID-19 conspiracy belief were correlated. Although belief in specific conspiracy theories is not held by all conspiracy theorists (see Uscinki et al. 2025), this result does demonstrate the close association between measures of broad conspiracy theory ideation and belief in specifically anti-science conspiracies (those around COVID-19).

Mediation models were conducted for each EPB separately using PROCESS 3.5 (Hayes 2012, see Figure 1). Two effect size metrics are indicated (Preacher and Kelley 2011; Wen and Fan 2015),

TABLE 2 | Study 1 – Descriptive statistics of variables and inter-correlations among transformed variables.

	α	Mean	SD	2	3	4	5	6	7
1. Conspiratorial belief	0.94	2.60	0.88	0.67*** (0.60/0.73)	0.29*** (0.19/0.39)	0.31*** (0.20/0.41)	0.23*** (0.12/0.34)	0.35*** (0.24/0.44)	0.17** (0.05/0.27)
2. COVID conspiracies	0.90	2.75	1.67		0.30*** (0.20/0.40)	0.46*** (0.37/0.55)	0.27*** (0.16/0.37)	f0.35*** (0.24/0.44)	0.16** (0.05/0.27)
3. Spite	0.87	1.73	0.56			0.37*** (0.27/0.46)	0.33*** (0.23/0.43)	0.29*** (0.19/0.39)	0.34*** (0.24/0.44)
4. Realistic threat	0.94	2.67	1.19				0.35*** (0.25/0.45)	0.21*** (0.10/0.32)	0.16** (0.04/0.27)
5. In-group narcissism	0.86	2.69	1.04					0.18** (0.07/0.30)	0.14* (0.02/0.24)
6. Political powerlessness	0.70	3.33	1.27						0.20*** (0.09/0.31)
7. Uncertainty	0.87	3.02	0.72						

Note: Significant correlations: *<0.05, **<0.01, ***<0.001. 95% confidence intervals in parentheses.

with proportional mediation (Pm) showing the mediation effect relative to the total effect model, and Completely Standardized Indirect Effect (CSIE) indicating the wider effect of the model. As shown in Table 3, the indirect effect of EPBs on conspiracy theory ideation through spite is modest in absolute terms (CSIE 0.06–0.09). However, the indirect pathways accounted for a moderate to large amount of the total effects (17%–57%). This suggests spite mediates the relationship between EPBs and conspiracy theory ideation, but that other factors are involved in the direct relationship between them (Fiedler et al. 2018). This pattern held for COVID-19 conspiracy beliefs (for full pathways for both models, see Supporting information B) Thus, both the correlational and mediation results of this study support our hypothesis that each EPB is related to feelings of spite, which in turn might lead to belief in conspiracy theories.

3 | Study 2

In Study 2, we (unsuccessfully) manipulated each EPB. Participants were randomly allocated to one of four conditions where they were asked to read and reflect on short predictions about a post-COVID future. Details can be found on the OSF Project Page along with the pre-registration.

3.1 | Method

3.1.1 | Participants

A Prolific sample ($N = 405$) was recruited based on age, gender, and ethnicity in line with UK demographics (Table 1). A power analyses based on the correlations between the measured variables in Study 2 (Monte Carlo Power Analysis for Indirect Effects, Schoemann et al. 2017; alpha = 0.01 and power = 0.8) suggested that a sample size of 390 was necessary to detect a mediation effect at an alpha adjusted to account for multiple comparisons (<0.01). Participants were paid £3.00 for their time.

3.2 | Materials and Procedure

Participants were told that they would be shown three articles discussing the projected consequences of the COVID-19 pandemic. This served as the (failed) manipulation. All participants read two neutral short newspaper articles (one on the move to home-based working and one on why mask-wearing might become more common). Participants in the social motive condition read a short article suggesting that most of the jobs created post-COVID would be taken by migrants, participants in the epistemic motive condition read about how uncertain the post-COVID future will be, and participants in the existential condition read that individual voters would be even more powerless in a post-COVID world. Those in the control condition read an article that speculated on the post-COVID fortunes of streaming services. However, the manipulation check showed no differences across the different conditions on participants' responses to the target motive (e.g., participants in the social condition did not show significantly greater scores on the "threat" measure compared to other conditions[4]). Participants then followed the same procedure and were asked to complete the same measures as in Study 2.

3.3 | Results and Discussion

As with Study 1, the positive skew of the measured variables resulted in an application of log transformations. Means are reported for the raw data (Table 4), but all analyses use the log data. The positive correlations between spite and conspiracy theory beliefs, and all the EPBs found in Study 1 were replicated in Study 2 (see Table 4). As shown in Table 5, the mediation effects from Study 1 were also replicated: the indirect effect of EPBs on conspiracy theory ideation through spite is modest in

TABLE 3 | Study 1 – Spite as a mediator in the relationship between EPB and conspiracy theory belief.

Study 1	Outcome: Conspiracy theory ideation								
	Indirect effect	**BootSE**	**Boot 99% CI**	**Total effect**	**SE**	**99% CI**	**Pm**	**CSIE**	**BootSE**	**Boot 99%CI**
Realistic threat	0.06**	0.02	0.01/0.12	0.25**	0.04	0.13/0.36	0.24	0.08	0.03	0.02/0.15
In-group narcissism	0.07**	0.02	0.02/0.13	0.20**	0.05	0.08/0.33	0.35	0.08	0.02	0.02/0.14
Political powerlessness	0.05**	0.02	0.01/0.11	0.30**	0.05	0.18/0.42	0.17	0.06	0.02	0.02/0.12
Intolerance uncertainty	0.13**	0.03	0.04/0.22	0.23**	0.08	0.03/0.43	0.57	0.09	0.02	0.03/0.16
Study 1	**Outcome: COVID-19 Conspiracy beliefs**									
	Indirect effect	**BootSE**	**Boot 99% CI**	**Total effect**	**SE**	**99% CI**	**Pm**	**CSIE**	**BootSE**	**Boot 99% CI**
Realistic threat	0.07**	0.03	0.001/0.15	0.59**	0.07	0.42/0.76	0.12	0.06	0.02	0.01/0.12
In-group narcissism	0.11**	0.03	0.04/0.21	0.37**	0.08	0.17/0.57	0.30	0.08	0.02	0.03/0.14
Political powerlessness	0.09**	0.03	0.03/0.17	0.48**	0.08	0.28/0.67	0.19	0.06	0.02	0.02/0.12
Intolerance uncertainty	0.21**	0.05	0.09/0.36	0.35**	0.13	0.02/0.68	0.60	0.10	0.02	0.04/0.16

Note: Significant effects: *<0.05, **<0.01.

absolute terms (CSIE 0.05–0.07). However, the indirect pathways accounted for a moderate to large amount of the total effects (16%–80%). This again suggests that spite mediates the relationship between EPBs and conspiracy theory ideation, but that are other (unmeasured) factors are involved. This pattern held for the measure of COVID-19 conspiracy beliefs (for all pathways, see Supporting information D) Interestingly, for both conspiracy theory ideation (Pm = 0.80) and COVID-19 conspiracy beliefs (Pm = 1.0), Spite accounted for almost all the total effects in the models where intolerance to uncertainty was included as the predictor variable. Overall, the replication of Study 1's results observed in this study further supports our core hypothesis that spite plays a key role in conspiratorial thinking.

4 | Study 3

Finally, to test the causal relationship between spite and conspiratorial beliefs, we manipulated spite directly. This required making feelings associated with spite salient (e.g., resentment, the feeling of losing out; Marcus et al. 2014). To do this ethically, we draw on aspects of Immersive Digital Realism which uses a form of role-play whereby participants are not asked to think as themselves, but from the perspective of a character (Millard 2014). We expected that, compared to the control group, participants given the spite manipulation would report more spite and a stronger belief in conspiracy theories. We also expected that the increase in spite caused by the manipulation would mediate the effect of the manipulation on conspiracy theory beliefs.

4.1 | Pilot Study

Participants recruited through Prolific (N = 471) were randomly assigned to one of eight scenarios (or a control condition) in which they were asked to read about a character called "J" who had lost out to "Cam". Scenarios ranged across a variety of situations, but all were written to induce feelings of spite in the reader on behalf of J. After reading the scenario, participant's were asked to imagine they were J and to spend 5 min writing about how they might "get back" at Cam on the assumption that they would never be caught.[5] Following this, they completed the same measure of spite used in Studies 1 and 2. The scenario resulting in the highest spite score that differed significantly from the control group involved J being replaced in his friendship circle by Cam (see OSF project site). Thus, it was chosen for the main study. Across all of the experimental conditions, participants spent an average of 3 min and 33 s writing their answer to the scenario; there was a tendency for those who spent longer on their revenge plan to report more spite, $r(404) = 0.31$, $p = 0.051$, $CI_{95}[-0.043, 0.143]$.

4.2 | Method

4.2.1 | Participants

A Prolific sample (N = 406) was recruited to represent the UK population in terms of age, gender, and ethnicity (Table 1). A power analysis (Erdfelder et al. 1996; alpha = 0.05 and power = 0.8) determined that to find an effect size as small as 0.20,

TABLE 4 | Study 2 – Descriptive statistics of variables and inter-correlations among transformed variables.

	α	Mean	SD	2	3	4	5	6	7
1. Conspiratorial belief	0.94	2.55	0.89	0.73***	0.27***	0.26***	0.26***	0.39***	0.08
				(0.68/0.77)	(0.18/0.36)	(0.17/0.35)	(0.17/0.35)	(0.30/0.47)	(−0.02/0.17)
2 COVID conspiracies	0.9	2.67	1.67		0.27***	0.39***	0.28***	0.38***	0.061
					(0.17/0.36)	(0.30/0.47)	(0.18/0.36)	(0.27/0.44)	(−0.04/0.16)
3. Spite	0.85	1.72	0.53			0.32***	0.26***	0.34***	0.22***
						(0.23/0.40)	(0.17/0.35)	(0.24/0.42)	(0.13/0.31)
4 Realistic threat	0.96	2.87	1.36				0.42***	0.24***	0.15**
							(0.33/0.49)	(0.15/0.33)	(0.06/0.25)
5. In-group narcissism	0.89	2.69	0.98					0.11*	0.19***
								(0.01/0.21)	(0.10/0.28)
6. Political powerlessness	0.75	3.41	1.35						0.15**
									(0.06/0.25)
7. Uncertainty	0.88	3.04	0.74						

Note: Significant correlations: *<0.05, **<0.01, ***<0.001. 95% confidence intervals in parentheses.

a sample size of at least 310 would be sufficient. However, because the pilot study indicated that some participants did not spend the full time asked on the task (see OFS project page), we expected some of the data to be unusable and increased the sample size. Participants were paid £1.50 for their time.

4.3 | Materials and Procedure

Participants were told they might see a description of one of many social interactions upon which they would be asked to comment. After consenting to the study, participants were randomly assigned to one of two conditions: either the experimental condition (N = 198) or the control group (N = 208). In the experimental situation, participants read a vignette describing how a character ("Cam") invited an old high school friend ("J") into their new friend group. J then quickly becomes much more popular than Cam, and friends start inviting J to events but not Cam. As per the pilot, participants were asked to imagine they were Cam, and to write how they might get back at J. Participants in the control condition were not presented with a vignette (see Supporting information E) They were then asked to complete the same scales measuring spite (α = 0.86), conspiracy beliefs (α = 0.94), and COVID-19 beliefs (α = 0.88) used in Studies 1 and 2. Participants in the control condition were not given a scenario, completing only the three scales.

4.4 | Results and Discussion

The positive skew of the measured variables resulted in a log transformation being performed. Means are reported for the raw data (Table 6), but all analyses use the log data. Replicating previous studies, spite was positively associated with both conspiracy theory ideation, and COVID-19 conspiracy beliefs (Table 6). Conspiracy beliefs were also positively associated with COVID-19 conspiracy beliefs (Table 6). However, the results of an independent-samples t-test showed that the manipulation did not affect spite (Manipulation, M = 0.57, SD = 0.31; Control, M = 0.55, SD = 0.31; $t(402)$ = 0.61, p = 0.27, CI_{95} [−0.08, 0.04], d = 0.06), nor did it impact on conspiracy theory beliefs (Manipulation, M = 0.85, SD = 0.38; Control, M = 0.84, SD = 0.37; $t(399)$ = 0.12, p = 0.45, CI_{95} [−0.08, 0.42], d = 0.012) or COVID-19 conspiracy beliefs (Manipulation, M = 0.62, SD = 0.53; Control, M = 0.67, SD = 0.51; $t(403)$ = −1.04, p = 0.15, CI_{95} [−0.05, 0.16], d = −0.10).

Based on the pilot study and as written in the pre-registration, we anticipated that not all our participants would engage in the task to the extent needed to induce feelings of spite (i.e., spend the full 5 min thinking and writing about how they might get back at J). With this in mind, we asked three independent coders who were blind to condition and the study's purpose to read the open responses written by participants in the experimental condition and code each as follows: 0 = "not spiteful", 1 = "could be considered spiteful", or 3 = "definitely spiteful". Of the 198 participants in the experimental condition, all three coders agreed that 93 of these cases had responses that at least "could be considered spiteful". We re-ran the analysis using only these cases and 93 randomly selected cases from the control group. We found that these participants reported significantly more spite (M = 0.69, SD = 0.26) than the control group (M = 0.54, SD = 0.31; $t(184)$ = 3.49, p < 0.001, CI_{95} [0.06, 0.23], d = 0.51) although this did not extend to our measure of conspiracy theory beliefs (Manipulation, M = 0.90, SD = 0.35; Control, M = 0.86, SD = 0.37; $t(184)$ = 0.78, p = 0.22, CI_{95} [−0.06, 0.15], d = 0.12) or our COVID-19 belief scale (Manipulation, M = 0.68, SD = 0.51; Control, M = 0.68, SD = 0.52; $t(184)$ = 0.03, p = 0.49, CI_{95} [−0.16, 0.15], d = 0.01).

Because we found a significant relationship between the manipulation and spite, as well as between spite and conspiratorial beliefs, it was still appropriate to conduct a mediation analysis to test our prediction that spiteful ideation in response to the

TABLE 5 | Study 2 – Spite as a mediator in the relationship between EPB and conspiracy theory belief.

Study 2	Outcome: Conspiracy theory ideation								
	Indirect effect	**BootSE**	**Boot 99% CI**	**Total effect**	**SE**	**99%CI**	**Pm**	**CSIE**	**BootSE**	**Boot 99% CI**
Realistic threat	.05**	.02	.02/.10	.20**	.04	.10/.29	.25	.07	.02	.02/.12
In-group narcissism	.05**	.02	.02/.10	.24**	.05	.13/.36	.21	.06	.02	.02/.11
Political powerlessness	.05**	.01	.01/.09	.32**	.04	.22/.42	.16	.05	.02	.01/.10
Intolerance uncertainty	.09**	.03	.03/.16	.11	.08	−0.08/0.29	.80	.06	.02	.02/.11
Study 2	**Outcome: COVID-19 Conspiracy beliefs**									
	Indirect effect	**BootSE**	**Boot 99% CI**	**Total effect**	**SE**	**99%CI**	**Pm**	**CSIE**	**BootSE**	**Boot 99% CI**
Realistic threat	0.06**	0.02	0.01/0.12	0.48**	0.06	0.33/0.62	0.13	0.05	0.02	0.01/0.10
In-group narcissism	0.08**	0.03	0.03/0.16	0.42**	0.07	0.23/0.60	0.19	0.05	0.02	0.02/0.10
Political powerlessness	0.08**	0.05	0.02/0.15	0.49**	0.06	0.32/0.65	0.16	0.06	0.02	0.01/0.11
Intolerance uncertainty	0.14**	0.04	0.05/0.26	0.14	0.12	−0.16/0.44	1.0	0.06	0.02	0.02/0.11

Note: Significant effects: *<0.05, **<0.01.

manipulation would have an indirect effect on the relationship between the manipulation and conspiratorial beliefs (Shrout and Bolger 2002; Zhao et al. 2010). As predicted, an indirect effect was evident ($b = 0.06$, BootSE = 0.02, BootCI_{99} [0.01, 0.11]; CSIE = 0.16, BootSE = 0.05, BootCI_{99} [0.03, 0.31]), suggesting the indirect pathway had a noticeable impact on the relationship between the manipulation and conspiracy theory ideation. However, as the direct effect was negative, the relative proportion of the total effect could not be calculated (Wen and Fan 2015). The analyses of the COVID-19 conspiracy belief data also showed a similar mediation effect ($b = 0.07$, BootSE = 0.03, BootCI_{99} [0.02, 0.15]; CSIE = 0.14, BootSE = 0.05, BootCI_{99} [0.03, 30]). For the full pathways in both analyses, see Supporting information F).

5 | General Discussion

Conspiracy theories are at the heart of many instances of science denial or anti-science beliefs (Lewandowsky et al. 2013; Rutjens et al. 2018). Within this literature there are three broad, well-established predictors of conspiracy theory beliefs (EPBs): epistemic motives, existential motives, and social motives (Douglas et al. 2017). The current study investigated whether these motives could be unified under the framework of spite. Specifically, we proposed that spitefulness would mediate the relationship between each EPB and beliefs in both general conspiracy ideation and COVID-19 conspiracy theories.

Overall, the results offer initial evidence for our hypothesis. Studies 1 and 2 found spite to be positively associated with both general and COVID-19 conspiracy beliefs, and with realistic threat and in-group narcissism (social motives), political powerlessness (existential motives), and an intolerance for uncertainty (epistemic motives). Depending on the motive, spite had a small to large mediating effect on the relationship between each EPB and both conspiracy theory ideation beliefs and COVID-19 conspiracy beliefs, respectively. In Study 3, we manipulated spite directly and showed that those who engaged with the task were more spiteful, an ideation that mediated the relationship between the manipulation and these beliefs. However, this result should be considered with caution as Study 3 failed to show a direct causal link between spite manipulation and increased belief in conspiracy theories.

In considering the role of spite in conspiracy theory ideation, our hypothesis extends previous literature (Pierre 2020; van Prooijen and van Vugt 2018) by providing a framework whereby the previously established and highly intercorrelated predictors of conspiracy theory beliefs can be seen as serving as domain-specific cues to one's (perceived) competitive disadvantage. Taken together, our results suggest that established predictors of conspiracy theory belief might produce this common outcome because each in its own way provokes a common facultative "spiteful" psychological motivation, which in turn makes a person more open to conspiratorial thinking. Although spite did show a small to medium effect size as a mediator for conspiracy theory ideation, the smaller effect sizes for COVID-19 conspiracies and the lack of a causal link in our results suggest that it is possible that other unmeasured factors, in addition to spite, may underlie these motives (see *Limitations and future directions*).

TABLE 6 | Study 3 – Descriptive statistics of variables and inter-correlations among transformed variables.

	α	Mean	SD	2	3
1. Conspiracy theory ideation	0.94	2.49	0.87	0.66***	0.26***
				(0.60/0.73)	(0.16/0.35)
2. COVID Conspiracies	0.88	2.42	1.42		0.22***
					(0.12/0.31)
3. Spite	0.86	1.83	0.59		

Note: Significant correlations; *<0.05, **<0.01, ***<0.001. 95% confidence intervals in parentheses.

Considering conspiracy theory beliefs as part of a spiteful framework helps explain *why* the triumvirate of concerns (epistemic, existential, and social) might result in individuals gravitating toward conspiracy theories: they are fantastical ideas that might allow a "spiteful" psychological motivation to be expressed by undermining the standing of, and trust in, established narratives and the purveyors thereof (whether this is in reality or in the imagination of the believer; Singh 2022). As reported by Alam et al. (2025), the conceptually similar "need for chaos"—a desire to destroy the established order of society—is common in those feeling disadvantaged and was also found to be associated with general conspiracy theory beliefs and COVID-19 beliefs. Thus, conspiracy theory beliefs, or, beliefs that encourage the rejection of expertise and denial of science-based evidence, can be seen as a cultural item that provides an opportunity for the (spiteful) motive to level the playing field: providing an illusion of understanding of important events when one would otherwise not have the expertise to do so (epistemic), providing a way to derogate competitors (social), and to reduce the power of a perceived authority by refusing to comply with its wishes or explanations (existential).

Although individual conspiracy beliefs are not universally held (see Uscinki et al. 2025), across our results, conspiracy theory ideation correlated with belief in COVID-19 conspiracies. Sadly, science and scientific findings are perhaps uniquely placed to be the subject of conspiracy theory beliefs. The advancement of science depends on the systematic exploration of the natural world, but as a result, science and scientists produce evidence that may be contrary to people's (unfounded) personal intuitions or group ideologies. Furthermore, the results from scientific inquiry often require expertise to understand, confirm, or refute them. Therefore, to reject findings, the simpler alternative is to accuse scientists of acting on behalf of a malevolent all-powerful hidden group. Although ad-hominin attacks are common across political spectra, the global consensus on issues such as the dangers of climate change or the effectiveness of vaccinations means the spiteful rejection of the "official narrative" inevitably gives rise to global "super conspiracies" to explain why all the experts are "wrong" (Barkun 2013). A recent review of the conspiracy theory literature suggested that researchers in the field must recognize the inherent social and creative nature of conspiracy theory belief (Douglas and Sutton 2023). In this regard, our hypothesis—that conspiracy beliefs are a cultural manifestation of a distal, evolved, social behavior—captures this call well.

Nevertheless, there are alternative explanations for the intercorrelation among EPBs across our studies. The Existential Threat model (van Prooijen 2020) posits that anxiety about an event can drive sense-making, potentially leading to conspiracy theory beliefs if an antagonistic outgroup is encountered. In other words, if how the event was made sense of is contradicted by experts and scientific evidence, belief in conspiracy theories is more likely. At present there is limited causal evidence for this model, but its "feedback loop" between existential, epistemic, and social factors may explain the elaborate nature of "super conspiracies" (Barkun 2013). Still, while examples of the EPBs, narcissism (Cichocka et al. 2022), reactance and autonomy (Bellis et al. 2022), or lack of scientific knowledge (Čavojová et al. 2022) do inevitably result from social comparisons (feeling that one's greatness is unacknowledged, that there is an imbalance between groups, and that there are different levels of expertise), the relationship might better be characterized as individuals wanting to shift their social world in their favor, rather than experiencing existential fear of an antagonistic outgroup (see also, Mus et al. 2022; Petersen 2020).

Equally, no matter which EPB one uses as a starting point, it is difficult not to encounter a social component; the implausible or counter-factual nature of conspiracy theory beliefs makes encountering an out-group inevitable. Here again, science is uniquely placed to act as an antagonistic outgroup as, at some point, the claims of theorists will be met with counters and debunking by experts in whatever field has been alluded to in the conspiracy theory. Our use of spite as a conceptual model suggests that conspiracy beliefs do not require a set order of predictors. Spiteful ideation, triggered by various cues of disadvantage, allows existential, epistemic, or social factors to independently foster a mindset conducive to conspiratorial thinking. Although conspiracy beliefs often encounter out-groups due to their counter-mainstream nature, an antagonistic out-group is not essential for initiating these beliefs. That manipulating these factors independently influences beliefs (Douglas and Sutton 2017) is consistent with this, as is the fact that a facet of conspiracy ideation is the rejection of the "mainstream opinion" regardless of the subject matter (Wood et al. 2012). Thus, we suggest that the relationship between the established predictors of belief might be more parsimoniously explained as a manifestation of an evolved general (spiteful) facultative response to many domains of (potential) individual competitive disadvantage, rather than as the causal outcome of sensitivity to specific cues of (potential) existentially threatening rival groups.

5.1 | Implications for Policy

Framing conspiracy theory belief as a broad expression of spiteful motivation has implications for policy and initiatives that aim to tackle the acceptance and spread of conspiracy theory beliefs. However, our suggestions come with the caveat that our results are initial and the mediation effect small, and as such cannot be considered conclusive.

As spite can be seen as an expression of (perceived) competitive disadvantage (Gardner and West 2004; Jensen 2010), targeting the cause(s) of this feeling would be fruitful. For example, focusing on media literacy might reduce feelings of uncertainty or anxiety due to a lack of understanding when faced with an onslaught of both scientific and pseudo-scientific perspectives (see van Prooijen 2017). In fact, the strongest mediation effects identified in the current research were for measures of uncertainty, a feeling that could possibly be offset by effective science communication aimed at countering misinformation (e.g., Bjola and Papadakis 2021; O'Mahony et al. 2023). Equally, Levy et al. (2025) report that solution-focused climate change information reduced denial about the subject, as solutions make individuals feel more hopeful and empowered to act, and as such, less likely to turn to conspiracy theories. Also, Golec de Zavala (2025), found that encouraging a positive in-group identity might lower the desire to attack scientific findings. Indeed, research has shown that framing climate change policies as issues of national pride (Gainous and Merry 2022; Wang et al. 2023) and personal pride (Shimul and Cheah 2023) increases acceptance of them, even among populations prone to rejecting the scientific consensus.

Broader still, if conspiracy theory beliefs can be seen as a manifestation of spite—of a feeling of disadvantage, high competition, and scarcity—then stemming the tide of conspiracy theories and science denialism is not separate from social issues such as financial inequality and precariousness (e.g., Credit Suisse 2019). Spite therefore frames conspiracy theory belief as an indicator of underlying social issues, rather than indicating deficiencies within the individual theorist. This highlights that any policy attempt to reduce conspiracy theory belief must also acknowledge and engage with this "spiteful" underlying cause: A societal feeling of disenfranchisement that creates a perpetual reservoir of minds willing to reject the latest "official narrative," whatever it may be.

Finally, a spiteful framework for conspiracy theory beliefs may be more effective than others (e.g., Existential Threat model) to help understand how conspiracy theories are used by "bad actors" who consciously generate and propagate them to cause harm to the target as an end unto itself (e.g., as opposed to pushing a specific political agenda, see Barnes et al. 2018; Paul and Matthews 2016; Yablokov 2015). A recognition that the primary aim might be to simply cause harm and distress would be worth considering when formulating responses to conspiracy theories or their architects; or indeed before one assumes that those sharing conspiracy theories believe completely what they claim (see Petersen 2020). Although not examined by the current study, spite might be a useful model for explaining behavior at different levels of conspiracy theory research.

6 | Limitations and Directions for Further Research

Despite the potential our hypothesis has to elucidate the processes behind conspiratorial thinking, there are limitations of the current studies. To return to the results, our hypothesis was supported by the consistent mediating effect found of spite on the relationship between each EPB and COVID-19 conspiracy theories in Studies 1 and 2. However, it should be noted that overall belief in COVID-19 conspiracies among our participant sample was low ($M = 2.50$ out of a maximum of 9, $SD = 1.44$ across three studies), in comparison to the generic conspiracist beliefs scale ($M = 2.63$ out of a maximum of 7, $SD = 0.85$, across three studies, matching the results from the scale's construction; Brotherton et al. 2013). This supports work suggesting that reports of a broad acceptance of COVID-19 conspiracy theories by the general public have been exaggerated (Sutton and Douglas 2022), and these low means should be considered when interpreting the results.

There are also potentially more impactful limitations to consider. Although post-hoc analysis suggested appropriate power to detect an indirect effect in each mediation analysis singularly, analyses were conducted on multiple variables (Study 2 and 3) thus increasing the probability of type-1 errors. Furthermore, our attempts to influence conspiracy theory beliefs directly by manipulating spite were not successful. Although we did demonstrate an indirect pathway (mediation effect) through spiteful ideation, a direct effect of the manipulation would have provided stronger evidence of our claim. Whether this was due to the absence of an effect or to an ineffective manipulation should be explored in future research. It is possible, for instance, that our brief manipulation was not strong enough to elicit a change in conspiracy theory belief. Although research on spite has typically been conducted in a lab environment or through direct online recruitment, paid crowdsourcing combined with current economic realities in the UK may have influenced participant engagement. This is particularly evident in Study 3 where many participants did not engage with the task as asked. As experimental work on spite within the behavior economic paradigm has successfully provoked facultative spiteful behavior (Ding et al. 2017; Nishimura et al. 2011), future work might consider using such methods when investigating the relationship between spite and conspiracy theory beliefs.

Related to this, some research suggests that the willingness to act spitefully is bipolarly distributed in the population (Kimbrough and Reiss 2012). From this perspective, the engagement shown by participants in Study 3 who completed the task as instructed might reflect engagement by those who are higher in spite as a trait. In this way, the results of Study 3 could suggest a relationship between high trait spite and conspiracy theory beliefs rather than a mediation effect through the manipulation (see Fiedler et al. 2018). Still, even if the magnitude of any spiteful response could be affected by related individual differences (Jonason et al. 2020), a wealth of research demonstrates that spite is a facultative response to circumstances (Barker and Barclay 2016; Ding et al. 2017; Jensen 2010; Nishimura et al. 2011; Prediger et al. 2014), hence our pre-registered hypothesized mediation model.

Furthermore, to the authors' knowledge, no investigation has been conducted to experimentally manipulate spite as measured by the Spitefulness Scale (Marcus et al. 2014). Thus, a key issue with the current studies is whether the measure of spite used can be interpreted as a measure of a facultative response to cues of competitive disadvantage (e.g., individual responses to the spite scale are caused by their feeling of powerlessness), upon which our model is contingent. If it is not, and spite as measured by the utilized scale represents a stable personality trait, then spite might instead moderate the influence of epistemic, existential, and social concerns on conspiracy theory belief, rather than being caused by them. If spitefulness functions as an individual difference (and thus a moderator), our findings still shed light on a personality characteristic that explains why some turn to science-denial and conspiracy theories in response to uncomfortable truths (see also, the desire for chaos, Alam et al. 2025). Certainly, further work is needed to explore and replicate the pattern of results before any firm conclusions can be drawn.

Still, work within the behavioral economic paradigm has shown a relationship between the Spitefulness Scale and spiteful behavior (Gordon and Birney 2024; Martínez and Maner 2024; Moyer et al. 2017) and research has also successfully provoked facultative spiteful behavior (e.g., Barker and Barclay 2016). Hence, future work investigating the relationship between spite and conspiracy theory beliefs should use these methods. For example, we would expect greater conspiracy theory beliefs from participants in a competitive situation with limited means to respond. Given spite is almost universally seen as negative (Barash and Lipton 2011, Jackson et al. 2019) the use of these methods would also overcome the possibility that social desirability reduced participant's willingness to indicate their spitefulness (Studies 1–3) or engage with the manipulation task (many participants insisted they would never "get back" at someone in the situation described: Study 3, see Supporting information). Finally, as emphasized by our results and those of others (e.g., Sutton and Douglas 2022), conspiracy theory beliefs are widespread but are not the norm. Future work might also explore why some follow this path when such cues are experienced while others do not in the context of spite. For instance, research suggests that shame is associated with spite (Marcus et al. 2014) and work on hate crimes has identified shame as a predictor of whether the victims of such crimes desire retaliation (Paterson et al. 2019). Therefore, whether an individual feels shame in response to cues of their lack of power, understanding, or social status, might also be a mediating factor between these motives, spite, and conspiracy theory beliefs.

It should be noted that the use of mediation in cross-sectional research is contentious. Although we would argue that our theoretical rationale for investigating spite as a potential mediator is well-evidenced and valid (see Fiedler et al. 2018), even with a sound theoretical rationale, much of our data are cross-sectional and causal relationships inferred from statistical outcomes of such methods should always be treated cautiously (Fiedler et al. 2018; Rohrer et al. 2022; but see Grosz et al. 2020). As noted above, we have proposed two areas for further study: continued investigation into whether the Spitefulness scale (Marcus et al. 2014) measures *state* rather than a *trait*, and using economic games to both manipulate and measure spite's role in conspiratorial thinking. Such work would help investigate further the role of spite and spitefulness within anti-science and conspiracy beliefs.

6.1 | Contribution to the Special Issue and Conclusion

This special issue explores the psychological underpinnings of science denial and the spread of misinformation, and by doing so examines strategies that might prevent or mitigate the damage such beliefs cause. The current manuscript investigated whether spite—the desire to harm others, especially in response to perceived disadvantage—could help understand why some individuals have a conspiracy theory ideation and accept anti-science conspiracy theories (here, around COVID-19). We show that conspiracy theory ideation is associated with anti-science conspiracy theory belief, and that spitefulness has a small to medium effect on the relationship between beliefs and the broad motives established in the conspiracy theory literature (e.g., Douglas et al. 2017). Even with the caveats and limitations of the research firmly in mind, our results provide initial support for our hypothesis that conspiracy theories are a cultural manifestation of spite. Certainly, the results can be seen as an initial proof-of-concept for future work to build upon. As mentioned previously, the framing of conspiracy theory belief as a response to perceived disadvantage, of a desire to level the playing field, provides specific policy implications around reducing this perception.

The suggestion to consider science denialism and conspiratorial thinking within a spiteful framework corresponds to the findings of existing literature and those within this special issue: Disadvantage and a desire for chaos (Alam et al. 2025), the importance of group identity (Golec De Zavala 2025), and the usefulness of empowering information (Levy et al. 2025). Finally, our results support the importance of recognizing conspiracy theory beliefs as an expression of general feelings of disenfranchisement (see Douglas and Sutton 2023). Thus, instead of focusing on issues such as how conspiracy theories spread or theorists' lack of scientific literacy, tackling the harm caused by science denial and conspiracy theories will only be accomplished by viewing them as symptoms of broader socio-political issues that result in social inequalities and, by extension, the real (and perceived) disadvantage people face.

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Ethics Statement

Ethical approval for all studies was granted by the Psychology Ethics Panel of the University of Chester, UK.

Consent

All participants were over the age of 18 and gave informed consent.

Conflicts of Interest

There is no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are openly available in the Open Science Framework, at https://osf.io/y96xs/?view_only=a5aa994e9fd142beb098129982b23bf6

Endnotes

[1] This definition combines elements from Goertzel (1994), Wood et al (2012), and Brotherton and French (2014) to differentiate "conspiracy theory" beliefs from the arguably rational mistrust of the powerful (see Coady 2019). It highlights that many, if not all, beliefs identified as "conspiracy theories" are not simply illogical or unlikely suspicions of malfeasance but are accepted by adherents despite their grandiose nature and better evidenced or parsimonious explanations being available.

[2] In the Ultimatum Game, participants assume one of two roles: The proposer and the responder. The proposer is given an amount of money (e.g., £10) and must decide how to divide it between themselves and the responder. The responder can then choose to accept the division, with participants receiving the amount as per the split, or reject it. If the division is rejected, neither participant receives any money.

[3] In the Joy of Destruction game, participants are given an amount of money and have the option to spend it on destroying a portion of the money given to another (anonymous) participant. While variations exist (see Gordon and Birney 2024), typically there is no direct benefit to the participant from destroying the money of another participant.

[4] It is possible that this approach was too ambitious and the priming too slight for it manipulate the relevant expected predictors of belief. For example, other research has used longer comprehension tasks or writing tasks (e.g., Swami et al. 2014; Lantian et al. 2017) to successfully manipulate one of the three broad motives associated with conspiracy theory beliefs. See Supporting Information C for priming materials.

[5] This instruction was given to (a) remove possible confounds caused by participants considering legality and (b) to ensure the participants response was not intended to change the behavior of "Cam" in the future. Interestingly, all participants who engaged with the task opted for secret gossip as a mechanism (see OSF project site)

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.