**Social Norms and Reducing Belief in Conspiracy Theories**

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# **Memorandum**

The research presented in this thesis was conducted whilst the author was a full-time postgraduate student in the Department of Psychology, School of Social Sciences and Education at Staffordshire University.

The author has not been awarded a degree by this university or any other university for the work included in this thesis.

The research outlined in Chapter 4, along with Study 4 which is outlined in Chapter 6, has been published and is presented in this thesis, with a few amendments to allow for the studies to be split, as the following journal article:

Cookson, D., Jolley, D., Dempsey, R. C., & Povey, R. (2021). “If they believe, then so shall I”: Perceived beliefs of the in-group predict conspiracy theory belief. *Group Processes & Intergroup Relations, 24(5),* 759-782. <https://doi.org/10.1177/1368430221993907>.

The research outlined in Chapter 7 has been published in the following paper:

Cookson, D., Jolley, D., Dempsey, R. C., & Povey, R. (2021). A Social Norms Approach intervention to address misperceptions of anti-vaccine conspiracy beliefs amongst UK parents. PloS one, 16(11), e0258985.

# **Dedication**

In memory of Beryl ‘Bel’ and Leslie ‘Les’ Lloyd.

This thesis is dedicated to my Grandma and Grandad.

# **Acknowledgements**

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# **Abstract**

Conspiracy theories are explanations for important events that involve secret plots from powerful malevolent groups. Research finds that belief in conspiracy theories can lead to negative consequences for individuals and society. Importantly, belief in anti-vaccine conspiracy theories is related to vaccine hesitancy. Intervention attempts to attenuate the consequences of these beliefs thus far have had limited success. This thesis empirically tests social norms-based interventions to address anti-vaccine conspiracy beliefs.

Social norms are expectations about appropriate social behaviour. Our perceptions of social norms can exert a powerful influence on beliefs and behaviours. Across four studies, we found that perceived norms of in-group conspiracy beliefs are strongly related to personal conspiracy beliefs; demonstrated in a student sample (Study 1), in a community sample (Study 2), and specific to anti-vaccine conspiracy beliefs in a UK parent sample (Study 4). Similarly, the level of identification to the in-group is important in this relationship (Study 3). This thesis also found that individuals overestimated the perceived belief of others in conspiracy theories, misperceiving that these beliefs are more normative than they are.

Utilizing this knowledge, two experimental studies with UK parents were conducted, which paired anti-conspiracy counterarguments and social norm messages to address anti-vaccine conspiracy beliefs. However, these interventions were ineffective in reducing anti-vaccine conspiracy beliefs and increasing vaccination intentions (Studies 5 and 6). Combatting limitations of the previous interventions tested in this thesis, a Social Norms Approach (SNA) intervention was conducted, using normative feedback to challenge misperceptions of anti-vaccine conspiracy beliefs amongst UK parents (Study 7). The SNA intervention successfully reduced these beliefs, but the effects did not extend to increasing vaccination intentions.

Overall, the research in this thesis demonstrates the strong relationship between perceived norms of conspiracy beliefs and personal beliefs and the potential of the SNA to address these beliefs. Future research is invited to further explore the contribution of the SNA to reduce anti-vaccine conspiracy endorsement.

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# **Chapter 1: Thesis Overview**

## **1.1 Overview of the Current Research**

Conspiracy beliefs, defined as explanations for important events that involve secret plots from powerful malevolent groups (Douglas et al., 2019), are widespread in society (Oliver & Wood, 2014). Conspiracy theories are endorsed by millions of people and can influence choices one makes in their life (see Jolley, Mari et al., 2020). Specifically, belief in conspiracy theories can have potentially negative social and health consequences (e.g. Bogart & Thorburn, 2005; Bogart et al., 2011; Bogart et al., 2010; Jolley & Douglas, 2014a; Jolley & Douglas, 2014b). For example, exposure to anti-vaccine conspiracy beliefs has been shown to increase belief in them and in turn, reduce vaccinations intentions (Jolley & Douglas, 2014a). This is concerning, particularly given that vaccination uptake in the UK is steadily decreasing (NHS, 2019; 2020), despite scientific consensus regarding the efficacy and safety of vaccines (Taylor et al., 2014).

Therefore, it is crucial to understand why people endorse conspiracy theories, particularly anti-vaccine conspiracy beliefs. A multitude of research has helped us to understand the antecedents of conspiracy beliefs (see Douglas et al., 2019). For example, individual differences and psychological factors, cognitive biases and situational factors have been shown to explain conspiracy beliefs. However, the potential role of perceived social norms in motivating conspiracy beliefs has yet to be considered. Perceived social norms are our beliefs about what most other people typically do or typically approve of (Robinson, 2015). Specifically, perceived descriptive norms refer to one’s perception of what most others typically do (Cialdini & Trost, 1998) and perceived injunctive norms refer to one’s perception of what most others typically approve of (Cialdini & Trost, 1998). Perceived social norms have been shown to influence a wide range of behaviours, for example, college student drinking (e.g. Bosari & Carey, 2001), smoking tobacco (e.g. Pischke et al., 2015), eating habits (e.g. Lally et al., 2010; Perkins et al., 2010, 2018), gambling (e.g. Larimer & Neighbors, 2003; Meisel & Goodie, 2014), and sun protection (e.g. Reid & Aiken, 2013). Previous research indicates the potential that perceived norms of conspiracy beliefs are linked to personal belief. Group members subscribe more to conspiracy theories that accuse the out-group or boost their in-group (Smallpage et al., 2007; Mashuri & Zaduqisti, 2013; Chayinska & Minescu, 2018). Therefore, this thesis will investigate a direct association between perceived in-group norms of conspiracy beliefs and personal conspiracy beliefs. Similarly, a direct association between perceived in-group norms of anti-vaccine conspiracy beliefs specifically and personal anti-vaccine conspiracy beliefs will also be investigated.

The presence of misperceptions of other people’s conspiracy beliefs will be investigated in this thesis. Specifically, it is hypothesised that individuals will overestimate the conspiracy beliefs of others. Conspiracy beliefs are very visible, particularly online, to the extent where the UK government has released a counter-response to the current spread of COVID-19 conspiracy theories, including a guide to how 5G works (Gov, 2020). Similarly, conspiracy theories have been given headline attention (Jolley & Paterson, 2020). Research shows that exposure to conspiracy theories can increase belief in them without individuals being aware that their beliefs are changing (Douglas & Sutton, 2008). This visibility and exposure to conspiracy theories could increase not only personal belief, but also the consensus that other people endorse them also, fuelling a false consensus that conspiracy endorsement is more typical than it actually is. This thesis will be the first research to our knowledge to test for the presence of misperceptions of general conspiracy beliefs and anti-vaccine conspiracy beliefs and assess their role in personal belief in conspiracy theories.

The Social Identity Approach states that norm formation and normative behaviour should strengthen when people identify more strongly with the group defined by the norm (Tajfel & Turner, 1979; Turner et al., 1987). Therefore, this PhD thesis will investigate from which social groups are perceived norms of conspiracy beliefs more strongly related to personal beliefs. Perceived norms of both proximal (high identification) and distal (lower identification) referent groups will be measured alongside individual’s personal conspiracy beliefs. The moderating role of social identification on the potential relationship between perceived norms of conspiracy beliefs of proximal and distal referent groups and personal conspiracy beliefs will be explored. As well as further understanding the mechanism of the association between perceived norms of conspiracy beliefs and personal conspiracy beliefs, this simultaneously addresses a limitation of the perceived norms literature which has not always paid attention to ensuring that the referent groups utilised are psychologically salient (Oakes, 1987). Thus, this thesis will test for the first time the relationship between perceived norms of different referent groups (both proximal and distal) and actual conspiracy beliefs, and whether this relationship is contingent on the level of social identification with the referent group.

This thesis also examines the role of the need for uniqueness in the relationship between perceived norms of conspiracy beliefs and personal belief. Previous research has shown that those with a higher need for uniqueness are more likely to endorse conspiracy theories (Imhoff & Lamberty, 2017; Lantian et al., 2017). However, those who have a high need for uniqueness are less likely to be influenced by perceived social norms (Imhoff & Erb, 2009). Thus, it was hypothesised that the relationship between perceived norms of conspiracy belief and actual norms would be moderated by the need for uniqueness, such that the stronger participants need to feel unique, the less influence the perceived norms would have on actual conspiracy belief. This will extend our understanding of the relationship between need for uniqueness and belief in conspiracy theories by examining the role of need for uniqueness in belief in anti-vaccine conspiracy theories specifically and assessing whether a need to feel unique will buffer against potential benefits of interventions aiming to reduce belief in conspiracy theories.

Identifying the relationship between perceived social norms of conspiracy beliefs and personal beliefs is important as this knowledge can be used to develop interventions to reduce conspiracy beliefs and the potential consequences of harbouring these beliefs. This is crucial as research is emerging which demonstrates potentially dangerous consequences of conspiracy beliefs. Specifically, belief in anti-vaccine conspiracy theories can reduce individuals’ vaccination intentions (Jolley & Douglas, 2014a). Therefore, this thesis will aim to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions by employing experimental methods, manipulating the perceived norms of in-group anti-vaccine conspiracy belief.

By investigating the role of perceived norms in personal anti-vaccine conspiracy belief and demonstrating the presence of misperceptions of the perceived norms of anti-vaccine conspiracy beliefs, the two tenants of the Social Norms Approach (SNA) intervention would have been met. The SNA is an intervention approach that has been used widely to promote positive health-related behaviours, where the premise is to correct the misperceptions of the beliefs and behaviours of others, to reduce the social pressure to engage in a problematic behaviour. Thus, the final aim of this thesis is to test the feasibility of a brief SNA intervention, utilising normative feedback, to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions. This intervention will target UK parents of young children and aim to correct their misperceptions of anti-vaccine conspiracy beliefs of other parents and, in turn, reduce their personal anti-vaccine conspiracy beliefs and increase vaccination intentions. This is the first time to our knowledge a SNA intervention has been used to target anti-vaccine conspiracy beliefs and thus extends the use of the SNA. Moreover, this research is particularly important as to date anti-vaccine conspiracy theories have been shown to be consequential and difficult to change.

**To summarise, the main aims and objectives of this thesis are:**

1. To understand the role of perceived norms in predicting belief in conspiracy theories. This aim will be addressed across studies 1, 2 (Chapter 4), 3 (Chapter 5) and 4 (Chapter 6).
2. To test for the presence of misperceptions in individuals’ estimations of other peoples’ endorsement of conspiracy theories. This aim will be addressed in studies 1, 2 (Chapter 4) and 4 (Chapter 6).
3. To explore the potential moderating role of identification with the group, on the relationship between perceived norms of conspiracy belief and personal belief. This aim will be explored across each of the seven studies in this thesis.
4. To explore whether this relationship is buffered by ones’ need to feel unique. This aim will be addressed across studies 1-6 (Chapters 4-6).
5. To employ experimental methods to reduce individuals’ endorsement of anti-vaccine conspiracy theories through manipulating norm perceptions. This aim will be addressed in studies 3 (Chapter 5), 5 and 6 (Chapter 6).
6. The final aim of this thesis is to test the feasibility of a brief SNA intervention, utilising normative feedback to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions of UK parents of young children. This aim will be addressed in Study 7 (Chapter 7).

## **1.2 Introduction to the Thesis**

This thesis begins with Chapter 2 introducing the psychology of conspiracy theories. This Chapter highlights definitions of conspiracy beliefs, the prevalence of conspiracy beliefs and how they are measured. Chapter 2 reviews previous research which has focused on why people believe in conspiracy theories, specifically highlighting the limited research exploring social norms and belief in conspiracy theories and how the potential dangers of endorsing conspiracy theories require the development of effective interventions to address these beliefs. Chapter 3 then outlines social norms in psychology and the Social Norms Approach (SNA), indicating how this type of intervention is an unexplored possibility to addressing belief in more dangerous conspiracy theories.

Chapter 4 is the first empirical Chapter and examines the predictive power of perceived descriptive norms of conspiracy beliefs on the personal endorsement of conspiracy theories. Across two studies (Study 1 and 2), a cross-sectional design was employed where we asked participants to complete a questionnaire to measure their personal belief in conspiracy theories and then to estimate the extent to which they believed a proximal in-group, a more distal in-group, and an out-group endorsed the same conspiracy theories. This allowed us to firstly see whether perceived beliefs of in-groups in conspiracy theories can predict personal beliefs, and secondly, it allowed us to assess whether misperceptions were present. Specifically, if participants believed that others from their in-group endorsed conspiracy theories more than they did, then this would suggest that individuals over-estimate the conspiracy beliefs of others. Chapter 4 also measures individual’s level of identification with each of the social groups and their need for uniqueness, to assess whether these factors moderate the predicted relationships. This Chapter then discusses how the findings of this study could be used as a first step in developing novel interventions to reduce belief in conspiracy theories and also highlights the limitations of the cross-sectional design of these studies.

Chapter 5 then introduces an experimental study investigating whether perceived social norms of conspiracy beliefs play a causal role in personal conspiracy endorsement. This Chapter also focuses specifically on anti-vaccine conspiracy theories, as previous research demonstrates the potential societal and personal dangers of harbouring these beliefs (Hornsey et al., 2018; Jolley & Douglas, 2014a). As Studies 1 and 2 were cross-sectional, a limitation is the inability to assess cause and effect, and as such Study 3 aimed to address this limitation. Specifically, a between-subject 2\*3 experimental design was employed, where perceived norms of anti-vaccine conspiracy beliefs were manipulated, and personal endorsement measured. Participants were exposed to an article containing anti-vaccine conspiracy theories (e.g. that vaccine side effects are covered up to maintain profits). Along with the article, participants were given normative messages from either their national in-group or a national out-group, which specified that a recent poll found that either the majority or minority of that group endorsed the anti-vaccine conspiracy information in the article. This Chapter then explains the findings of this study and important limitations, for example the use of national in- and out-groups, which led to Study 4.

Chapter 6 consists of three studies that aim to address the limitations of Study 3 and test how normative messages can be used to reduce belief in anti-vaccine conspiracy theories. Study 4 utilises a cross-sectional design to identify a meaningful in-group in the context of anti-vaccine conspiracy theories, where it was hypothesised that the perceived beliefs of other parents in anti-vaccine conspiracy theories would be the strongest predictor of personal anti-vaccine conspiracy beliefs. Once established, Study 5 experimentally assesses the ability of counterarguments attributed to *other parents*, to reduce UK parents’ beliefs in anti-vaccine conspiracy theories and increase vaccination intentions. Then, Study 6 experimentally assesses the ability of normative messages from *other parents,* embedded within the conspiracy theory counterarguments, to reduce UK parents’ beliefs in anti-vaccine conspiracy theories and increase vaccination intentions. This Chapter concludes with a discussion of the findings from these three studies and re-iterates what the programme of research so far provides towards the development of an intervention to reduce endorsement of anti-vaccine conspiracy theories and increase vaccination intentions.

The final empirical Chapter of this thesis is Chapter 7. This Chapter details a novel normative feedback intervention study, in line with the SNA, aiming to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions in UK parents of young children (Study 7). As previously stated, belief in anti-vaccine conspiracy theories has been problematic; directly related to reduced vaccination intentions, and previous attempts to intervene have had limited success. Therefore, this Chapter is unique in employing a SNA intervention, which has previously been successful in improving health behaviours, to address conspiracy beliefs and vaccination intentions. This Chapter then discusses the strengths of our work, being the first to showcase the possibility that normative feedback could be used as a technique to reduce anti-vaccine conspiracy beliefs, and also the limitations. Finally, this Chapter invites future research to focus on further understanding the use of this type of intervention to combat the dangers of conspiracy beliefs.

Finally, Chapter 8 summarises the aims and the main findings of the thesis. Then, the implications and applications of the research programme are discussed. The Chapter also acknowledges the limitations of the research and suggests how future research can build on these findings.

# **Chapter 2: The Psychology of Conspiracy Theories**

## **2.1 Chapter Overview**

Conspiracy theories can be defined as explanations for an important event that involves secret plots from powerful malevolent groups (Douglas et al., 2019). This Chapter gives an overview of the psychology of conspiracy theories. Firstly, definitions of conspiracy theories are discussed, and then the extent of conspiracy belief is examined; polls across the US and the UK have measured belief in conspiracy theories and give an indication of how widespread they are. For example, a 2021 YouGov survey in the UK found that 20% of those surveyed endorsed anti-vaccine conspiracy theories to some extent, and a 2019 YouGov UK survey found that 60% endorsed at least one conspiracy theory. This indicates that although conspiracy theory beliefs can be described as non-conventional (e.g. Lantian et al., 2017) and once thought to be minority beliefs, they are endorsed by a proportion of society. This Chapter then looks at how conspiracy beliefs are measured in research, where scales measuring belief in real-life conspiracy theories, specific conspiracy theories, and conspiracy ideation are often used.

Researchers have measured belief in conspiracy theories to establish different correlates of these beliefs to aid the understanding of why people may endorse conspiracy theories. A consistent predictor of belief in a conspiracy theory is belief in other, unrelated conspiracy theories (Goertzel, 1994; Swami et al., 2010; 2011; Wood et al., 2012). Belief in one conspiracy theory can increase endorsement of other, unrelated conspiracy theories and as such suggests that some people could have a stronger tendency towards conspiracy theorising. Thus far, research indicates that different psychological factors can predict conspiracy beliefs. This Chapter reviews the role of individual difference variables (e.g. Goreis & Voracek, 2019), political positions (e.g. van Prooijen et al., 2015), need for uniqueness (e.g. Imhoff & Lamberty, 2017), and social factors (e.g. Chayinska & Minescu, 2018) in predicting belief in conspiracy theories. The role of cognitive biases, which develop as a shortcut to facilitate sense-making, in conspiracy beliefs is next explored. Research indicates that susceptibility to specific cognitive biases, for example, bias assimilation, projection, proportionality bias, the conjunction fallacy, and hypersensitive pattern perception and agency detection are positively associated with endorsing conspiracy theories (Brotherton & French, 2014; Douglas & Sutton, 2011; McCauley & Jacques, 1979; van Prooijen et al., 2018).

An understanding of the predictors of conspiracy beliefs is crucial as research finds that belief in conspiracy theories is not without consequences. This Chapter then reviews research that demonstrates the potential negative consequences of conspiracy beliefs. First, conspiracy endorsement has been shown to have a system justification function, where endorsing conspiracies allows individuals to blame societal misgivings on the actions of a ‘bad’ individual or small group of individuals. This therefore protects the social system as a whole when its legitimacy is under threat, and could be a mechanism by which increased endorsement of conspiracy theories may reduce the likelihood of social change (Jolley et al., 2017). Belief in conspiracy theories is also positively related to the rejection of science (Lewandowsky et al., 2013), and related to this, is associated with negative health consequences. For instance, across numerous studies, endorsement of conspiracy theories reduce intentions to vaccinate (e.g. Jolley & Douglas, 2014a; Ruiz & Bell, 2020). Similarly, conspiracy beliefs can reduce other positive behaviours, for example, political engagement and green behaviours (Jolley & Douglas, 2014b).

Consequently, there is an onus on research to develop successful interventions to alleviate these potential negative consequences. Therefore, this Chapter discusses research that has tested interventions aiming to reduce conspiracy beliefs using counterarguments to conspiracy theories (Jolley & Douglas, 2017) and analytical thinking (Swami et al., 2014). This indicates that conspiracy beliefs and the negative consequences could be reduced through psychological interventions, however, further research is needed.

## **2.2 Defining Conspiracy Theories**

There are several definitions of *conspiracy theories* used in the literature. One example is an attempt to explain the ultimate cause of an event as a secret plot by a covert alliance of powerful actors or organizations, rather than as an overt activity or natural occurrence (Douglas & Sutton, 2008; McCauley & Jacques, 1979). Conspiracy theories have also been defined as suspicions that a group of individuals are involved in secret agreements, attempting to achieve hidden goals which are unlawful or malevolent (Swami et al., 2010; Zonis & Joseph, 1994). Similarly, a simple definition of a conspiracy theory is an explanation for an important event that involves secret plots from powerful malevolent groups (Goertzel, 1994).

Although there are slight differences, these definitions allude to the same phenomenon; and whichever definition is used, there are five critical factors present, conceptualised by van Prooiijen in his book *The Psychology of Conspiracy Theories* (2018). Firstly, conspiracy theories contain a) *Patterns*, the chain of events is not coincidental, but instead a purposeful connection; b) *Agency*, the events were purposely conducted by intelligent actors; c) *Coalitions*, more than one actor is involved, and they plot together; d) *Hostility*, these plots are not in the public interest, but are selfish and/or evil and; e) *Continued Secrecy*, the actors plot in secret and these plots are hidden from the public. Taking the assassination of President Kennedy as an example, a popular conspiracy theory propagates that Lee Harvey Oswald collaborated with the CIA in assassinating President John F. Kennedy (JFK). The JFK conspiracy meets the criteria to be classified as a conspiracy theory as it assumes patterns and agency in the events; rejecting the coincidental explanation that a lone gunman was present that day who desired to kill the president. This theory also includes coalitions between Lee Harvey Oswald and CIA and the plotting of hostile actions -killing the President, for selfish needs, often attributed to frustration towards events in Cuba. Finally, there are accusations of continued secrecy, where over half of Americans still believe there was a cover-up involved in the death of JFK (Public Policy Polling, 2013). Other popular examples of conspiracy theories include the belief that the moon landings were a hoax staged by NASA (Lewandowsky et al., 2013), the United States government had prior knowledge of the 9/11 attacks (Swami et al., 2010), vaccinations are harmful, but this is covered up by pharmaceutical companies to maintain profits (Jolley & Douglas, 2014a), and more recently, that COVID-19 is caused by 5G electromagnetic waves and this is being kept secret (Jolley & Paterson, 2020).

Those accused in conspiracy theories are often governments, however, conspiracy theories can accuse any group, which is perceived as powerful or malevolent, of coalition (Douglas et al., 2019). For example, conspiracy theories related to climate change have accused several groups: scientists, political groups, as well as governments (Jolley & Douglas, 2014b). *Conspiracy theories* refer specifically to allegations of a conspiracy which may or may not be based on evidence and may or may not be true (Douglas et al., 2019). However, conspiracies, defined here as a secret plot by two or more powerful actors, (e.g. Keeley, 1999) have been shown to have happened in history, for example the Watergate scandal, and as such are no longer a theory.

Conspiracy belief refers to a belief in a specific conspiracy theory, or belief in several conspiracy theories. Research tends to show that belief in one conspiracy theory is strongly related to also believing in several others (e.g. Goertzel, 1994; Wood et al., 2012). Scholars have therefore discussed the possibility of a general conspiracy mindset (Brotherton et al., 2013). This is often also referred to as conspiracy ideation or mentality, suggesting that some people have a heightened tendency to be attracted to conspiracy explanations, and this concept will be discussed further in this Chapter.

## **2.3 Breadth of Belief**

Belief in conspiracy theories is ubiquitous in society (Oliver & Wood, 2014). Considering the conspiracy theory that global warming is a malicious hoax (Jolley & Douglas, 2014b), belief in this conspiracy is widespread. However, it also varies widely. Large representative surveys have been conducted which indicate the breadth of conspiracy beliefs. A US poll found that 58% of Republicans agree that global warming is a conspiracy. However, 77% of Democrats disagree (Public Policy Polling, 2013). A similar poll in the UK by YouGov (2020), not split by political orientation, found that 9% endorsed this conspiracy theory. In keeping with conspiracy theories concerned with science, in the UK 19%, and in the US 33%, believe that vaccines have harmful effects which are being kept secret (and 19% of respondents selected ‘don’t know’) (YouGov, 2020). Fifteen percent of Americans believe that the pharmaceutical and medical industry plot to “invent” new diseases in order to make money, and 16% are not sure (Public Policy Polling, 2013). Polls from the UK have found that 7% of those surveyed believed that the AIDS virus was created and spread around the globe (YouGov, 2020). Looking at COVID-19 conspiracy beliefs, a recent US poll found that 40% believe that COVID-19 was created purposefully in a lab in China (Ipsos, 2020). Conspiracy theories against the government are also widely endorsed, with 44% of Americans believing that the Bush administration intentionally misled the public about the possibility of weapons of mass destruction in Iraq to promote the Iraq War, and 12% are not sure. In the UK, 41% believe that the government is hiding the truth about how many immigrants live in the UK, and 28% agree that regardless of who is officially in charge, there is a single group of people who secretly control events (YouGov, 2016; 2020). Finally, a recent poll found that 60% of people in the UK endorse at least one conspiracy theory (YouGov, 2019), showing that a proportion of society do harbour conspiracy beliefs.

Clearly, conspiracy theories, old and new, are still prosperous and widespread across societies. There is apprehension amongst academics about whether belief in conspiracy theories is on the rise, as there is no empirical research to support this (Douglas et al., 2019). A large study, published in 2014, analysed printed letters to the editor of the New York Times between 1890 and 2010, with the primary aim of investigating to what extent the letters contained conspiracy theories. Interestingly, the findings concluded that there was no upwards trend in the level of conspiracy theories contained within the letters (Uscinski & Parent, 2014). This suggests that the level of conspiracy theory endorsement might not be on the *rise*. However, this research is the only empirical evidence investigating this question, and there are limitations to the study, namely the involvement of each editor in deciding which letters were to be published. Moreover, there is reason to suspect that the introduction of the internet and the rapid spread of misinformation online facilitates a societal increase in conspiratorial belief (Howell, 2013).

Firstly, in 2000, South African president Thabo Mbeki propagated his view that HIV was not the cause of AIDS and communicated his endorsement of AIDS-related conspiracy theories. He disclosed that the origin of his views derived, at least partly, from internet searching (Smith & Novella, 2007). Unsurprisingly, a notable figure positing these views had a detrimental effect on the confidence of South Africans in science which led to major health consequences (Smith & Novella, 2007). This is an example of how the introduction of the internet can facilitate the spread of conspiracy theories on and offline. Much research has investigated the spread of misinformation online (Del Vicario et al., 2016; Lewandowsky et al., 2012), and the spread of conspiracy beliefs specifically have been studied. Del Vicario and colleagues (2016) investigated the drivers of the spread of both conspiracy theories and scientific information online. Findings revealed that the primary driver of the diffusion of conspiracy theories online is selective exposure to content; meaning that people sought out information that confirmed their prior held beliefs (Del Vicario et al., 2016). Therefore, people who already endorsed conspiracy theories would actively seek out this content. Also, they found that that as the lifetime of conspiracy theories increase, so does their cascade size, emphasising their durability (Del Vicario et al. 2016). Unlike the spread of scientific information, the spread of conspiratorial information online continues to increase over time. Research has also shown that increasing the exposure of users to unsubstantiated information increases their proneness to credulity (Bessi et al., 2014).

This research suggests that the introduction of the internet can fuel conspiracy beliefs by providing easier access to misinformation which can then be propagated on or offline, and the more misinformation people are exposed to, the more influential it can be (Bessi et al., 2014). The spread of misinformation online has been listed by the World Economics Forum as one of the main threats to society (Howell, 2013). The current COVID-19 pandemic can offer an example of the association between the use of social media and conspiracy beliefs, as research has shown a positive relationship between using social media as a source of information about COVID-19 and endorsement of conspiracy theories relating to the pandemic (Allington et al., 2021). Consequently, it is plausible that belief in conspiracy theories could rise due to online dissemination, but what is known is that belief in conspiracy theories is widespread. Over the last decade, a multitude of research has been conducted to decipher why some people believe in conspiracy theories and others do not. This has also led to investigations into the consequences of these beliefs (Jolley & Douglas, 2014a, 2014b) and calls for future research to examine ways to alleviate the potential negative harm (e.g. Jolley et al., 2017; Green & Douglas, 2018).

## **2.4 Measuring Belief in Conspiracy Theories**

Several different scales have been used to measure belief in conspiracy theories and these tend to fall under three categories; belief in real-world conspiracy theories scales (e.g. Darwin et al., 2011; Douglas et al., 2016; Swami et al., 2010, 2016); novel scales to measure belief in specific or fictional conspiracy theory (e.g. Cichocka et al., 2016; Jolley & Douglas, 2014a, 2014b; Lantian et al., 2017; van Prooijen & Jostmann, 2013); and scales which measure conspiratorial mindset (e.g. Brotherton et al., 2013). These scales are usually self-report scales, where participants answer the extent to which they endorse each item of the scale on a Likert type rating measure, ranging from one to seven, where one refers to ‘strongly disagree’ and seven refers to ‘strongly agree’.

Belief in Real World Conspiracy Theories scales usually include a range of specific conspiracy theories, for example ‘The AIDS virus was created in a laboratory’, ‘The attack on the Twin Towers was not a terrorist action but a governmental conspiracy’, and ‘The American moon landings were faked’ (Douglas et al., 2016). Participants will read each statement and then self-report the extent to which they agree or disagree with it. Belief in Real World Conspiracy Theories scales are used widely in the literature and usually contain very similar items with sound reliability; scales usually have between seven and 15 items (Douglas et al., 2016; Swami et al., 2010, 2014; Swami, Furnham, et al., 2016). However, in certain studies, it is necessary to use novel scales to measure belief in one specific conspiracy theory. For example, Douglas and Sutton (2008) exposed participants to conspiratorial material about the death of Diana, Princess of Wales, and then measured the extent to which exposure led to endorsement of conspiracy theories about the event. In these cases, novel scales are developed to measure such specific beliefs. In a similar vein, some studies expose participants to fictional conspiracy theories (e.g. Lantian et al., 2017), in order to isolate the effect of the independent variable on between subject differences in conspiracy belief. These studies also develop novel scales to measure belief in the specific fictional conspiracy theory.

As the Belief in Real World Conspiracy Theories scales often contains different popular conspiracy theories, with different wording, Brotherton et al., (2013) addressed concerns regarding the comparability of these measures of conspiracy belief. They also acknowledged that these scales have limited use as the specific popular conspiracy theories included could become outdated; for example, it is unclear to what extend the next generation will be familiar with the assassination of JFK. Similarly, Belief in Real World Conspiracy Theories scales could be confounded by cultural relevance or familiarity, for example, conspiracy theories surrounding the July 7th bombings in London are well-known in the UK, however they may not be as well-known in other countries. Consequently, Brotherton et al., (2013) developed ‘The Generic Conspiracist Beliefs Scale’, a standardised measure of conspiracist ideation, which can be used across generations and across cultures. This scale takes a non-event related approach to measuring conspiracist ideation, using more generic items in their claims of conspiratorial activity. Example items include ‘The government is involved in the murder of innocent citizens and/or well-known public figures and keeps this a secret’ and ‘The power held by heads of state is second to that of small, unknown groups who really control world politics’.

The Generic Conspiracist Beliefs Scale is often used in the literature to measure conspiracist ideation (Lantian et al., 2017; Swami et al., 2014), which refers to individuals’ general tendency to engage with conspiracy theories (Brotherton et al., 2013). However, it is worth noting that both the Belief in Real World Conspiracy Theories and Generic Conspiracist Beliefs scales are often used in studies together or inter-changeably (Barron et al., 2014) as there is a strong correlation between scores (Brotherton et al., 2013). Therefore, particularly in US and UK samples, both scales can provide a reliable measure of conspiracy beliefs.

## **2.5 Individual Difference Variables**

A body of research is emerging, exploring why some people endorse conspiracy theories while others do not. Research has investigated individual difference measures in participants and assessed their associations with belief in conspiracy theories. There is mixed evidence as to whether individual difference variables can predict endorsement of conspiracy theories (Abalakina-Paap et al., 1999; Cichocka, el al., 2016; Darwin et al., 2011; Douglas & Sutton, 2011; Goreis & Voracek, 2019; Swami et al., 2010, 2011). A large, cross-sectional study assessed the relationship between support for democratic principles, the big five personality traits, attitudes to authority, political cynicism, and belief in real world conspiracy theories as the predictor variables, and belief in 9/11 conspiracy theories as the dependent variable (Swami et al., 2010). Findings revealed that 9/11 conspiracy beliefs were positively predicted by political cynicism, attitudes to authority, and the big five personality traits- low-agreeability and openness to experience. However, this study is limited in design, as the scales were not distributed randomly to participants which could evoke order effects.

Further research which assessed the relationship between personality factors and belief in conspiracy theories have found that narcissism (Cichocka et al., 2016) and Machiavellianism (Douglas & Sutton, 2011) are predictive of increased endorsement of conspiracy theories. Darwin et al., (2011) assessed correlations between paranormal beliefs, paranoid ideation, schizotypy and belief in conspiracy theories. Previous research has linked paranormal belief and conspiracy belief (Ramsay, 2006), but the reason for this relationship was unclear. To investigate this further, Darwin et al., (2011) assessed whether individual difference correlates of paranormal belief; schizotypy, and paranoid ideation (Genovese, 2005; Hergovich et al., 2008) can also predict heightened belief in conspiracy theories. Initial correlations indicated that conspiracy beliefs were positively correlated with all the predictors. However, confirmatory analysis configured a model of best-fit to explain conspiracy belief that did not include paranormal beliefs. This research therefore suggests that paranoid ideation and schizotypy are strongly linked to conspiracy belief (Darwin et al., 2011). The link between schizotypy and conspiratorial beliefs has been further confirmed by Barron et al., (2014).

Moreover, two studies by Swami et al., (2011) provide support for the relationship between conspiracy beliefs and further individual difference variables. Their first study further established the relationships between higher political cynicism, negative attitudes to authority, lower agreeableness and belief in conspiracy theories while also identifying links between greater support for democratic principles and lower self-esteem with conspiracy belief. In their second study, a fictitious conspiracy theory was introduced and agreement with the fictitious conspiracy theory was significantly associated with paranormal beliefs, further investigating the link between paranormal beliefs and conspiratorial beliefs, and lower crystallized intelligence (Swami et al., 2011).

Although studies mentioned above (e.g. Swami et al., 2010, 2011) suggest a relationship between conspiracy beliefs and big five personality traits; openness to experience and agreeableness, other studies have not confirmed this. Brotherton et al., (2013) found no relationship between these big five personality traits and generic conspiracy beliefs. To investigate this thoroughly, a meta-analysis was conducted to assess the association between big five personality factors and conspiracy beliefs (Goreis & Voracek, 2019). From a systematic review, 96 studies were identified which measured conspiracy beliefs and their relation to one other variable. From this, 13 studies were included in the meta-analysis as they included a conspiracy belief measure and a measure of at least one big five personality trait. However, results showed that agreeableness, openness to experience, and the remaining big five personality factors were not significantly associated with conspiracy beliefs (Goreis & Voracek, 2019).

While an individual differences approach can explain why some people may be more susceptible than others to conspiracy theories, it is too simplistic given the popularity of conspiracy theories in the general population. It would be disingenuous to assume that these individual difference variables are the sole contributor to conspiracy beliefs, given the peaks and troths in societal belief in conspiracy theories across the years (Uscinski & Parent, 2014) and the clear attraction of some conspiracy theories over others (Public Policy Polling, 2013). Similarly, when investigating specific personality traits, findings have been mixed (Goreis & Voracek, 2019). Overall, the individual differences approach is limited as it provides little information about the cognitive mechanisms that lead to conspiracy belief and, consequently, how one could intervene to reduce belief in harmful conspiracy theories.

## **2.6 Monologicality of Belief**

A consistent predictor of belief in a conspiracy theory is belief in another unrelated conspiracy theory (Goertzel, 1994; Swami et al., 2010; 2011; Wood et al., 2012). This was referred to as monologicality and was first proposed by Goertzel (1994), meaning that belief in one conspiracy theory can increase endorsement of other unrelated conspiracy theories as these beliefs support each other. Goertzel (1994) conducted a cross sectional survey of 348 residents of south-western New Jersey, where he exposed participants to a list of 10 conspiracy theories. He found that people who believed in one conspiracy were more likely to also believe in other conspiracy theories (Goertzel, 1994). Even in cases where the perpetrators are different, for example conspiracy theories accusing governments, pharmaceutical companies, or scientists, still predicted belief in another. The reason for this phenomenon, he suggested, is that if one conspiracy could be executed then the threshold to imagining that others can occur is lowered (Goertzel, 1994).

Support for this monologicality explanation has been demonstrated in the literature (Douglas & Sutton, 2008; Swami et al., 2010; 2011). Firstly, Swami et al., (2010) found that the strongest predictor of endorsement of 9/11 conspiracy beliefs was belief in other conspiracy theories. Likewise, Swami et al., (2011) found that stronger belief in 7/7 conspiracy theories was predicted by stronger belief in other real-world conspiracy theories. Belief in a fictitious conspiracy theory, designed solely for use in this study was significantly associated with stronger belief in other real-world conspiracy theories, assessed using a Belief in Real World Conspiracy Theories Scale (Swami et al., 2011). It was suggested, in line with Goertzel’s (1994) reasoning, that conspiracy theories offered support for each other, as if one conspiracy theory is able to occur then it is more plausible that other conspiracy theories could occur.

Goertzel (1994) referred to this as a monological belief system, consisting of two key features, a closed epistemology, and a nomothetic explanatory style. A closed epistemology refers to the idea that when presented with new information, instead of evaluating this new information on its merits, it is evaluated based on its coherence with an established belief system. Thus, if someone believes in one conspiracy theory, when presented with another, the new conspiracy theory will be evaluated in terms of its consistency with previous held beliefs rather than rather than on the evidence. A nomothetic explanatory style refers to the tendency to view an event in terms of general patterns, rather than as a unique occurrence. Therefore, when faced with a conspiracy theory, if this theory fits with the pattern of another conspiracy theory held then it will be accepted, suggesting that belief in each conspiracy theory builds evidence for another (Goertzel, 1994; Sutton & Douglas, 2014).

 More recent research has unravelled this initial explanation, as Wood et al., (2012) found that support of two completely contradictory conspiracy theories are also related. For example, those who believe Osama bin Laden was already dead when U.S. Special Forces raided his compound in Pakistan were also likely to believe he was still alive (Wood et al., 2012). This research discredits the idea that conspiracy theories could support each other as these theories are entirely mutually exclusive, however hold the same predictive powers. This suggests that rather than the content of the theories, it is the higher order belief systems supporting conspiracies more generally which may explain this phenomenon. For example, rather than the plausibility of the actual events propagated in the conspiracy theory driving belief (i.e. the credibility of the claim that Osama bin Laden is still alive), it is instead the assumption that the official version of events is a cover up which drives belief. Therefore, the content of specific conspiracy theories is not as important as the overall ideation that conspiracy theories and cover-ups happen. This has been supported when investigating COVID-19 conspiracy beliefs. Miller, (2020) concluded that COVID-19 conspiracy beliefs form a monological belief system as belief in different conspiracy theories related to COVID-19 are strongly correlated, with a large majority endorsing more than one, and completely contradictory conspiracy beliefs are also positively related.

The view that conspiracy beliefs form a monological belief system has been scrutinised by Sutton and Douglas (2014). They highlighted some major problems with the argument that belief in conspiracy theories forms a belief system characterised by a closed epistemology, and a nomothetic explanatory style. Firstly, as explained above, conspiracy beliefs are clearly correlated with each other, however the explanation as to why may be flawed. Firstly, rather than each conspiracy theory being used as evidence to support another, it could be that each is related to a general distrust of authority. This gels with both the finding that belief in one conspiracy theory is related to belief in another (e.g. Goertzel, 1994), and this holds true even when the specific conspiracy theories are incompatible (e.g. Wood et al., 2012). Similarly, besides the support from studies showing that different conspiracy beliefs correlate, there is no specific support for the characteristics of a monological belief system (Sutton & Douglas, 2014). Firstly, there is no evidence to suggest that believing in conspiracy theories is related to nomothetic thinking, and secondly, there is no evidence that belief in conspiracy theories is associated with closed experience, if anything, previous research has indicated that conspiracy beliefs are associated with openness to experience (Swami et al., 2010). A final issue with the idea of a monological belief system is that it doesn’t account for a simpler explanation, that the reason conspiracy beliefs are related could be due to their relationships to other variables binding them together (Sutton & Douglas, 2014). For example, if endorsement of different conspiracy theories are each related to a need for control, then it is statistically logical that the different conspiracy theories beliefs will also be related.

Overall, although much evidence shows that belief in a conspiracy theory is strongly predicted by belief in another conspiracy theory, it may be premature to attribute this to a monological belief system. However, conspiracy theory beliefs are clearly bonded together and although it may not be clear why exactly that is, it does support the current measurement of conspiracy theory belief. Specifically, scales often measure belief in several different conspiracy theories to give a measure of general conspiracy beliefs, as explained previously. Therefore, it could be that these do all tap into one underlying variable, conspiracism.

## **2.7 Cognitive Biases**

Van Prooijen (2018) argues that conspiracy theories are widespread in society because they are rooted in normal psychological processes rather than as a result of pathological traits (2018). On top of the individual differences outlook discussed previously, much research has focussed on the cognitive mechanisms involved in developing and maintaining conspiracy beliefs (Brotherton & French, 2014; Douglas et al., 2016; Douglas & Sutton, 2011; Leman & Cinnirella, 2007; Leman & Cinnirella, 2013; McCauley & Jacques, 1979; McHoskey, 1995; van Prooijen et al., 2018; van Prooijen & Van Dijk, 2014). This body of research focuses on cognitive biases, which can, under some circumstances, directly lead to belief in conspiracy theories (Douglas & Sutton, 2011; van Prooijen et al., 2018; van Prooijen & van Dijk, 2014). Cognitive biases refer to a systematic pattern of thinking or problem solving which deviates from rationality (Haselton et al., 2005). Cognitive biases develop as a shortcut to decision making in order to solve problems faster and thus facilitate sense-making (Brotherton & French, 2014; Douglas & Sutton, 2011; McCauley & Jacques, 1979; van Prooijen et al., 2018). The research below explores different cognitive biases which have been demonstrated to be related to conspiracy beliefs.

### ***2.7.1 Biased Assimilation***

Biased assimilation refers to the human tendency to interpret information in such a way that it supports a desired conclusion (McHoskey, 1995). This cognitive bias has been used to explain why people draw different conclusions from the same evidence (Taber & Lodge, 2006). When faced with evidence that supports a prior held attitude, or viewpoint, this evidence is uncritically accepted, whereas when evidence unsupportive of one’s attitudes or views is presented, that evidence is scrutinized and rejected, thus desired conclusions are drawn (McHoskey, 1995). Demonstrating this bias, two experimental studies were conducted exploring how participants evaluate arguments about affirmative action and gun control (Tabor & Lodge, 2006). The researchers found that arguments which supported participants’ prior attitudes were evaluated as stronger than arguments unsupportive of these attitudes. Interestingly, these studies also provided evidence for the relationship between biased assimilation and attitude polarisation; participants who demonstrated bias assimilation, also demonstrated attitude polarisation. This means that the attitudes of participants became more extreme on both sides of the arguments, even though all participants were exposed to the same information.

Bias assimilation is a widespread phenomenon, and recent research has emphasised the extent to which the processing of information can be confounded by these involuntary processes. In research conducted by Gilead and colleagues (2019), participants were shown a series of statements, for example, “The internet has made people more isolated” or “The internet has made people more sociable” and were tasked with indicating as quickly as possible if the grammar was correct. Findings demonstrated a difference in the processing of statements agreed with and statements not agreed with; whereby correctly assessing grammar was quicker when participants agreed with the opinion. Taken together, this research provides further indication that the way information is assimilated is influenced by our prior attitudes.

Focussing on belief in conspiracy theories, assimilation bias, and thus attitude polarisation, has been shown to shape beliefs (Del Vicario et al., 2016; Leman & Cinnirella, 2013; McHoskey, 1995). McHoskey (1995) argued that the process of bias assimilation explained the endurance of personal belief in conspiracy theories. They found that the same body of evidence was assimilated to support both conspiratorial and official explanations of the assassination of President John F. Kennedy. Participants initially completed an attitude survey to ascertain their baseline beliefs regarding the assassination of President John F. Kennedy. They were then instructed to read and evaluate (rate the persuasiveness of) summarized evidence for each theory (conspiratorial and official). Attitude change was then measured through self-report of their personal attitude change and using the same attitude survey completed previously. McHoskey (1995) found evidence of bias assimilation; participants on both sides of the attitude survey felt that the same body of evidence reviewed supported their initial opinion. Specifically, subjects who initially adopted the conspiratorial explanations overwhelmingly polarised or maintained their initial positions (McHoskey,1995). Interestingly however, a limitation to this study is the lack of participants who initially endorsed the official account as opposed to conspiratorial accounts of the assassination of President Kennedy, further signalling the popularity of conspiracy beliefs.

Moreover, research conducted by Leman and Cinnirella (2013), exposed participants to a fictional news article which had the potential to be construed as a conspiracy theory. They found that participants’ initial level of conspiratorial belief had an enduring impact on how the fictional article was to be perceived. Specifically, participants who had a higher level of conspiracy belief were more inclined to process the fictional article as a conspiracy than participants who had a lower initial belief in conspiracy theories (Leman & Cinnirella, 2013). This research provides further evidence that our prior conspiratorial views shape how new information is processed, in line with the premise of bias assimilation.

This prospect is particularly interesting with the growing use of the internet to facilitate the spread of conspiracy theories (Smith & Novella, 2007). Del Vicario et al., (2016) demonstrated through the analysis of conspiracy theory pages on social media sites that conspiracy theories tend to be shared with communities who already endorse them. Consequently, chambers emerge where conspiracy theories are continuously shared, fostering a polarized community (Del Vicario et al., 2016). Furthermore, these communities have been shown to filter out contrary arguments, whilst continuously sharing arguments confirming their positions. This could facilitate attitude polarisation, meaning members of these conspiracy theory pages become further entrenched. In summary, this research indicates that belief in conspiracy theories remains popular as those who endorse conspiracy theories will both seek out supporting information and assimilate new information in such a way that it supports previously held views.

### ***2.7.2 Projection***

Projection refers to the process whereby one’s own thoughts, feelings and potential actions are attributed to others (Douglas & Sutton, 2011). This is a socio-cognitive tool used to make sense of the environment when other tools, such as objective information are not available (Ames, 2004). For example, if you lose your friends in a club and you have little information on where they may be, you could project your own thoughts, feelings and potential actions onto the situation and look in places where you might go if you were lost. Douglas and Sutton (2011) investigated the role of projection in belief in conspiracy theories, hypothesising that individuals may be more likely to endorse conspiracy theories if they were also more willing to conspire.

 Across two studies this hypothesis was supported. Firstly, a correlational study measured the predictive capability of Machiavellianism on belief in conspiracy theories (Douglas & Sutton, 2011). Personal willingness to conspire, if the participants were in the position of the alleged conspirators, was also measured. It was found that personal willingness to conspire fully mediated the relationship between Machiavellianism and conspiracy belief. This means that those who have lower moral tendencies have a higher endorsement of conspiracy theories as they themselves feel that they too would be willing to conspire if they were in the position of the alleged conspirators (Douglas & Sutton, 2011).

In their second study, Douglas and Sutton (2011) clarified this relationship by showing that when participants are primed with their own morality, they are less likely than those who have not been primed with their own morality to endorse conspiracy theories. Further, this finding was fully mediated by personal willingness to conspire; meaning that when participants are primed to recall their own morality, they are less likely to endorse conspiracy theories as under this situational condition, they are less willing to conspire themselves. Thus, projection can explain why some people may endorse conspiracy theories.

### ***2.7.3 Proportionality Bias***

The proportionality bias refers to the human assumption that big consequences must have big causes (McCauley & Jacques, 1979). Therefore, when something consequential happens, people engage in a cause-consequence matching process whereby events which evoke big consequences are assumed to have big causes. An example used by van Prooijen (2018) includes a President dying from the influenza virus. The death of a President would accumulate such world-changing consequences that the cause being something so small, like the flu, would violate this bias and thus be more difficult for people to accept. Consequently, conspiracy theories could arise by some people, as a way to attribute a big cause to the big consequence, i.e. the President was killed as part of a conspiracy theory and the flu explanation is a cover-up. It is unlikely that this way of thinking would take place if it was your neighbour who tragically died from the flu, this would be accepted much easier as the consequence would have a better match to the cause (unless your neighbour is of course a President). The proportionality bias is a mental heuristic which is established in other domains (LeBoeuf & Norton, 2012) and has also been shown to influence people’s tendencies to believe conspiracy theories (Leman & Cinnirella, 2007; McCauley & Jacques, 1979; van Prooijen & van Dijk, 2014).

Research conducted by McCauley and Jacques (1979) initially tested the hypothesis that an event which evoked a big consequence would elicit more conspiratorial thinking than an event which did not have a big consequence. Across four studies, they predicted that the success or failure of an assassination attempt on the President should determine the likeliness participants will attribute a conspiracy theory as the cause, rather than a lone gunman. Participants read a passage about how a man tried to shoot the President, however one group of participants were informed that the assassination was successful, while the other group of participants were informed that the shot missed and the President survived. Participants were then asked their thoughts on the causes of this event, whether they believed that the man acted alone or that he was part of an organised group who planned to kill the President. Evidence of the proportionality bias was found; participants were more likely to suggest that a conspiracy caused the event when the President was killed than when the shot missed and they survived (McCauley & Jacques, 1979). Participants displayed the proportionality bias by attributing a major cause to a major event, which initiated conspiratorial beliefs.

It could be argued, however, that the reason participants attributed a conspiracy cause to the successful assassination attempt was because they believed a conspiracy is more likely to be successful in its plans than a lone gunman (McCauley & Jacques, 1979). This theory also makes sense as previous research has shown that the more extreme the effect of an event, the more likely it is to have multiple causes, which is in line with a conspiracy explanation, rather than a lone gunman explanation (Kelley, 1973). Further research however has boosted evidence for the proportionality bias influencing people’s tendencies to endorse conspiracy theories (Leman & Cinnirella, 2007).

In order to investigate this process further, a series of experimental studies conducted by van Prooijen and van Dijk (2014) explored the moderating effects of perspective taking. When participants were shown fictional and real potential conspiracy theories that had either big or small consequences, events with big consequences elicited more conspiratorial causes when participants took the perspective of the group affected by the event. Researchers concluded that the phenomenon that events with big consequences lead to stronger conspiracy beliefs than events with small consequences is moderated by perspective taking (van Prooijen & van Dijk, 2014). The proportionality bias is an example of the sense-making needs of humans; when something consequential happens, people will attribute a similarly large cause to these events as this makes more sense to them.

### ***2.7.4 Conjunction Fallacy***

The conjunction fallacy is an error or bias that occurs whereby people overestimate the likelihood of co-occurring events (Tversky & Kahneman, 1983). First explored by Tversky and Kahneman (1983), they found that when given a brief synopsis of a woman named Linda, participants displayed the conjunction fallacy when attributing the likeliness that three propositions about her were correct. When deciding if a) Linda is an active feminist, b) Linda is a bank teller, or c) Linda is a bank teller and an active feminist, researchers found that some participants selected option ‘c’ and thus committed the conjunction fallacy. The conjunction cannot be more likely that either of its constituent parts. When several variations of this scenario were given to participants, between 50-90% of participants committed a conjunction fallacy (Tversky & Kahneman, 1983). It is argued that the conjunction fallacy is resultant of the representativeness heuristic, a mental short cut of decision-making, favouring options that are more representative of our past experiences. If the conjunction is perceived as subjectively more representative then it could be favoured (Brotherton & French, 2014). Similarly, the conjunction fallacy could be a product of a human resistance to coincidence, driving us to relate two events (Brotherton & French, 2014).

Previous findings have demonstrated that the representativeness heuristic can explain in part belief in the paranormal (Blackmore & Trościanko, 1985), thus, research has been conducted to assess if susceptibility to the conjunction fallacy is related to paranormal beliefs. Research conducted by Roberts et al., (2009) found that this was the case, stronger belief in the paranormal was related to more conjunction fallacy errors. Those who believed in the paranormal appeared less accepting of coincidences and thus over-estimated the likeliness of two events occurring together (Rogers et al., 2009). As similarities between paranormal and conspiratorial beliefs exist, for example, they are both anomalistic beliefs, and conspiracy theories centre on the believers collating diverse details of an event to a conspiratorial plot, researchers hypothesised that the conjunction fallacy could also relate to conspiracy beliefs (Brotherton & French, 2014).

Brotherton and French (2014) conducted two studies to test this prediction. Participants completed a Belief in Real World Conspiracy Theories scale and conducted a scenario judgement questionnaire, previously used by Rogers et al. (2009), and extended to include conspiracy related scenarios. The scenario judgement questionnaire therefore consisted or 24 conjunction vignettes where participants read a situation and then select out of 100 the likeliness that three statements are true. Two of these statements contain a singular component, while one statement contains a conjunction of the two; a conjunction fallacy error occurs when the conjunction statements are rated as more likely than either one or both of the singular component statements (Brotherton & French, 2014). It was hypothesised that those with stronger belief in conspiracy theories will commit more conjunction fallacy errors. Findings confirmed that belief in conspiracy theories was significantly correlated with conjunction fallacy errors, and this was replicated in a second study that used a different measurement of conspiracy belief, the Generic Conspiracist Belief Scale (Brotherton & French, 2014). This research suggests that the conjunction fallacy may influence the formation and maintenance of conspiratorial beliefs. This is perhaps due to a biased view of randomness pertained by conspiracy believers, who actively weave details of events together as aspects of one conspiratorial plot rather than accept that coincidences do occur (Brotherton & French, 2014).

### ***2.7.5 Pattern Perception and Agency Detection***

Sense-making requires us to detect patterns in stimuli, which is usually functional, for example, allowing us to ‘connect’ drinking water with quenching thirst, or any instance of connecting actions together in patterns or order to predict outcomes (van Prooijen, 2018). However, in some situations, this process does not work, and patterns are detected which are not in fact there, and this is called illusionary pattern perception (van Prooijen et al., 2018). One reason this occurs is due to error when detecting random occurrence. For example, when observing a game of roulette, one might anticipate a red will come next as there have been several blacks, however this is merely a coincidence and bears no influence on what colour will next appear. Illusionary pattern perception is also related to paranormal beliefs (Shermer, 2011). Given the sense-making function of illusionary pattern perception, and the already established links between conspiracy belief and paranormal belief, van Prooijen, and colleagues (2018) proposed that illusionary pattern perception would also predict belief in conspiracy theories. They conducted a series of correlational and experimental studies which consistently supported this assumption- those who were more likely to seek patterns where they did not exist were also more likely to endorse conspiracy theories, thus directly linking illusionary pattern perception and conspiracy beliefs (van Prooijen et al, 2018).

In a similar vein, applying agency to actions is a sense making process which allows us to understand why people do things and the consequences of our actions (van Prooijen, 2018). However, in some circumstances hypersensitive agency detection occurs, which is the tendency to attribute agency and intentionality where it does not exist or is unlikely to exist (Barrett, 2004). Imhoff and Bruder, (2014) identified a significant positive relationship between anthropomorphism (used as a proxy of the tendency to attribute intentionality and agency (Waytz et al., 2010)) and belief in conspiracy theories.

Research conducted by Douglas et al., (2016) investigated hyper-sensitive agency detection as a predictor of conspiracy belief. Their first study was correlational in design and replicated the finding observed by Imhoff and Bruder (2014), where hypersensitive agency detection, operationalised as anthropomorphism, predicted belief in conspiracy theories. This study also identified a relationship between hypersensitive agency detection operationalised in a different way, using the well-known Heider and Simmel (1944, as cited in Douglas et al., 2016) animation task, where participants watch an animation of moving shapes and are then asked five questions about the ‘behaviour’ of the shapes, and their endorsement of conspiracy theories. The second study found that education level predicted belief in conspiracy theories, and this relationship was mediated by hypersensitive agency detection (Douglas et al., 2016). The researchers concluded that conspiratorial thinking could originate from a particular thinking style that is more sensitive to intentionality, whereby conspiracy believers assume an underlying cause for events that are more likely to be coincidences.

The research synthesised above is congruent in the sense that taken together it can be construed that conspiratorial beliefs develop and maintain as a result of functional cognitive processes, and this is why they are so widespread in society. Cognitive biases first develop as a short cut to decision making in order to solve problems faster and facilitate sense-making, which is usually a functional cognitive process. However, certain cognitive biases can, under some circumstances, directly lead to conspiracy beliefs as outlined above. Similarly, these biases could accumulate to a particular thinking style which is more susceptible to conspiracy theories. However, if these beliefs are produced by functional cognitive processes this does little to explain why some people overexert these and thus are more inclined to endorse conspiracy theories.

## **2.8 Conditions of Belief**

It is argued that although some people may be more susceptible to believe in conspiracy theories due to individual differences, the role of sense-making processes in driving conspiracy beliefs can be exacerbated under certain conditions (van Prooijen, 2018). Research has shown that psychological mechanisms, for example cognitive biases, may be over-exerted and thus distorted, due to conditions of uncertainty and lack of control.

### ***2.8.1 Feelings of Uncertainty***

As mentioned previously, conspiracy theories tend to emerge extremely quickly after major events occur; for example, the death of a celebrity, the death of a president, a pandemic, or a declaration of war have all been known to evoke conspiracy theories (van Prooijen & Douglas, 2017). The COVID-19 pandemic is an example of this which will be discussed later in this Chapter. The sense-making processes discussed above could be activated by the conditions engendered by these events and thus mediate the consequential spread of conspiracy theories (Jolley & Douglas, 2014; van Prooijen & Acker, 2015; Whitson & Galinsky, 2008; Whitson et al., 2015). Specifically, uncomfortable feelings that people experience when in crisis, for example, fear, uncertainty, and lack of control, could stimulate a motivation to make sense of the situation and this sense-making could, in turn, increase the likelihood of endorsing conspiracy theories (e.g. van Prooijen & Douglas, 2017).

Feelings of fear and uncertainty have frequently been cited as factors that can fuel belief in conspiracy theories (van Prooijen & Acker, 2015; Whitson et al., 2015; Whitson & Galinsky, 2008). When one feels fearful or uncertain, they strive to make sense of their environment and re-gain control (Park, 2010) and thus exhibit compensatory cognitive processes. Whitson and Galinsky (2008) found that lacking control led people to perceive illusionary patterns and construct conspiratorial links. In an experimental study, Whitson and colleagues (2015) manipulated feelings of uncertainty amongst participants and found that this led to increased conspiracy belief. This research established that uncertainty and lacking control represent one broad construct that stimulates the same compensatory processes which in turn drive conspiratorial beliefs. Further research from van Prooijen and Acker (2015) consolidated this finding, experimentally corroborating the relationship between the human need for control and susceptibility to conspiracy theories. Taken together, this research indicates that under situational circumstances which cause feelings of uncertainty and lack of control, compensatory sense-making occurs, in an attempt to re-gain a sense of control, which leads to stronger conspiratorial beliefs. Resultantly, Whitson and colleagues (2015) described conspiratorial thinking as an attempt to gain structure and understanding in situations where this is lacking.

Moreover, research has found that participants over-estimate the extent to which people act in their own self-interest, and this tendency is heightened when we experience uncertainty (Vuolevi & Van Lange, 2010). Therefore, if uncertainty causes us to become less trusting, a foundation is provided for conspiracy belief to manifest, creating an additional rung between feelings of uncertainty and conspiracy beliefs. These findings are echoed in correlational research from both Goertzel (1994) and Abalakina-Paap et al. (1999), who found that powerlessness can predict belief in conspiracy theories. For people who feel powerless, it could be tempting, or compensatory, to believe that forces beyond their control influence their lives, and that is why they are powerless (Hofstadter, 1965). Therefore, conspiracy theories could be attractive as they provide individuals with structure and explanations for how they feel and why they lack the power to control their own lives (Abalakina-Paap et al., 1999). Finally, feelings of anxiousness or feeling worried are related to belief in conspiracy theories (Grzesiak-Feldman, 2013). Therefore, research demonstrates that under certain conditions; uncertainty, lack of control, distrust, and powerlessness, conspiracy theories are more likely to manifest.

### ***2.8.2 Uniqueness***

Although feelings of uncertainty can explain why some people endorse conspiracy theories, this is not the only reason, as research has shown that long after these events have occurred, conspiracy theories remain (McHoskey, 1995). Classic conformity research (e.g. Asch, 1956) has demonstrated that people often follow social norms and agree with the majority view. However, this is not always the case, and some people prefer to ‘stand out from the crowd’ more than others do; standing out from the crowd is an important aspect of human existence and has been conceptualised as one of the fundamental human motives (Gebauer et al., 2014). As conspiracy theories are, by definition, an alternative view, different to the mainstream; researchers, Imhoff and Lamberty (2017), considered the possibility that those who endorse conspiracy theories do so because they have a high dispositional need for uniqueness. Thus, conspiracy theories may appeal to those who place higher importance on feeling unique as they go against an ‘official’ account or the mainstream view (Imhoff & Lamberty, 2017).

To test the prediction that the need to feel unique is a motivator of conspiracy belief, three studies were conducted (Imhoff & Lamberty, 2017). Firstly, a cross-sectional study found a modest but significant positive correlation between need for uniqueness and belief in conspiracy theories. This finding was replicated in their second study and by Lantian et al. (2017). The third study conducted by Imhoff and Lamberty (2017) used a fictional conspiracy theory to experimentally assess the importance of whether a conspiracy theory is presented as a minority versus majority point of view on its level of endorsement. They hypothesised that if a belief was presented as a minority view, it would be more appealing to those with a strong need for uniqueness. Participants were instructed to read a newspaper article about a conspiracy theory in Germany and then were asked to answer some questions about the article, designed to measure their endorsement of the conspiracy theory. One group of participants were informed that the (fictional) conspiracy theory was accepted by the majority whereas the other group of participants were told that it was accepted by the minority (and rejected by the majority).

Central to their hypothesis, they found that need for uniqueness was associated with conspiracy mentality which predicted whether they accepted the (fictional) conspiracy theory, and this relationship was more pronounced when they believed that the conspiracy theory was a minority point of view. Similarly, an experimental study from Lantian et al., (2017) found that participants who were primed to display uniqueness showed higher conspiracy belief than participants in a low need for uniqueness condition. Taken together, this research suggests that conspiracy theories may emphasise a person’s desire to feel unique and thus are more attractive to people who have heightened dispositional need to feel unique.

However, there are limitations to these studies. Firstly, effect sizes were very small, indicating that uniqueness by no means completely explains why people believe in conspiracy theories. Moreover, when participants were informed that the ‘majority’ endorsed the fictional conspiracy or rejected the fictional conspiracy theory, it was not clear who the majority were. Whether one conforms to the majority, or matches group norms, is determined by their level of identification to the particular group (Terry & Hogg, 1996). Therefore, by not identifying the groups referred to in the study, it is difficult to establish whether group norms do in fact contribute to conspiracy belief. Conspiracy beliefs often take an intergroup focus which will be discussed later in this Chapter. Research has however, supported the role of intense emotions, in line with feeling like you stand out from the crowd, and possess scarcely known information, in arousing conspiracy beliefs. For example, conspiracy beliefs have been associated with sensation-seeking, and could be persuasive due to their entertainment value (van Prooijen et al., 2021).

## **2.9 Politics and Conspiracy Beliefs**

The role of politics in conspiracy beliefs have been investigated and is of specific interest given the extent of conspiracy propagation during Donald Trump’s presidency (e.g. Uscinski, 2016). Examples of conspiracy theories propagated by President Trump include the idea that Barack Obama was born outside of the US and the details around the 9/11 attacks (Uscinski, 2016). Similarly, the Brexit campaign utilised several conspiracy theories including Islamophobic conspiracy theories, which research has found was related to voting behaviour (Swami et al., 2018). Therefore, one could be led to believe that those on the political right are more inclined to endorse conspiracy theories. However, a growing body of research is emerging, demonstrating that both the extreme political right and the extreme political left endorse conspiracy theories, but concerning different topics (Krouwel et al., 2017; van Prooijen et al., 2015).

As mentioned previously, polls consistently find differences in endorsement of conspiracy theories across supporters of different political positions (Public Policy Polling, 2013). However, both the right and left endorse conspiracy theories. Therefore, rather than focusing on differences between the political right and the political left, research also focuses on differences between the political extremes (both right and left) and political moderates. Research has found that those who embody extreme political positions feel more uncertain about their future than those who held more moderate positions (van Prooijen et al., 2015). As research has shown that uncertainty fuels conspiracy belief (van Prooijen & Acker, 2015; Whitson et al., 2015; Whitson & Galinsky, 2008), this could explain why those on the political extremes may be more likely to endorse conspiracy theories than moderates.

Research conducted by van Prooijen and colleagues (2015) demonstrated the relationship between political extremity and conspiracy beliefs. Dutch voters were asked to complete a questionnaire where both their political position and endorsement of conspiracy theories were measured. The measure of conspiracy theories included some neutral items as well as some items more likely to be endorsed by the political left and some items more likely to be endorsed by the political right. Findings revealed a quadratic trend, whereby participants who placed themselves either on the extreme right or the extreme left were more likely to endorse conspiracy beliefs than more moderate voters. These findings have been replicated in both a German and Swedish sample (Imhoff, 2015; Krouwel et al., 2017).

Political positions can make some conspiracy theories more attractive than others (van Prooijen et al., 2015). This could suggest that conspiracy belief is related to our group identification. US research has investigated the ‘partisan contours’ of conspiracy belief and found that conspiracy beliefs manifest in the same way as other partisan attitudes; suggesting that individuals are motivated by their partisan identities to believe in certain conspiracy theories- to belittle the out-group (Smallpage et al., 2017). It was found that people accuse partisan out-groups of conspiratorial activities and can recognise which parties have ‘ownership’ of different conspiracy theories. For example, both Republicans and Democrats recognise that ‘Birther’ conspiracy theories are more likely to be propagated by Republicans (Smallpage et al., 2017). This research is interesting as it emphasises the importance of conspiracy belief on these partisan identities; for example, believing that climate change is a hoax could be part of one’s Republican identity. Taken together, not only does this research implicate political extremism as an antecedent of conspiracy beliefs but also introduces group identity as a motivator of conspiracy beliefs.

## **2.10 Social Roots of Conspiracy Belief**

Belief in conspiracy theories can occur unintentionally. Research by Douglas and Sutton (2008) found that when participants were exposed to conspiracy theories, their belief in them increased, and participants under-estimated the extent to which this happened. Participants were divided into a control group and an experimental group and were asked firstly their level of agreement with conspiratorial statements about the death of Dianna, Princess of Wales, and then they were asked for their perception of how much other undergraduate students would agree with the statements. However, the experimental group were first exposed to conspiratorial arguments regarding the event and then were asked to rate theirs and their peers’ level of agreement with the statements now (after reading the conspiratorial arguments) and what their (and their peers’) level of endorsement was prior to reading this. The researchers found that participants underestimated the extent to which they were influenced by exposure to the conspiracy theory (Douglas & Sutton, 2008). Participants in the experimental condition failed to detect the influence the conspiratorial material had had on their views; suggesting that exposure to conspiracy theories alone is enough to persuade participants.

Coined the ‘hidden impact’ of conspiracy theories, this research was the first to evidence the influence of exposure to conspiracy theories on belief, which has been supported in subsequent research (Jolley & Douglas, 2014a, 2014b; Swami et al., 2011). Group memberships can considerably influence the types of conspiracy theories individuals are exposed to. As mentioned previously, research has demonstrated that in the US, members of different political parties can recognise which parties have ‘ownership’ of different conspiracy theories (Smallpage et al., 2017); both Republicans and Democrats agreed that conspiracy theories regarding Obama’s birthplace were more likely to be promoted by Republicans than by Democrats, thus, a Republican is likely to have heightened exposure to these conspiracy theories (Smallpage et al., 2017). This exposure could increase the individual’s belief in these conspiracy theories as well as their perception that other group members also endorse them.

Moreover, research has found that intergroup relations can also influence conspiracy belief. Specifically, research has found that strong identification to your in-group, along with perceiving the out-group as threatening increased endorsement of conspiracy theories related to the out-group (Chayinska & Minescu, 2018; Mashuri & Zaduquisti, 2013). Research has explained this as a response to out-group threat; when members of the in-group feel victimised, they are more likely to endorse conspiracy theories against the out-group (van Prooijen & van Diijk, 2014). For example, Mashuri and Zaduqisti (2013) and Chayinska and Minescu (2018) found that in the context of intergroup conflict, strong identification with the in-group (Muslims and Euromaiden supporters respectively) increased endorsement of conspiracy theories related to the out-group. Social Identity Theory states that to maintain a positive social identity, one seeks to distinguish the in-group from the out-group in such a way that favours the in-group (Reicher et al., 2010). Thus, stronger identification with the in-group influences motivation to endorse conspiracy theories against the out-group. Together, this research suggests that the influence of our in-groups could be important in conspiracy beliefs.

This is relevant to any in-group; firstly, if members of a group are exposed to conspiracy theories within that group, then belief in them may increase simply as a function of exposure. Moreover, if conspiracy theories are visible and people are repeatedly exposed to them through their in-group, consequently they are likely to over-estimate the actual consensus of conspiracy beliefs and thus perceive them to be normative. Therefore, it is possible that social influence could play a role in conspiracy belief, whereby our belief and behaviour regarding conspiracy theories could be influenced by what we think other people do or think (Tajfel & Turner, 1979; Turner, 1982; 1991). A major component of social influence is social norms, described by Sherif (1936) as jointly negotiated rules for social behaviour (see Chapter 3 for an overview). Social norms guide one’s behaviour by implicitly outlining what is acceptable and what is not in particular contexts (Cialdini & Trost, 1998). People who more strongly identify with the group will be more influenced by the norms of that groups and thus, conspiracy belief may be influenced by the extent to which we perceive groups who we identify with endorse conspiracy theories (Terry & Hogg, 1996). This is a novel line of enquiry that will be explored in this thesis.

## **2.11 Satisfying Unmet Social Psychological Motives**

 To summarise the antecedents of conspiracy beliefs, a framework has been put forward by Douglas and colleagues (2017), positing that people are more likely to endorse conspiracy theories when important psychological needs are not being met. Research investigating why people endorse conspiracy theories can be synthesised as appealing to three psychological motives: epistemic motives, existential motives, and social motives. The framework therefore suggests that conspiracy theories are appealing, when compared to non-conspiratorial explanations, as they satisfy these three social psychological motives (Douglas et al., 2017). Epistemic motives refer to our human desire for accuracy, understanding and certainty (Douglas et al., 2017). Thus, when this need is not met, conspiracy theories could be more appealing as they offer an explanation which can give a quick answer and can hold up against contradiction (Douglas et al., 2019). This is supported by evidence that shows that those who are more inclined to seek meanings and patterns to understand their environment are also more likely to endorse conspiracy theories (Douglas et al., 2016; van Prooijen et al., 2018). Similarly, when people feel more uncertain, belief in conspiracy theories is also increased (e.g. van Prooijen & Douglas, 2017).

Similarly, belief in conspiracy theories has been linked to the need for cognitive closure, particularly when something lacks a clear and coherent official explanation (Marchlewska et al., 2018). And as mentioned previously, when events have a big and important consequences, conspiracy beliefs can be more appealing (Leman & Cinnirella, 2007; McCauley & Jacques, 1979; van Prooijen & van Dijk, 2014). This evidence suggests that conspiracy beliefs can appeal to epistemic motives and when these needs are unmet, conspiracy beliefs could be relied on for answers.

Existential motives refer to the human need for control and security (Douglas et al., 2017), and when this need is not met, people could be more likely to turn to conspiracy theories to compensate this. In support of this, feelings of anxiousness and powerlessness are associated with conspiracy beliefs (Abalakina-Paap et al., 1999; Grzesiak-Feldman, 2013). Moreover, when people are in situations where they feel like they lack control, conspiracy beliefs can increase (van Prooijen & Acker, 2015). This suggests that conspiracy beliefs can be appealing as they can provide an explanation for why something is happening which can compensate when existential needs feel threatened.

 Finally, threatened social motives could offer an explanation for heightened belief in conspiracy theories (Douglas et al., 2017). Social motives refer to one’s need to protect a positive image of the self and the in-group. Research shows that when the positive image of the in-group is threatened, for example if one’s political party loses (Uscinski & Parent, 2014), then conspiracy beliefs are heightened. This could be because conspiracy theories point the finger at out-groups and can accuse them of being responsible for the group’s current disadvantage. Research has also shown that collective narcissism is associated with belief in conspiracy theories. Collective narcissism is a form of defensive in-group positivity, reflecting a belief in the in-group’s greatness which is unfairly unappreciated by others (Cichocka et al., 2015). Cichocka et al., 2016 found that national collective narcissism is associated with endorsement of conspiracy theories which accuse an out-group. Taken together this framework suggests that when important social psychological needs are threatened, this can drive conspiracy beliefs.

**2.12 The Context of COVID-19**

With this framework from Douglas and colleagues (2017) in mind, the COVID-19 pandemic is a situation where these psychological needs are specifically frustrated and, as such, creates the ideal environment for conspiracy beliefs to flourish. For example, the constant uncertainty of what will happen next and what rules will be put in place, the fear of contracting the virus, or someone close to you contracting it, the removal of control over one’s life, and the accusations towards different groups can help understand the flurry of conspiracy theories emerging almost immediately after the initial news of the COVID-19 outbreak (Douglas, 2021). This has been supported in the literature thus far. Firstly, those who feel more uncertain are more likely to endorse COVID-19 related conspiracy theories (Miller, 2020). Similarly, in the US, partisanship is also predictive of COVID-19 conspiracy beliefs, with Republicans showing a heightened belief. This is explained as a tool to buffer the threatened image of their political party, who were being criticised for their handling of the virus (Miller, 2020). Moreover, belief in COVID-19 conspiracy theories is positively related to anxiety (Leibovitz et al., 2021). Taken together, this research highlights the potential of threatened social psychological needs during the current pandemic to create an environment for conspiracy beliefs to flourish.

## **2.13 The Consequences of Conspiracy Belief**

A multitude of research has been discussed with the aim of explaining *why* some people endorse conspiracy theories, and others do not. However, it has not yet been discussed why it is so important that these reasons are understood and researched. A growing body of literature is developing which robustly demonstrates negative social and health consequences of belief in conspiracy theories; emphasising the importance of identifying the potential antecedents of belief, with a view to inspire tools for intervention.

## ***2.13.1 System Justification***

Early research suggested that believing in conspiracy theories was harmless, or in fact had a social critique role (Miller, 2002). However recent research has brought to light the potential negative social and health consequences of conspiracy belief (Bilewicz & Krzeminski, 2010; Bogart et al., 2010, 2011; Bogart & Thorburn, 2006; Jolley et al., 2019; Jolley & Douglas, 2014a, 2014b; Thorburn Bird & Bogart, 2003; Thorburn & Bogart, 2005; van Prooijen et al., 2015) Interestingly, belief in conspiracy theories has been shown to bolster, rather than undermine, support for the social status quo (Jolley et al., 2018). Conspiracy theories hold a system justification function, actioned through blaming societal misgivings on the actions of a ‘bad’ individual or small group of individuals, thus protecting the social system as a whole when its legitimacy is under threat. In contradiction with the assertion that conspiracy theories are a means to critique society, the system-justifying function of conspiracy belief could be a mechanism by which increased endorsement of conspiracy theories may reduce the likelihood of social change (Jolley et al., 2018).

## ***2.13.2 Health Consequences***

In the health domain, initial research focussed on birth control conspiracy theories and the consequences of such beliefs on African Americans (Bird & Bogart, 2003; Bogart & Thorburn, 2005, 2006; Bogart et al., 2011; Bogart et al., 2010; Thorburn & Bogart, 2005). A cross sectional questionnaire with 71 African American respondents explored the relationship between birth control conspiracy beliefs (e.g. the belief that birth control is primarily to reduce Black populations), perceived discrimination and contraceptive attitudes and behaviours (Bird & Bogart, 2003). Findings demonstrated that both conspiracy beliefs and perceived discrimination played an important role in attitudes towards and use of specific contraceptive methods. Further research exploring these conspiracy theories and pregnancy prevention in an African American population found that stronger birth control conspiracy belief predicted more negative attitudes towards contraceptives and, men with higher belief in conspiracy theories were less likely to currently be using any form of contraceptive (Thorburn & Bogart, 2005). This research suggests that conspiracy theory endorsement can be a barrier to pregnancy prevention and safe sex practices. A limitation to these studies however is the correlational design, meaning that the causal order of variables cannot be determined.

 Research has also focussed on the consequences of HIV/AIDS conspiracy beliefs amongst African Americans (Bogart & Thorburn, 2005; Bogart et al., 2011; Bogart et al., 2010). Cross sectional research has found that among African American men, stronger HIV/AIDS conspiracy beliefs are significantly associated with inconsistent condom use and thus are a barrier to HIV prevention (Bogart & Thorburn, 2005). Addressing the limitations to these studies, a longitudinal design was utilised where, over a six-month period, endorsement of HIV/AIDS conspiracy beliefs were measured at three time points and condom use was measured monthly. Findings corroborated previous assertions that greater belief in HIV/AIDS conspiracy theories was associated with higher likelihood of reporting unprotected sex (Bogart et al, 2011). Moreover, conspiracy beliefs related to HIV/AIDS, especially those related to treatment mistrust, can contribute to health disparities by reducing appropriate treatment adherence (Bogart et al., 2010). This research highlights some of the personal and societal dangers of conspiracy beliefs and researchers suggest that these should be openly addressed in adherence-promoting interventions.

Experimental research has also assessed the consequences of vaccine conspiracy theories on behaviour intentions (Jolley & Douglas 2014a). Participants were shown either anti-vaccine conspiracy material (pro-conspiracy), material which refuted anti-vaccine conspiracy theories (anti-conspiracy) or no material (control) and was then asked to indicate their intention to have a fictional child vaccinated against a fictional disease (Jolley & Douglas, 2014a). It was found that exposure to anti-vaccine conspiracy theories reduces a parent’s intention to vaccinate a fictional child (Jolley & Douglas, 2014a), experimentally demonstrating the potential health consequences of exposure to anti-vaccine conspiracy theories. This is particularly pertinent to the ongoing COVID-19 pandemic, where at least seven COVID-19 vaccines are being rolled out across the world (Acquah, 2021), and uptake of the vaccines is imperative to controlling the virus (Williams et al., 2020). Research is already showing that anti-vaccine conspiracy beliefs are associated with the rejection of COVID-19 vaccines (Ruiz & Bell, 2020). Allington et al., (2021) conducted a cross sectional survey with a representative sample of 4343 UK residents, aged 18–75 at the end of 2020, investigating different predictors of COVID-19 vaccine hesitancy and found that suspicions of COVID-19 conspiracy theories to be a key predictor.

Aside from vaccine hesitancy, belief in COVID-19 conspiracy theories has also been related to other negative consequences. Belief in COVID-19 conspiracy theories has been shown to be associated with reduced social distancing (Bierwiaczonek et al., 2020) specifically, and a survey conducted in the US found that COVID-19 conspiracy beliefs were associated with reducing a host of preventative measures, for example, wearing a mask and avoiding larger gatherings (Romer & Jamieson, 2020). Imhoff and Lamberty (2020), investigated specific COVID-19 conspiracy beliefs and their associations with pandemic related behaviour. They found that “hoax”-related conspiracy theories were more related to reduced engagement in preventative measures, whereas belief in conspiracy theories propagating that COVID-19 was purposefully developed in a lab was more related to self-centred prepping behaviour (e.g. stocking up on toilet paper). Together, this research indicates the potential negative consequences of endorsing COVID-19 related conspiracy theories.

Much research has corroborated the link between conspiracy belief and alternative heath-related choices. There is a strong relationship between belief in medical conspiracy theories and intentions to favour unconventional and alternative medical advice (Oliver & Wood, 2014). Similarly, Lamberty and Imhoff (2018) demonstrated the link between conspiracy mentality and preference for alternative over biomedical therapies. Further, research has consistently shown that conspiracy beliefs are related to science denial more generally, which will be discussed in more detail in the following section (e.g. Lewandowsky et al., 2013).

## ***2.13.3 Social Consequences***

In several measures of Belief in Real World Conspiracy Theories, at least one of the items is a conspiracy theory pertaining scientists as the conspirators. As stated above, several conspiracy theories exist and are endorsed which reject the scientific knowledge of the AIDS virus (Bogart & Thorburn, 2005; Bogart et al., 2011; Bogart et al., 2010). Climate science has long been entrenched with conspiracy accusations, and thus conspiracy theories relating to climate science are well-known (Lewandowsky et al., 2013). However, even though scientific findings consistently iterate increasing environmental risks, the public perception of those risk has been shown to decrease (Brulle et al., 2012; Scruggs & Benegal, 2012). Lewandowsky et al. (2013) acknowledged that one reason for the decreasing perceived risk could be conspiracy ideation and therefore investigated the role of conspiracy ideation in the rejection of science.

As conspiracy theories regarding scientists and the rejection of science are often shared online, through climate blogs, the researchers surveyed visitors to climate blogs. Although these climate blogs were generally pro-science, rather than pro-conspiracy, they have a diverse audience (Lewandowsky et al., 2013). Participants answered questions regarding their acceptance of climate science, along with other science propositions and their conspiracist ideation. Findings indicated that conspiracist ideation was associated with the rejection of both climate science and other well-established scientific propositions. This remained true even though specific science-related conspiracy theories were removed from the scales, suggesting that general propensity to endorse conspiracy theories induces rejection of scientific facts, even those completely unrelated to the conspiracy theory (Lewandowsky et al., 2013).

Further, research conducted by Jolley and Douglas (2014b) established how conspiracy belief can not only lead to rejection of climate change science, but also to inaction against it. They also investigated the effect of exposure to conspiracy theories on political engagement and demonstrated that exposure to conspiracy theories regarding climate change can influence both political and environmental intentions. In this experimental study, participants were either exposed to climate change conspiracy theories, anti-conspiracy theory arguments or a control group, who were not exposed to any materials. After a manipulation check, participants then indicated the extent to which they intended to engage in climate-friendly behaviours over the next 12 months, using a seven-item scale (e.g. ‘Do you intend to use energy-efficiency as a selection criterion when buying a light bulb or household appliance’). The second dependent variable measured participants’ intended engagement in political behaviour. Findings revealed that participants in the experimental group, exposed to climate change conspiracy theories, reported reduced intentions to makes efforts to reduce their carbon footprint and reduced intentions to engage in politics (Jolley & Douglas, 2014b). This effect of conspiracy exposure was mediated by climate powerlessness, uncertainty, and disillusionment. This research showed the first experimental evidence of the potential detrimental social outcomes of endorsing conspiracy beliefs. However, it is important to note, that although robust, the effect sizes were small, meaning there are potentially many other factors that which contribute to one’s intentions to engage in environmentally friendly and political behaviours.

Further research has supported the link between conspiracy beliefs and political inaction. For example, Uscinski and Parent (2014) showed that those who had a heightened belief in conspiracy theories were less likely to engage in politics, for example they were less likely to register to vote and go out to vote. Disengagement in the political system is consequential, and conspiracy beliefs can be a driving factor in this. Specifically, Jolley and Douglas (2014b) found that the effect of conspiracy theories on political inaction occurred because conspiracy beliefs led to feelings of political powerlessness. Similarly, Einstein and Glick (2013) found that exposure to conspiracy theories reduced trust in governments, which could also explain the link between conspiracy beliefs and political disengagement. Taken together, research suggests that conspiracy beliefs are consequential in the sense that they can reduce trust and engagement in the political system.

Conspiracy belief has also been linked to increased intentions to engage in criminal behaviour. Across two studies, Jolley and colleagues (2019) found, firstly, that belief in conspiracy theories predicted everyday crime behaviours and, secondly that exposure to conspiracy theories increased intentions to engage in everyday crime in the future. Everyday crime behaviour refers to common offences, for example, driving through a red light, or trying to claim a refund from a shop that you are not entitled to, which people are likely to commit at some point in their lives. Jolley and colleague’s (2019) research suggested that the link between conspiracy beliefs and everyday crime is related to anomie, where conspiracy belief is associated with a lack of usual social or ethical norms which in turn is related to intentions to engage in everyday crime. In a similar vein, research has shown that beliefs in 5G COVID-19 conspiracy theories is associated with both justification and willingness to use violence (Jolley & Patterson, 2020), and that those with a heightened belief in conspiracy theories were also more likely to agree that violence could be justified to express disagreement with the government (Uscinski & Parent, 2014). Research therefore indicates that belief in conspiracy theories could be a facilitator of crime and violence in society.

***2.13.4 Prejudice***

Conspiracy beliefs have also been linked to prejudice against different groups. Firstly, research conducted with a Polish sample found that endorsement of conspiracy theories about Jewish domination of the world was positively associated with general anti-Semitic beliefs (Golec de Zavala & Cichocka, 2012). Belief in Jewish conspiracy theories has also been shown to be associated with anti-Semitic behaviour intentions (Bilewicz et al., 2013). Further, research has shown that general conspiracy beliefs are related to prejudice against groups perceived to have high power (Imhoff & Bruder, 2014). Therefore, conspiracy beliefs are consistently related to prejudicial attitudes.

Experimental research has also shown a direct link between endorsement of conspiracy theories and increased prejudice against out-groups (Jolley et al., 2019). Their research illustrated, across three studies, how exposure to intergroup conspiracy theories amplifies prejudice towards the target group (i.e. immigrants, Jewish people). In their final study they also demonstrated how exposure to conspiracy theories about a certain group (e.g. Jewish people) also increases prejudice towards other out-groups who were not mentioned in the conspiracy theories. This suggests that conspiracy theories may have potentially damaging and widespread consequences for intergroup relations. Thus, research has therefore provided strong evidence that endorsing conspiracy theories can have detrimental consequences across a range of behaviours, including health behaviours, notably vaccine hesitancy and social behaviours. van Prooijen and colleagues (2022) summarised that conspiracy beliefs have far-reaching implications which can “erode the fabric of society” (pp. 67).

## **2.14 Reducing Belief in Conspiracy Theories**

With the emerging literature highlighting the potentially detrimental consequences of conspiracy theory belief, researchers have begun to explore ways to reduce belief in harmful conspiracy theories and thus the potential negative outcomes. van Prooijen (2018) stresses the importance of understanding that “reducing conspiracy theories does not mean ignoring actual corruption; it means improving people’s capacity to recognise when conspiratorial allegations are implausible” (pp. 90). However, reducing belief in conspiracy theories can be extremely difficult, firstly, there is a multitude of reasons why people might endorse conspiracy theories, and secondly, they can be almost unfalsifiable. For example, research mentioned previously regarding bias assimilation highlights how new evidence, regardless of the aim of the evidence, can be assimilated to strengthen previously held worldviews (e.g. Leman & Cinnirella, 2013).

 After demonstrating the potential health consequences of exposure to anti-vaccine conspiracy theories, Jolley and Douglas (2017) investigated how this negative effect could be rectified. Jolley and Douglas (2017) used exposure to explicit anti-conspiracy arguments to try to reduce belief in anti-vaccine conspiracy theories. Using an experimental design, participants were presented with anti-conspiracy arguments either before, or after, being exposed to pro-conspiracy arguments regarding vaccination. Findings demonstrated that exposure to anti-conspiracy arguments prior to exposure to anti-vaccine conspiracy theories could inoculate people against the potentially harmful effects of anti-vaccine conspiracy theories. However, this intervention was not successful when the anti-conspiracy arguments were presented after the anti-vaccine conspiracy theories; demonstrating that once these beliefs are established, they can be difficult to correct (Jolley & Douglas, 2017). As ensuring that anti-conspiracy theory arguments are viewed before conspiratorial arguments is not practical, particularly with the ever-increasing access to misinformation online (Howell, 2013), the researchers stress the need for ongoing investigations to develop future interventions.

Further research conducted by Swami and colleagues (2014) found a significant association between heightened belief in conspiracy theories and lower analytical thinking. Using this finding, the researchers then explored whether priming participants to engage in analytical thinking could reduce belief in conspiracy theories. Undergraduate participants completed a scale measuring belief in conspiracy theories and five weeks later took part in the second stage. Participants were assigned to either the experimental or control condition, where the experimental condition were primed to engage in analytic thinking (Swami et al., 2014). Participants completed a scale measuring belief in conspiracy theories again and findings showed that the manipulation was successful at reducing belief in conspiracy theories. Participants in the experimental condition, who had been primed to engage in analytic thinking, reported a reduced belief in conspiracy theories. A second study confirmed the robustness of these findings, while a third study found similar results in a non-student population (Swami et al., 2014).

This research highlighted a new possible strategy for reducing belief in conspiracy theories, specifically addressing a motivator of conspiracy beliefs, reduced analytic thinking, to design a useful intervention. However, the real-life application of this procedure could be problematic; firstly, this research does not have a follow-up element, meaning that it is impossible to ascertain whether this intervention could be used to reduce belief in conspiracy theories long term (Swami et al., 2014). For example, although the intervention may immediately reduce belief in conspiracy theories in the short term, it is not known how long this effect will last. Secondly, there is no behavioural change measure included in this study, meaning this research cannot tell us if this type of intervention can also influence intended behaviour. Reducing belief in harmful conspiracy theories is important to buffer against the potential negative consequences of these beliefs. However, in this study, these variables (e.g. vaccination intentions, or green behaviours) were not measured, so it is unknown if this strategy is effective in alleviating any of the problematic consequences of conspiracy beliefs. Thirdly, the real-life application of this technique and how easily it could be used is still unclear. This research is important nonetheless as it demonstrates that conspiracy beliefs can be reduced.

Supporting this line of inquiry, other research evidences the link between belief in conspiracy theories and thinking style. Pytlick and colleagues (2020) found an association between a preference for intuitive thinking style, and quick decision making (jumping to conclusions) and belief in conspiracy theories. This suggests that interventions promoting more analytic thinking styles could be successful in reducing endorsement of harmful conspiracy theories.

Another potential avenue to address conspiracy beliefs could be promoting empowerment. The role of powerlessness, anxiousness, and lack of control in conspiracy beliefs have been well documented in this review (also see Douglas et al., 2017). From this, van Prooijen (2018) surmised that as a lack of perceived control and powerlessness increased endorsement of conspiracy theories, then perhaps affirming control could reduce endorsement. Van Prooijen and Acker (2015) demonstrated that participants in an experiment condition manipulated to affirm a sense of control, showed a reduced belief in conspiracy theories compared to participants in a neutral condition. This, therefore, suggests that empowerment could reduce conspiracy theory beliefs. However, delivering intervention tools to increase empowerment in the long term could be difficult. Van Prooijen argues (2018) one practical route which could be taken to increase empowerment on an organisation level is through procedural justice. This is the extent to which people feel as though those in authority are using fair or unfair decision-making procedures. Research indicates that when procedural justice is perceived people judge the outcomes, even if unfavourable, as fair (Lind et al., 1990).

Van Prooijen (2018) argued that when decision-making is perceived as fair then this could make people feel more empowered and thus could decrease conspiracy beliefs. To support this assertion, a study was conducted focusing on how different leadership styles within an organisation could be associated with employee conspiracy beliefs. Findings revealed that adopting a participative leadership style, where a key aspect of this style incorporates procedural justice, was associated with decreased belief in organizational conspiracy theories. This provides initial support for the practicality of increased empowerment being a mechanism to reduce conspiracy beliefs. However, this initial evidence was specific to employees of an organisation and may not be appropriate for addressing other dangerous conspiracy beliefs, for example, anti-vaccine conspiracy beliefs.

The research outlined above demonstrates that research is beginning to recognise the dangerous consequences of conspiracy endorsement, from risky health related decisions to science denial and prejudice, and subsequently is exploring routes to address these. However, the success of interventions to reduce belief in conspiracy theories is limited, and the ability of interventions to also address the consequences of these beliefs (e.g. vaccination intentions and climate change inaction) is even more limited. Specifically, theory-led psychological interventions have not been developed to address these beliefs. Therefore, research should focus on investigating ways to reduce belief in conspiracy theories and developing interventions targeting the more dangerous beliefs and whether these changes can remain over time.

## **2.15 Summary**

In summary, conspiracy theory beliefs are ubiquitous in society (Oliver & Wood, 2014) and research suggests that belief in one conspiracy theory is strongly related to believing in several others (Goerztel, 1994; Wood et al., 2012). Thus, a multitude of research has investigated antecedents of these beliefs. For example, different psychological factors have been shown to predict belief in conspiracy theories (e.g. ones need to feel unique, political extremism, attitudes to authority; Abalakina-Paap et al., 1999; Imhoff & Lamberty, 2017; Lantian et al., 2016; Swami, Weis, et al., 2016; van Prooijen et al., 2015). Moreover, cognitive biases have also been shown to influence conspiracy beliefs, for example, biased assimilation (Leman & Cinnirella, 2013; McHoskey, 1995), and proportionality bias (van Prooijen & van Dijk, 2014). Finally, different situational factors can influence conspiracy beliefs; specifically, conspiracy beliefs have been shown to increase in situations that are uncertain or lack control (van Prooijen & Acker, 2015; Whitson et al., 2015).

It is important to understand the reasons why individuals endorse conspiracy theories as research so far has evidenced the potential negative social and health consequences of heightened belief in conspiracy theories. Heightened belief in conspiracy theories is associated with increased risky sexual behaviour, risky health behaviour, and has been experimentally shown to decrease intentions to vaccinate, engagement in politics, and green behaviour intentions (Bogart & Thorburn, 2005; Bogart et al., 2011; Bogart et al., 2010; Jolley & Douglas, 2014a; Jolley & Douglas, 2014b). Although positive consequences may exist, the assumption that conspiracy theories are a means of social critique has been refuted (Jolley & Douglas, 2017). With ever-increasing exposure to conspiracy theories online (Howell, 2013), the onus on researchers to develop successful interventions to reduce belief in harmful conspiracy theories is paramount.

 Although social mechanisms of conspiracy beliefs were discussed previously in this Chapter, there is limited research investigating this. It is plausible that conspiracy beliefs may be influenced by the extent to which we perceive that groups who we identify with endorse conspiracy theories. Put another way, perceived norms of our in-groups’ conspiracy beliefs could influence personal belief in conspiracy theories. This is because research to date has indicated that social identity mechanisms can help explain beliefs in intergroup conspiracy theories (Chayinska & Minescu, 2018; Mashuri & Zaduquisti, 2013), where increased identity with this in-group is related to endorsing conspiracy theories against the out-group. This is in line with the Social Identity Theory (SIT, Tajfel & Turner, 1979), which posits that to maintain a positive social identity, one seeks to distinguish the in-group from the out-group in such a way that favours the in-group (Reicher et al., 2010). Similarly, research has demonstrated that memberships to different social groups can predict belief in different conspiracy theories (Smallpage et al., 2017). However, research thus far has yet to investigate directly the potential social influence mechanisms involved in the development and maintenance of conspiracy beliefs. If this antecedent is evidenced, specifically, if perceived norms of conspiracy beliefs are related to personal conspiracy endorsement, then potential social psychological interventions could be utilised as a new means to reduce belief in conspiracy theories. Chapter 3 will introduce Social Norms and how these can be used to develop interventions to improve behaviours.

# **Chapter 3: Social Norms and the Social Norms Approach**

## **3.1 Chapter Overview**

Social norms can be described as “customs, traditions, standards, rules, values, fashions, and all other criteria of conduct which are standardized as a consequence of the contact of individuals” (Sherif, 1936 p. 3). Social psychologists are interested in how social norms can influence and guide individuals’ behaviour. This Chapter begins by outlining injunctive and descriptive norms, before using the Focus Theory of Normative Conduct to show how injunctive and descriptive norms can influence attitudes and behaviour. The Chapter then focuses on misperceptions of perceived norms, where research demonstrates that individuals tend to over-estimate the extent to which others engage in negative behaviours and under-estimate engagement in more positive behaviours. The Chapter then draws on Attribution Theory and Pluralistic Ignorance to explain the theoretical basis for these misperceptions. The Social Norms Approach (SNA) is then introduced, where the premise of this approach is to correct the misperceptions of the beliefs and behaviours of others to reduce the social pressure to engage in a problematic behaviour. The role of the social identity perspective in the SNA is discussed before a review of literature that has utilised SNA interventions, using online personalised normative feedback (PNF). The Chapter ends by summarising that PNF aligned with the SNA can provide successful interventions to reduce problematic behaviours, for example, student drinking, gambling, substance abuse, and sun protection. As noted from Chapter 2, the role of perceived in-group norms in personal endorsement of conspiracy theories has not yet been investigated. It is discussed how belief in conspiracy theories could satisfy the key criteria for utilising the SNA intervention, which could lead to this type of intervention being used to address belief in conspiracy theories, particularly anti-vaccine conspiracy theories.

## **3.2 Overview of Social Norms**

Humans pay meticulous attention to others and imitate their behaviour, often without even being aware of it (Cialdini & Trost, 1998). From observing the behaviour of others, social norms are established; which are an expectation about appropriate social behaviour (Cialdini & Trost, 1998; Sherif, 1936). Social norms are formed in group situations, demonstrating what is acceptable and what is not in certain contexts. Social norms subsequently act as standards for behaviour and judgement when one is not in a group situation (Cialdini & Trost, 1998; McDonald & Crandall, 2015). Thus, according to social psychology, social norms guide one’s behaviour by implicitly outlining what is acceptable and what is not in particular contexts and continue to influence judgements and behaviour outside of group situations. For example, shaking hands when you meet someone in a formal setting, making eye contact when talking to someone, and not sitting right next to another person on a quiet bus are all examples of social norms which people are familiar with.

## **3.3. Injunctive and Descriptive Norms**

Social norms are referred to across several different disciplines and can have slightly different definitions (Chung & Rimal, 2016). For example, in the communication literature, the focus is on how communication and dissemination can lead to norm formation (e.g. interpersonal and mass communication (Lapinski & Rimal, 2005)) and philosophers have focused on how norms can shape what is morally acceptable in a society or group (see Chung & Rimal, 2016 for a review). Social psychologists are predominantly interested in how social norms can influence and shape behaviour. Two types of social norms often distinguished in social psychology literature are injunctive norms and descriptive norms. Injunctive social norms refer to one’s perception of what others believe to be appropriate conduct (Cialdini & Trost, 1998). Put simply, they refer to the perception of what most people approve or disapprove of, and thus what one ‘ought to do’. Injunctive norms can guide behaviour by outlining what attitudes and behaviour are accepted or not accepted by others. Thus, deviating from these injunctive norms could result in disapproval from others. Considerable research, which will be discussed in more detail further into the Chapter, indicates that such moral evaluation strongly influences personal attitudes and behaviours; expectations regarding what most others approve/disapprove can be quite impactful (Larimer & Neighbors, 2003; Reid & Aiken, 2013). For example, it could be argued that one reason a person may be helpful to a stranger in the street struggling to carry shopping bags is to act in accord with the societal norm for helpfulness. Being helpful is positively sanctioned, and thus by being helpful, one is adhering to the injunctive norm that they ought to be helpful and thereby gaining social approval and avoiding social disapproval (Berkowitz, 1972; Gouldner, 1960).

The second type of social norms is descriptive norms. Descriptive social norms refer to one’s perception of what most others actually do (Cialdini & Trost, 1998). The perception of what most others approve of and the perception of what most others actually do in a particular context are often related, but they are conceptually separate notions. For example, one might perceive that most people think that using energy-saving lightbulbs is a good thing to do (i.e. most people approve of this behaviour), but they may also perceive that most people do not actually use them. Research has shown that injunctive and descriptive norms are distinct constructs that can uniquely predict certain behaviours (Lee et al., 2007). For example, when assessing college student drinking, research has shown differential relationships between descriptive and injunctive drinking norms, with injunctive norms predicting personal attitudes towards alcohol and descriptive norms predicting personal alcohol use (Lac & Donaldson, 2018). Injunctive norms guide attitudes and behaviours via social evaluation, whereas descriptive norms guide attitudes and behaviours via social information, meaning by using information of what one perceives most others do. Descriptive social norms instigate normative behaviour as they send the message, “*If most people are doing this, it’s probably a wise thing to do*” (Cialdini, 2007 pp. 264).

Very early social psychology experiments have documented the ability of descriptive norms to influence behaviour (Asch, 1956; Sherif, 1936). In these studies, confederates were used to display a behaviour that would thus be the normative behaviour in that situation, and participants conformed to this behaviour. Asch (1956), for example, used a line judgment task, where in each situation, a single participant was in a room with seven confederates, who they thought were other participants like themselves. The participants and confederates were shown a line, called the target line, and then three other lines. They had to select which line matched the target line, where on each trial the answer was obvious. Each time, the real participant was seated so that they would give their answer last. There were 18 trials in total, and on 12 of these trials, all the confederates gave the same, incorrect answer. Asch (1956) found that almost one-third of the participants conformed with the clearly incorrect majority, and about three-quarters of participants conformed to the clearly incorrect majority at least once. This is an early example of how descriptive norms (what other people actually do) can motivate behaviour, where individuals can even conform to a norm that they know is incorrect. Cialdini (1988) argues that adhering to descriptive norms gives an information-processing advantage and a decisional shortcut to guide behaviour in certain situations. This type of normative behaviour that humans display is often used in persuasion, such as product advertisements showing many people reaching for the product off the shop shelves or describing the product as “fastest growing" or "bestselling". Therefore, rather than advertising the merits of the product, just advertising that *others* are buying it can be convincing enough as people are influenced by what others are doing (Cialdini et al., 1990).

Several studies support the notion that social norms influence attitudes and behaviour. Still, people often ignore or are unaware of the extent to which this happens (Cialdini, 2005). For example, Cialdini (2005) reported from a field study that when a confederate was observed giving money to a street busker, this initiated other people also to give money. Specifically, no passers-by had given money, then once a confederate has been witnessed giving money, eight passers-by followed suit and also donated. However, when interviewed afterwards, not one of the eight givers attributed their behaviour to the confederate’s donation decision. They instead attributed their behaviour to a number of other reasons, for example, “I liked the song he was playing,” or “I felt sorry for the guy” or “I had some extra change in my pocket” (pp. 265). However, as this study was experimental, where the behaviour of the confederate was manipulated, it can be determined that it was the introduction of confederate donating which motivated the behaviour of the other donators. Thus, people are not aware of how others influence their behaviour. Similarly, this illustrates how a subtle act of just observing someone give money to a busker can influence norm-congruent behaviour.

 Nisbett and Wilson (1977) stated that, in general, people are poor at recognizing why they behave as they do. Further research has corroborated the evident naivety humans have to the influence that the behaviour of others has on their personal behaviour (Schultz et al., 2007 cited by Cialdini, 2005). Schultz et al. (cited by Cialdini, 2005) surveyed respondent’s views of their reasons for conserving energy at home and measured their actual residential energy-saving activities (e.g. installing energy-efficient appliances and light bulbs, adjusting thermostats, and turning off lights). When respondents rated the importance of several reasons to why they conserve energy, they rated ‘because other people are doing it’ (the descriptive social norm) as the least important to them. However, when the relationship between participants’ responses to the list of reasons and their measured attempts to save energy was investigated, it was found that the belief that others were conserving energy held the strongest correlation with their personal energy saving efforts. This demonstrates that not only do social norms influence personal behaviour, but also that this influence is not acknowledged.

## **3.4 The Focus Theory of Normative Conduct**

Social norms, both injunctive and descriptive, can spur and guide human behaviour (Cialdini et al., 2006), but this is not always the case. For example, often norms can be contradictory: what one ought to do and what they actually do can be very different. Cialdini et al., (1991) used the example of walking past a charity box and putting money in. Although most people who pass the charity box might not contribute, the majority would likely approve of someone who did. Therefore, in this situation, the injunctive and descriptive norms are contradictory. Thus, it has been argued that social norms are vague and too general to predict and influence personal behaviour (e.g. Darley & Latané, 1970; Krebs, 1970). Moreover, social norms can be group specific; they exert influence on group members by outlining what conduct is appropriate and what is not (Abrams et al., 1990). Therefore, social norms are subject to consensus within specific groups. For example, eating with a fork is appropriate in some groups but not in all group contexts. Different social norms may be relevant for different social groups.

Taking into account this criticism that the influence of social norms on attitudes and behaviour is too vague, Cialdini et al. (1991) developed and tested the Focus Theory of Normative Conduct. They stated that social norms have a strong and regular impact on behaviour, but the specificity of that impact can only be soundly established through theoretical refinements. Whether a particular norm will influence responding attitudes and/or behaviour depends on the degree to which the respondents’ attention is focused on that norm. Different norm types (injunctive and descriptive) can produce different behaviour responses (Reno et al., 1993).

The Focus Theory of Normative Conduct posits that social norms do not necessarily exert the same degree of influence at all times or in all contexts. Instead, specific social norms influence a persons’ attitude or behaviour when the norm is salient. In some situations, injunctive norms may be salient (e.g. we are aware of what others approve or disapprove of), whereas in other situations, descriptive norms may be salient (e.g. we are aware of how others behave in this context). Then, whichever norm is salient in a specific context will more strongly predict an individual’s behaviour. Cialdini et al., (1991) tested this theoretical model, predicting that different norm types produce different behavioural responses and that norms directly guide behaviour only when they are focal. From nine experimental studies manipulating descriptive and injunctive littering norms, it was concluded that social norms could influence peoples’ behaviour systematically and powerfully. Specifically, both descriptive and injunctive norms were shown to guide one’s behaviour, dependent on which type of norm is currently focal at a given time.

The focus theory of normative conduct, therefore, states that when people are temporarily focused on a particular social norm, they have an increased likeliness of acting in norm consistent ways (Berkowitz, 1972; Berkowitz & Daniels, 1964; Gruder et al., 1978; Rutkowski et al., 1983; Schwartz & Fleishman, 1978). Whilst social norms may not always influence attitudes and behaviour, social norms are a tool that can be used to understand and influence human behaviour. By making desirable social norms salient, attitudes and behaviour can be adjusted to become more desirable. The example used above by Cialdini et al., (1991) was littering; making both descriptive and injunctive norms of not littering salient could reduce littering significantly. Normative social influence was also demonstrated to be successful in promoting conservation amongst hotel guests (Schultz et al., 2008). Leaving printed messages in hotel rooms stating injunctive and/or descriptive norms supporting towel reuse successfully influenced hotel guests to reuse towels. The printed normative messages, which combine both injunctive and descriptive norms, were the most successful in influencing the behaviour of the hotel guests. Thus, using social norms in line with the Focus Theory of Normative Conduct can direct behaviour.

## **3.5 The Social Norms Approach**

The ‘Social Norms Approach’ (SNA) is a behaviour change strategy which utilises the influence of perceived social norms to instigate behaviour change (Dempsey et al, 2018; McAlaney et al, 2011). The strategy maintains two key assumptions, firstly that people are influenced by the perceived beliefs and behaviours of others (perceived norms) and secondly, that people systematically make misperceptions about the beliefs and behaviours of others, often overestimating how much other people execute certain behaviours. The SNA operates by correcting these misperceptions, surmising that once misperceptions are corrected, the social pressure to engage in that behaviour will be lessened and consequently behaviour will decrease (McAlaney et al., 2011; Neighbours et al., 2006).

The SNA was first developed by Perkins and Berkowitz (1986). College student drinking has long been a concern as this population engage in more excessive and risky alcohol consumption (Perkins & Berkowitz, 1986). In their study, students were asked about their attitudes towards drinking and how much and how often they drank alcohol. Then, they were asked the same questions but from the perspective of their peers at their college; for example, what they thought their peers’ attitudes towards drinking are, and how often they thought their peers drank alcohol. Findings demonstrated that students held misperceptions about the drinking norms of their student peers. This means that students were inaccurate in their perceptions of how other students felt about alcohol (injunctive norms) and in their perceptions of how much and how often other students consumed alcohol (descriptive norms). Specifically, students perceived that the norm for how much other students drank (frequency and amount) was much higher than the actual norm. Similarly, students generally believed their peers were more permissive in personal attitudes about alcohol consumption than they actually were. This research demonstrated that most students do not accurately perceive the social norms of their peers’ drinking, and instead, these norms are exaggerated.

Further research had corroborated these findings (see Bosari & Carey, 2001; 2003 for reviews). Much of the research exploring the influence of perceived norms on actual college student drinking is survey-based. Students will report their own drinking behaviours and/or attitudes and then their estimations of other students’ drinking behaviours and/or attitudes. By using such a design, research (e.g. Bosari & Carey, 2001) have uncovered a self-other discrepancy. Participants perceive others to drink more than they do and have more permissive attitudes towards drinking. This self-other discrepancy is often referred to as a ‘misperception’ or an ‘over-estimation’ of drinking norms in the literature. This is because the participants' self-reported drinking behaviour and attitudes can be taken as the actual norm, as all participants are students, and their estimations of the behaviours and attitudes of other students are referred to as the perceived norm.

Perceived drinking norms are an important predictor of college student drinking (Borsari & Carey, 2001; LaBrie et al.1, 2008; Maddock & Glanz, 2005; Pedersen, Osilla, et al., 2017). As stated previously, social norms provide an expectation about appropriate social behaviour (Cialdini & Trost, 1998; Sherif, 1936) so individuals are driven to match what they perceive to be the social norm (Festinger, 1954). Thus, people are responsive to perceived drinking norms and as supported in much literature, perceived drinking norms are highly related to personal drinking. However, students consistently over-estimate the drinking norms of other students. An important consequence of such social norm misperceptions is the potential engagement in unhealthy drinking behaviour, due to a false belief that such drinking is commonplace amongst their student peers (McAlaney et al., 2011; Perkins, 2002). If students behave in line with perceived drinking norms, then their exaggerated perceptions of drinking norms could drive unhealthy drinking behaviour.

There are several reasons why individuals misperceive the beliefs and behaviours of others. Regarding over-estimating college students' drinking behaviour, one explanation for this tendency is rooted in attribution theory (Heider, 1958, cited in McAlaney et al., 2011). Attribution theory states that individuals actually have very little knowledge of how others feel and behave. Consequently, we make assumptions about this, and these are often vulnerable to attribution error; where individuals overemphasize personal characteristics and ignore situational factors in judging others' behaviour. Thinking of student drinking for example, seeing someone drunk could be attributed to their disposition, suggesting that they often drink a lot, rather than to situation factors, such example it being a special, one-off occasion. As the drunkenness is attributed to the person, the individual is likely to assume that this is usual behaviour for them, and thus over-estimate the usual drinking for that person. Consequently, excessive drinking can be inferred to be a common, typical behaviour. This could also be extended to belief in conspiracy theories. If someone sees a news article about a conspiracy theory, or a social media post, the individual could assume that others reading the article, or sharing the post endorse conspiracy theories, rather than it being a one-off article.

Pluralistic ignorance can also explain why individuals may make misperceptions about the beliefs and behaviours of others. Pluralistic ignorance refers to the assumption that ones’ own private attitudes are more conservative than others, even when public behaviour is identical (Schroeder & Prentice, 1998). Consequently, individuals misperceive the attitudes of others, and perceive themselves as being deviant from the norm (Miller & Prentice, 1994). As a result, errors are made when making estimations about the beliefs and behaviours of others. Another factor driving misperceptions could be the false consensus effect. Suppose an individual is at a party and a small minority of people are extremely drunk, it is a lot more noticeable and memorable than the majority of the party who have drunk moderately, and thus individuals may develop a false consensus of the prevalence of this minority behaviour and the more moderate majority are ignored (Dempsey et al., 2018; Perkins, 2002). Similarly, the media can amplify this as headline attention is often given to the problem behaviours amongst a minority of youths, such as excessive drinking. Thus, highlighting this extreme behaviour can fuel a false consensus that this behaviour is typical (Dempsey et al., 2018; Perkins, 2002). Again, this could be relevant to belief in conspiracy theories which can also generate headline attention (Jolley & Paterson, 2020). Therefore, attribution errors, pluralistic ignorance and media attention can lead to an overestimation of social norms. These misperceived norms can be problematic as they can generate unwarranted pressure to conform to erroneously perceived group norms.

The strategy utilised by the SNA intervention is to communicate the truth about social norms in terms of what the majority of people actually think and do (actual injunctive and/or descriptive norms). By communicating the actual norms, in a credible way, usually in the form of normative messages and survey results, the misperceptions that people often hold can be challenged and corrected, and thus pressure to engage in the problem behaviours (for example, drinking alcohol) is reduced. The premise of this approach is to correct the misperceptions of the beliefs and behaviours of others in order to reduce the social pressure to engage in a problematic behaviour. Many early SNA interventions utilised a social norms campaign, where posters and leaflets and other mass media were used to disseminate the accurate drinking norms to the target population and several university campuses (McAlaney et al., 2011). These campaigns were successful (Haines & Barker, 2003; Johannessen & Gilder, 2003; Perkins & Craig, 2003) and became one of the most widely used prevention approaches in the US. Social norm campaigns, however, could not directly compare personal perceptions with actual norms. Instead, the goal of these campaigns was to disseminate accurate normative messages to the target population, e.g. “Most (73%) students at [college name] have no more than four alcoholic drinks on a night out” (McAlaney et al., 2011, p. 83).

More recent SNA interventions have the ability to deliver more personalised interventions, whereby participants’ misperceptions are more explicitly corrected (Dempsey et al., 2018). Usually, participants will answer an online survey reporting their personal beliefs and behaviours and their perceptions of that of others. Once this is complete, participants will receive feedback of the ‘actual’ norms and thus any misperceptions are challenged. Computerised normative feedback is useful to present participants with more salient and detailed feedback, including i) their own behaviours and/or attitudes, ii) the perceived behaviours and/or attitudes of others and iii) the actual norms of others (Lewis et al., 2008; McAlaney et al., 2011; Neighbors et al., 2004). This format of feedback highlights discrepancies between individuals’ perceived norms and the actual reported group norms.

Although first established to reduce heavy drinking amongst college students, this approach has also been extended to decrease several other negative behaviours and to increase positive behaviours. Much research has tested the two key tenants of the SNA for several negative health behaviours: (1) that misperceptions of norms are present and (2) that perceived norms influence personal attitudes and behaviour. For example, perceived tobacco use of other students significantly predicts personal tobacco use, and students over-estimate the tobacco use of other students (Perkins et al., 2019; Pischke et al., 2015). Similarly, personal marijuana use among university students has been shown to be associated with perceived injunctive and descriptive norms of other students (Dempsey et al., 2016). Overestimations of social norms have also been evidenced across a range of behaviours, for example, drinking sugar-sweetened beverages and eating fast food (Lally et al., 2011; Perkins et al., 2010, 2018), sexual satisfaction (Stephenson & Sullivan, 2009), gambling (Larimer & Neighbors, 2003; Meisel & Goodie, 2014), risky driving (Brooks-Russell et al., 2014; Carter et al., 2014) and risky sexual behaviour (Lewis, Lee, et al., 2007). Thus, across a wide range of contexts, people tend to overestimate the extent to which others engage in negative behaviours, and these overestimations are predictive of personal negative behaviours. Additionally, research has shown that individuals underestimate the extent to which others engage in positive behaviours, for example, handwashing frequency (Dickie et al., 2018), fruit and vegetable consumption (Lally et al., 2011; Perkins et al., 2018) and use of sun protection (Reid & Aiken, 2013; White et al., 2015). Research could test these assumptions with belief in conspiracy theories to establish whether SNA interventions could be effective to address these potentially dangerous beliefs.

Thus, the primary assumptions of the SNA, that misperceptions of social norms are present, and that these misperceptions of social norms drive personal behaviour has been demonstrated across several contexts. SNA interventions base the feedback that they provide to participants on actual reported beliefs and behaviours from the same or a similar group as the group taking part in the intervention (Dempsey et al., 2018). This maximises the perceived credibility and relevance of the normative feedback received (Dempsey et al, 2018; McAlaney et al., 2011; Perkins, 2003). The specific group whose norms are communicated in an SNA intervention are referred to as the referent group (Perkins, 2003). The referent group featured in SNA interventions vary, whereby the referent group is usually a group in which participants share some type of group membership; this means they are likely to share a level of social identification with the group and as such will be influenced by the norms of that group (Terry & Hogg, 1996).

## **3.6 Social Identity and the SNA**

When designing a SNA intervention, the effectiveness of the intervention can depend on the type of referent group used. This can be explained using the social identity perspective. The social identity perspective comprises Social Identity Theory (Tajfel & Turner, 1979) and Self-Categorisation Theory (Turner et al., 1987, 1994). Social Identity Theory posits that people define themselves as members of social groups and as such, are simultaneously individuals and members of a social group (Tajfel & Turner, 1979). It proposes that “individuals categorize themselves as belonging to various groups such as to a professional group, a fan base of a particular pop band, or to persons with or without children. Alongside self-categorization, individuals evaluate the groups they feel they belong to (in-groups) and groups they do not consider themselves a member of (out-groups)” (Trepte & Loy, 2017, p. 1). Self-categorization theory focuses on the social cognitive processes that cause people to identify with groups, see other people in terms of their social groups, and behave in line with group norms (Hogg & Reid, 2006). The social identity perspective states that part of our self-esteem is rooted in our social identity, meaning that the fate of the group is attached to our self-esteem. As such, people want their group to do better than others as this will enhance self-esteem and, thus, we are biased to see our group favourably. Very early studies (e.g. Sheriff, 1954) have demonstrated that putting people in groups can quickly initiate intergroup behaviour, and people favour the in-group and can demonstrate extreme hostility towards out-groups.

A stronger sense of social identification to the group influences attitudes and behaviour such that people act in accordance with the group norms. Group norms do not only describe behaviour, they also prescribe it; telling individuals how to behave in certain situations (Terry & Hogg, 1996). However, the group norms of social groups must be salient to produce normative behaviour; this means people must psychologically identify with the in-group in that context (Hogg & Reid, 2006; Oakes, 1987; Reicher et al., 2010). Oakes (1987) stated that there are two notions that determine social identity salience: accessibility and fit. Some social categories are more readily accessible than others as they are important and valued to the person and thus are constantly salient in the immediate situation. For example, one’s race or gender are often readily accessible (Mackie et al., 1996). However, for these social categories to initiate normative behaviour, they must also fit within the context, meaning that the norms of the group must be relevant to the current context.

Firstly, comparative fit refers to the current social organization of similarities and differences between people in a given context. People apply categorizations that align with the similarities and differences observed (Reicher et al., 2010; Trepte & Loy, 2017). For example, if psychology students and sociology students were together in a room, they may categorise themselves in terms of their respective studies. However, if some non-students then entered the room, then there would be a shift in self-categorization, as their ‘student identity’ rather than their specific area of study would be comparably salient (Oakes, 1987). Normative fit refers to the expected content of these categorizations. Thinking again of the example above, people would be more inclined to categorise people as students and non-students, if the students were carrying books for example (Oakes et al., 1994). Thus, the ability of social groups to encourage normative behaviour rests on how appropriate and relevant the groups are in the comparative context.

Much empirical research has supported the notion that in-groups exert more influence on beliefs and behaviour than out-groups. For example, when individuals receive messages from both in-groups and out-groups, messages from the in-groups are recalled more accurately (Wilder, 1990). Similarly, messages from in-groups have been demonstrated to be more influential than messages from out-groups only when the basis for social categorisation was meaningful, and the in-group was a minority (Simon et al., 1997). Persuasion literature has also investigated the persuasive influence of in-groups versus out-groups. Wyer (2010), found that participants were more persuaded by in-group rather than out-group sources when the social categorisation basis was relevant to the topic of the issue. For participants to be influenced by the messages from the in-group, there needs to be a fit between the group membership and the issue topic. Research supports the social identity perspective view that in-group norms and messages from the in-group influence beliefs and behaviour when the in-group is identified with and is currently salient.

This notion has begun to be utilized in SNA interventions. Lewis and Neighbors (2004) found that the perceived descriptive drinking norms of those of the same gender were more strongly associated with personal drinking behaviour than non-gender-specific drinking norms were, and this was particularly the case for female participants. Similarly, Thombs et al., (2005) and Cho (2006) found that the perceived drinking norms of close friends were stronger predictors of personal drinking behaviour than the perceived drinking norms of typical students on campus. Level of social identification with the referent group has also been found to moderate the relationship between perceived norms and personal behaviour (Lewis et al., 2010; Neighbors et al., 2010). Examining the role of perceived injunctive drinking norms in actual alcohol consumption and alcohol related negative consequences in students, Lewis et al. (2010) found that the association between perceived injunctive drinking norms and consequences was dependent on participants’ level of identification with other students. Likewise, Neighbors et al. (2010) found that greater identification with a specific referent group (e.g. same gender, same race, same Greek status student) was associated with stronger relationships between the perceived drinking norms of the specific referent group and personal drinking behaviour. However, another study from LaBrie and colleagues (2010) found that the relationship between perceived injunctive norms of alcohol use and the experience of alcohol-related consequences was not stronger for more specific referent groups.

Overall, the social identity perspective states that the level of social identification with the group is vitally important for perceived norms to influence behaviour. Thereby salient in-groups should hold more persuasive power over personal beliefs and behaviour (Dempsey et al, 2018; Oakes, 1987; Terry & Hogg, 1996). Several studies detailed above have supported that level of social identification with the referent group strengthens the relationship between the perceived norms of that group and personal behaviour. Although the findings of Labrie et al., (2010) did not support this notion, as the perceived injunctive norms of more proximal referent groups were not more predictive of personal behaviour than distal referent groups, it is worth noting that level of social identification was not measured here. Thus, a group simply being more proximal does not confirm that participants identified with that in-group more than they did with a more distal in-group. Principally, referent groups with whom people have a stronger social identification will induce more normative behaviour.

## **3.7 Personalised Normative Feedback Interventions**

SNA interventions are intended to reduce problem behaviours (or increase positive behaviours) by conveying the message that problem behaviours are actually occurring less often than people think, and thus by correcting norm misperceptions, individuals have less social pressure to engage in such problem behaviours. SNA interventions usually adopt a personalized normative feedback (PNF) approach, where the feedback consists of three components: 1) one’s own behaviour, 2) their reported perceptions of the referent group’s behaviour (perceived norms) and 3) the actual behaviours of the referent group (actual norms). PNF interventions have shown much success at reducing college students drinking behaviour. Neighbors et al., (2004) aimed to use a PNF intervention to reduce alcohol consumption among heavy drinking college students. Participants were 252 college students who completed baseline measures of reasons for drinking, perceived drinking norms of other students on campus, and actual drinking behaviour. Then participants were randomly assigned to the intervention condition or the control condition. The intervention condition viewed PNF, which compared participants perceived drinking norms of other college students, with their personal drinking behaviour and the actual norms of other college student drinking. Results indicated that the PNF intervention successfully changed participants' perceived norms of other students drinking, where this correction of misperceptions led to reduced alcohol consumption at both a three-month and six-month follow-up, demonstrating the potential efficacy of PNF SNA interventions.

Similarly, Lewis, Neighbors, et al., (2007) aimed to reduce alcohol consumption among high risk college freshmen specifically using a PNF intervention. After completing baseline measures, participants were randomly assigned to receive freshmen specific PNF that was either gender-neutral or gender-specific or to an assessment only control. Findings from a three and five-month follow up indicated that PNF (both gender specific and gender neutral) was effective for reducing drinking among incoming high-risk freshmen. Mediation analyses indicated reductions in drinking quantity at five-month follow-up were mediated through reductions in the perceived norms at three-month follow up. Also focussing on heavy drinking in first year college students, Doumas et al., (2011) found that high risk students receiving PNF intervention reported significant reductions in heavy drinking and alcohol related consequences at a three-month follow up. A clear benefit of computerised PNF interventions, compared with social norm marketing campaigns, is that specific populations can be targeted. For example, Doumas et al., (2010) targeted heavy drinking intercollegiate athletes while Pedersen, Parast, et al., (2017) targeted young adult veterans. Both studies found that a PNF intervention reduced drinking and changes in perceived norms mediated intervention efficacy.

These studies provide strong evidence that SNA interventions using computerized PNF are efficacious in reducing problematic drinking behaviour. Moreover, they support the theoretical assertion that correcting misperceptions reduces individuals’ perception of how normative a certain behaviour is. This, in turn, reduces the social pressure to engage in that behaviour; as PNF interventions reduce drinking behaviour by also reducing how normative drinking is perceived to be. In further support of this theorizing, Bertholet et al., (2016) conducted secondary analysis of a randomised controlled trial which tested a PNF intervention that successfully reduced weekly drinking. Their analysis showed that the intervention was only effective among the participants who over-estimated the drinking behaviour of others and was not effective at reducing drinking behaviour of participants who were accurate in their estimations or underestimated the drinking behaviour of others. The authors concluded that this finding was supportive of the hypothesis that correcting misperceptions is an important ingredient of SNA interventions.

However, other research has disputed the claim that PNF interventions are only useful for participants who initially held misperceptions. Although SNA interventions are described as correcting misperceptions, Neighbors et al. (2016) found that this may not be a crucial ingredient. Neighbors et al., (2016) compared a full PNF feedback intervention, which included students’ personal level of drinking, compared with the actual campus norms, and their perceived drinking norms of other students, with a partially personalised social comparison intervention, which compared students’ personal level of drinking with the actual campus drinking norms. Alcohol consumption was measured via self-report at baseline, three-months, and six-months after the intervention. Results indicated that both interventions reduced alcohol consumption compared to a control condition. This therefore suggests that explicit correction of misperceived norms may not be *crucial* for these interventions to be effective. SNA interventions to reduce college student drinking has also been extended to UK universities, where Bewick et al., (2008) randomly assigned 506 students to an intervention or control condition. Participants in the intervention condition could access social norms feedback at any time by logging onto the website, however, this feedback did not report misperceptions of drinking norms. Findings showed a significant reduction in alcohol consumed per occasion for those in the intervention condition, even without the specific correction of drinking norm misperceptions. Consequently, it is possible that PNF interventions could still be successful without specific correction of misperceptions. However, previous research discussed has shown, through mediation analysis, that a change in perceived norms after PNF interventions has led to reduced drinking (e.g. Neighbors et al., 2004; Lewis, Neighbors et al., 2007).

LaBrie and colleagues (2013) remarked that SNA intervention research had yet to establish the types of referent groups that are most effective when included in interventions. To address this, a web-based PNF intervention was delivered using eight increasingly specific referent groups (e.g. typical student, same race, same gender, same race and gender). A sample of 1663 students was assigned to one of the intervention conditions or the control. Combined, participants in the intervention conditions showed reductions in alcohol consumption compared with control participants. However, when assessing the different referent groups used in the PNF, contradictory to the hypothesis, the more distal referent group (typical students) demonstrated greater effectiveness compared with participants receiving feedback from more specific referent groups. The authors inferred that one explanation for this could be because participants may project characteristics onto the typical students. As such, the ‘typical students’ may not be perceived by participants as a distal referent group. For example, they could project characteristics onto this ‘blank slate’ student they actually identified with. Thus, ‘typical student’ actually represented a group highly identified with and thus likely to incite normative behaviour. Also, as students are stereotypically perceived to drink a lot of alcohol, participants may have projected prototypical behaviour of heavy drinking onto the ‘typical student’. As such, there were greater misperceptions of drinking norms for ‘typical student’, which in line with the tenets of the SNA, the correction of these misperceptions motivates the behaviour change. However, this study did not measure participants’ level of social identification with the referent groups, and as such, it cannot refute the importance of the social identity perspective in SNA interventions (Labrie et al., 2013).

Hummer and Davison (2016) also examined referent group proximity in a PNF intervention to reduce alcohol use among college students and found that feedback from more proximal, rather than distal referent group feedback led to greater reductions in drinking behaviour. However, this study also did not measure identification with the proximal and distal referent groups. Thus, there is an opportunity for future SNA PNF interventions to maximise their potential efficacy by including referent groups that are psychologically salient, as the social identity perspective hypothesises that these referent groups have the greatest capacity to incite normative behaviour (Oakes, 1987). To achieve this, future SNA interventions using PNF should measure social identification with the referent groups to allow for stronger conclusions to be drawn.

SNA interventions using computerized PNF have been developed to reduce problematic behaviour across different contexts. Much of the research discussed so far is limited to reducing heavy drinking in college students. However, SNA interventions have shown potential to reduce negative behaviours and increase positive behaviours across different contexts on the condition that the key tenets of the SNA are met; that misperceptions of norms are present and that perceived norms predict personal behaviour (Dempsey et al, 2018; McAlaney et al, 2011). Neighbors et al., (2015) evaluated a computer delivered PNF intervention aiming to address problematic gambling in college students. After a baseline assessment, students identified as problem gamblers (*N*= 252) were randomly assigned to receive PNF or to a control condition. Follow up assessments were completed at three-months and six-months after the intervention and indicated that PNF was successful in reducing participants’ actual quantity lost gambling and their level of gambling problems. Moreover, mediation analysis showed that changes in perceived gambling norms mediated the intervention effects. Interestingly, intervention effects were moderated by social identification with other student gamblers, such that the more participants identified with other student gamblers, the stronger the intervention effects. In line with the social identity perspective (Tajfel & Turner, 1979; Turner et al., 1987), the norms of an in-group were more persuasive when individuals strongly identified with the group. Further SNA interventions using personalised normative feedback have also successfully reduced problem gambling behaviours (Celio & Lisman, 2014; Cunningham et al., 2009).

Moreover, SNA interventions using computerized PNF have been shown to reduce marijuana use in heavy using students (Riggs et al., 2018). A marijuana use intervention which provided PNF to students attending a university with state legalised adult recreational marijuana use found that PNF reduced perceived norms of marijuana use and personal use. Lewis et al., (2014) found that a PNF based intervention to reduce alcohol related risky sexual behaviour in college students was successful and a reduction in descriptive norm perceptions mediated the efficacy of the intervention. Reid and Aiken (2013) focussed on sun protection norms and utilised PNF to correct misperceptions of injunctive norms regarding sun protection behaviours. Two-hundred-and-sixty-three white women reported their approval or disapproval of sun protection behaviours and tanning, and they also provided their perception of the injunctive sun protection and tanning norms of typical women. Participants were then assigned to receive either information regarding sun protection or information about sun protection and PNF. Immediately after exposure to the intervention, participants in the PNF displayed more positive sun-protective descriptive norms. Thus, SNA interventions utilising PNF have been shown to be effective at influencing attitudes and behaviour across a range of contexts.

## **3.8 Summary**

SNA interventions using PNF have been used mostly to curb heavy alcohol consumption in college students (e.g. Neighbors et al., 2004; Lewis et al., 2007), but are also expanding in focus and becoming successful intervention strategies across other behaviours, for example; marijuana use (Riggs et al, 2018); risky sexual behaviours (Lewis et al., 2014); gambling (Celio & Lisman, 2014; Cunningham et al., 2009; Neighbors et al., 2015) and sun tanning (Reid & Aiken, 2013). These intervention studies discussed above have shown promising results and are rooted in testable social psychological theory (Dempsey et al., 2018; McAlaney et al, 2011), supporting the mechanism of action that changes in perceived norms are responsible for intervention efficacy. Belief in conspiracy theories has been shown to directly lead to negative social and health outcomes (Jolley et al., 2020). Of particular and timely interest, endorsement of anti-vaccine conspiracy theories has been associated with vaccine hesitancy, and exposure and belief in these conspiracy theories can lead to reduced vaccination intentions (Hornsey et al., 2018; Jolley & Douglas, 2014b). Therefore, an exploration into the relationship between perceived norms of conspiracy beliefs and personal beliefs, and the presence of misperceptions of other people’s beliefs could provide a fruitful suggestion for developing interventions to curb these negative consequences.

 It is worth noting that two Cochrane reviews of the use of social norms interventions on reducing problematic drinking behaviour among university students have been published, yielding mixed to negative findings (Foxcroft et al., 2015; Moreira et al, 2009). However, in these reviews, social norms interventions were broadly defined, where several studies included interventions where social norms feedback was combined with other interventions techniques (Dempsey et al., 2018). Thus, it is difficult to tease apart which intervention components may be effective, and which are not. Therefore, to develop this type of intervention to address belief in conspiracy theories, research is needed to systematically assess the role of perceived norms of other people conspiracy beliefs in personal beliefs and assess the presence of misperceptions to develop a targeted intervention.

To summarise, this Chapter began by introducing social norms, distinguishing injunctive and descriptive norms and how they can influence personal attitudes and behaviour (Asch, 1954; Cialdini et al., 1991; Sherif, 1936). The Focus Theory of Normative Conduct was then introduced, stressing that the ability of social norms to influence personal attitudes and behaviours rests on the degree to which attention is focussed on the norm, which is important in the context (injunctive or descriptive or both) (Cialdini et al., 1991; Reno et al., 1993). Research has identified that individuals often hold misperceptions of norms, which can be problematic, as these can encourage beliefs and behaviour to match up to exaggerated norm perceptions. For example, students overestimate how much their peers consume alcohol and perceived norms of other people’s drinking influence personal consumption (Bosari & Carey, 2001). The SNA intervention was developed to challenge these normative misperceptions and thus reduce the social pressure to engage in these problematic behaviours (Perkins, 2003). The SNA challenges misperceptions by providing PNF to participants which details i) their own behaviours and/or attitudes, ii) the perceived behaviours and/or attitudes of others and iii) the actual norms of others (Lewis & Neighbors, 2006; McAlaney et al., 2010; Neighbors et al., 2004).

The social identity perspective (Tajfel & Turner, 1979; Turner et al; 1987) can help decipher the importance of the type of referent group used in PNF feedback. The social identity perspective posits that one must psychologically identify with the in-group in the specific context to maximise the influence of group norms on personal behaviour (Hogg & Reid, 2006; Oakes, 1987; Reicher et al., 2010). Supporting this, research has demonstrated that higher social identification with the referent group strengthens the relationship between perceived norms and personal behaviour (Lewis et al, 2010, Neighbors et al, 2010). The Chapter then focussed on the use of PNF SNA interventions to reduce problematic behaviours (e.g. student drinking (Lewis & Neighbors, 2006; Neighbors et al., 2004), gambling (e.g. Celio & Lisman, 2014; Cunningham et al., 2009; Neighbors et al., 2015) and sun tanning (Reid & Aiken, 2013)). However, very few intervention studies have capitalised on learning from the social identity perspective. This thesis next endeavours to assess the relationship between perceived norms of conspiracy beliefs and personal beliefs, and the role of social identification in this relationship. Subsequently, these learnings can aid the development of targeted SNA interventions to address the dangers of conspiracy endorsement, specifically anti-vaccine conspiracy beliefs.

# **Chapter 4: “If they believe, then so shall I”: Perceived Beliefs of the In-Group Predict Conspiracy Theory Belief**

The studies presented in this Chapter have been published in the following journal article:

Cookson, D., Jolley, D., Dempsey, R. C., & Povey, R. (2021). “If they believe, then so shall I”: Perceived beliefs of the in-group predict conspiracy theory belief. *Group Processes & Intergroup Relations, 24*(5), 759-782. https://doi.org/10.1177/1368430221993907.

## **4.1. Abstract**

Conspiracy beliefs are widespread and can have detrimental consequences. As perceived social norms can exert a powerful influence on individuals, in this Chapter we investigated the relationship between perceived norms of conspiracy beliefs and personal endorsement, and whether others’ conspiracy belief is overestimated. In Study 1, UK university students (*N* = 111) completed measures of their personal conspiracy beliefs and estimations of others’ beliefs (an in-group and out-group they chose, and a prescribed in-group). Perceived in-groups’ belief strongly predicted personal conspiracy belief; the out-group’s belief did not. Study 2 replicated these findings in a British community sample (*N* = 177). Both studies demonstrated that people overestimate the conspiracy beliefs of others. This is the first demonstration of the association between perceived social norms of in-group conspiracy belief and individuals’ personal conspiracy beliefs. Interventions challenging misperceived norms could be effective in reducing conspiracy beliefs.

## **4.2 Introduction**

*Conspiracy theories* can be defined as explanations for important events that involve secret plots from powerful malevolent groups (Douglas et al., 2019). Commonly endorsed conspiracy theories argue that climate change is a hoax (Jolley & Douglas, 2014b; Lewandowsky et al., 2013), the moon landings were faked by NASA (Lewandowsky et al., 2013) and that vaccinations are harmful, but this fact is covered up to maintain profits (Jolley & Douglas, 2014a). Although by definition conspiracy theories are alternative explanations, they are widespread (Oliver & Wood, 2014) and research suggests that belief in one conspiracy theory is strongly related to believing in several others (Goerztel, 1994; Wood et al., 2012). British polls have found that one in four people believe that the threat of climate change is exaggerated, one in six believe that the moon landings were staged, and one in five believe that vaccines have harmful effects which are being kept secret (YouGov, 2019). The current paper investigates a potential new antecedent to conspiracy belief - the perceived belief of others we identify with. Across two different contexts, we examine the relationship between perceived conspiracy belief norms and actual beliefs.

### ***4.2.1 The Psychology of Conspiracy Theories***

There is a growing body of research demonstrating that belief in conspiracy theories can lead to harmful consequences (see Jolley et al., 2020). In the health domain, endorsement of conspiracy beliefs about birth control (e.g. the belief that birth control is primarily to reduce Black populations) has been found to predict negative attitudes towards contraceptives (Thorburn & Bogart, 2005). Belief in conspiracy theories also reduces intentions to vaccinate children against common childhood diseases (Jolley & Douglas, 2014a). In the social domain, exposure to conspiracy theories regarding climate change reduces pro-environmental intentions and political engagement (Jolley & Douglas, 2014b). Jolley et al., (2019), illustrated how exposure to intergroup conspiracy theories amplifies prejudice towards the target group (i.e., immigrants, Jewish people). Endorsing conspiracy theories can have detrimental consequences across a range of behaviours.

Given that millions of people subscribe to these potentially harmful viewpoints (Sunstein & Vermeule, 2009), there needs to be a better understanding of the psychological mechanisms underlying why people believe in conspiracy theories. Research to date has suggested that personality traits such as narcissism (Cichocka et al., 2016), Machiavellianism (Douglas & Sutton, 2011; March & Springer, 2019), and subclinical paranoid and schizotypal personality traits (Barron et al., 2018; Darwin et al., 2011; March & Springer, 2019), are related to conspiracy beliefs. Other psychological factors have also been shown to predict belief in conspiracy theories, such as distrust in authority, higher political cynicism, lower self-esteem, need for uniqueness, and heightened stress (Abalakina-Paap et al., 1999; Imhoff & Lamberty, 2017; Lantian, et al., 2017; Swami et al., 2016). The current research aims to contribute to the literature by identifying a potential new antecedent to conspiracy belief, perceived social norms regarding such belief, and suggests potential new avenues to address the dangers of heightened conspiracy belief.

### ***4.2.3 Social Norms***

Social influence refers to how our beliefs and behaviours are determined by perceptions of what other people think and do (Cialdini & Trost, 1998). A major component of social influence is social norms. Sherif (1936) describes social norms as jointly negotiated rules for social behaviour. Social norms guide one’s behaviour by implicitly outlining what is acceptable and what is not in particular contexts (Cialdini & Trost, 1998). Social norms are often subcategorised into descriptive and injunctive norms. Descriptive norms refer to the perceived prevalence of an attitude or behaviour (i.e. ‘‘what others do’’), and injunctive norms refer to the perceived attitudes toward the behaviour (i.e. ‘‘what others approve or disapprove of’’) (Cialdini et al., 1990). Perceived social norms are a major determinant of attitudes and behaviour across diverse domains, for example: substance use (LaBrie, Hummer, Neighbors, et al., 2008; Clayton Neighbors et al., 2004; Walters et al., 2000), gambling (Larimer & Neighbors, 2003), infection control (Dickie et al., 2018), and green behaviours (Anderson et al., 2017). The current study focuses on descriptive norms of conspiracy belief, as these are used most often in the first instance of exploring the link between perceived norms and personal attitudes and behaviours (Dempsey et al., 2018).

The theoretical basis for the exploration of the association between perceived social norms of conspiracy beliefs and personal beliefs is rooted in Social Identity Theory (SIT) (Tajfel & Turner, 1979). SIT states that individuals look to other members of the group to guide their attitudes and behaviour; meaning, people’s attitudes and behaviour are systematically influenced by the norms of groups to which they belong (Tajfel & Turner, 1979; Turner, 1982; 1991). People who more strongly identify with the group are more likely to act in accordance with the group norms (Terry & Hogg, 1996). For example, Neighbors et al. (2010) studied college student drinking norms and demonstrated that higher identification with other students was associated with stronger relationships between perceived student drinking norms and personal drinking. Thus, perceived norms of conspiracy belief may influence personal belief in conspiracy theories, particularly if we perceive groups who we strongly identify with endorse conspiracy theories (Terry & Hogg, 1996).

### ***4.2.4 Social Norms and Conspiracy Belief***

In accordance with this train of thought, core aspects of SIT have been demonstrated to influence belief in specific conspiracy theories. Research shows that in the context of situational threats, individuals who highly identify with an in-group are motivated to endorse conspiracy theories against the out-group. For example, Mashuri and Zaduqisti (2013) and Chayinska and Minescu (2018) found that in the context of intergroup conflict, strong identification with the in-group (Muslims and Euromaiden supporters respectively) increased endorsement of conspiracy theories related to the out-group. Further, research has robustly demonstrated that acceptance of conspiracy theories in intergroup contexts is associated with a defensive identification with the in-group (Cichocka et al., 2015; Cichocka, Marchlewska et al., 2015; Marchlewska et al., 2019). Specifically, collective narcissism, a form of defensive in-group positivity, reflecting a belief in the in-group’s greatness which is unfairly unappreciated by others, predicts belief in out-group conspiracies (Cichocka, Marchlewska et al., 2015). SIT states that to maintain a positive social identity, one seeks to distinguish the in-group from the out-group in such a way that favours the in-group (Reicher et al., 2010). Thus, stronger identification with the in-group influences motivation to endorse conspiracy theories against the out-group, particularly when the positive image of the in-group is threatened.

Douglas and Sutton (2008) demonstrated that exposure to conspiracy theories increases belief in them, which has been the foundation of subsequent research (e.g. Jolley & Douglas, 2014a, 2014b; Swami et al., 2011). Group memberships can influence the types of conspiracy theories individuals are exposed to. For example, in the US, members of different political parties can recognise which parties have ‘ownership’ of different conspiracy theories (Smallpage et al., 2017). Both Republicans and Democrats agreed that conspiracy theories regarding Obama’s birthplace were more likely to be promoted by Republicans than by Democrats (Smallpage et al., 2017). This could increase the individual’s belief in these conspiracy theories as well as their perception that other group members also endorse them, leading to misperceptions of how widespread conspiracy theories are. Specifically, if individuals perceive that the groups they identify with endorse conspiracy theories, and thus normative influence is maximised, this could drive personal endorsement of conspiracy theories.

### ***4.2.5 The Current Research***

The current studies aim to investigate the association between perceived in-group conspiracy belief norms and personal endorsement of a range of conspiracy issues (such as climate change, the moon landings, and the existence of aliens), and whether people over-estimate others’ belief in these conspiracy theories. Two studies examine the relationship between participants’ predictions of the belief of three social groups in conspiracy theories (a) an in-group chosen by participants; (b) an out-group chosen by participants; and (c) a prescribed in-group, ‘typical students’ (Study 1) and ‘other British citizens’ (Study 2)- and their personal belief in the same conspiracy theories. The in-group chosen by the participant represents a proximal group, as research has shown that proximal groups exert more influence on individual beliefs and behaviour (e.g. Neighbors et al., 2010), whereas the prescribed in-groups represent broader in-groups. It is hypothesised that the perceived norms regarding conspiracy belief of both the in-group chosen by participants and the prescribed in-group will positively predict personal belief in conspiracy theories; however, the perceived norms of the out-group regarding conspiracy belief will not. It is also hypothesised that participants will over-estimate the extent to which other students at the same university (Study 1) and other British citizens (Study 2) endorse conspiracy theories.

Need for uniqueness and identification with each of the social groups were also measured in each study. Previous research has shown that conspiracy theories are attractive as they can bolster one’s need to feel unique (Imhoff & Lamberty, 2017; Lantian et al., 2017), and those who are high in uniqueness are less likely to be influenced by perceived social norms (Imhoff & Erb, 2009). Thus, it was hypothesised that the relationship between perceived norms of conspiracy belief and actual norms will be moderated by (a) need for uniqueness, such that, the stronger participants need to feel unique, the less influence the perceived norms would have on actual conspiracy belief, and (b) level of social identification with the group, such that the stronger participants identify with a group, the stronger the association between perceived norms of conspiracy belief and actual beliefs. All materials for Study 1 can be found here: <https://osf.io/2p9ez/>, materials and data for Study 2 can be found here: <https://osf.io/4786a/>.

## **4.3 Study 1**

### ***4.3.1 Method***

**4.3.1.1 Participants and Design**. As no previous studies had assessed the relationship between perceived norms of conspiracy belief and actual norms, there were no clear expectations of effect size. Power analysis using GPower (Faul et al., 2009) showed that to detect a medium effect using Cohen’s f2 (f2 = .15), a sample of 115 participants would be required for 85% power for regression analysis (linear multiple regression: fixed model, R2 deviation from zero) with seven predictor variables. One hundred and eighty-one students studying at a UK university were recruited to take part in the study in return for course credit. The questionnaire included attention check items (e.g. ‘Check 4 for this statement’); participants who failed an attention check (*n* = 48), and participants who failed to enter a sensical in-group and out-group (*n* = 22), were removed (total *n* = 70). The remaining participants (*N* = 111; 97 females, 14 males, *M* = 23.32 years, *SD* = 7.81) were included in the analyses.

The study employed a cross-sectional design, where the outcome variable was participants’ belief in conspiracy theories. The predictor variables were the perceived conspiracy beliefs of an in-group (chosen by participants), of an out-group (also chosen by participants), and of ‘typical (name of university) students’. Need for uniqueness and social identification with each of the groups were measured as moderator variables[[1]](#footnote-2). Demographic variables, gender and age, were also assessed.

**4.3.1.2 Materials and Procedure.**Ethical approval was obtained from the relevant university’s ethics panel. The study was hosted by Qualtrics, an online software tool used to build questionnaires. Once the study was accessed, participants were first presented with an information page followed by a consent form. First participants were asked to complete some demographic questions, and then they were asked to state an in-group of their choice:

 “We are often part of many different groups, some of these we feel close to and identify with, and some of these we may not feel as close to or may not identify with. Please indicate below a group who you feel close to and strongly identify with.”

 Participants were then asked to state an out-group: “Please indicate below a group who you do not feel close to and do not identify with.”

Personal belief in conspiracies was measured using the Belief in Real-World Conspiracy Theories Scale adapted from Douglas and Sutton (2011). There were seven statements (e.g. “Governments are suppressing evidence of the existence of aliens”, *1= strongly disagree, 7= strongly agree,* see Appendix A). The Belief in Real-World Conspiracy Theories Scale was adapted to measure the perceived beliefs of the in/out groups (“Now think about the group you previously stated that [you feel close to and identify with/ you do not feel close to and do not identify with]. Please indicate how much you think the majority of [chosen in-group/ prescribed in-group/out-group] agree with each statement below”).

Level of identification with each of the social groups (in-group, out-group and other university students) was measured using the Inclusion of Other in the Self scale (Aron et al., 1992; Tropp & Wright, 2001, see Appendix B). This is a one-item scale where participants were presented with a series of seven Venn diagrams ranging from non-overlapping circles to almost fully overlapping circles. Participants were asked to indicate which diagram best represents their level of identification with each group. The measure was scored on a scale ranging from one to seven, with one representing completely non-overlapping circles (i.e. very low identification) and seven representing nearly completely overlapping circles (i.e. very high identification). Finally, need for uniqueness was measured using the four-item Self-Attributed Need for Uniqueness (SANU) scale (Lynn & Snyder, 2002; e.g. “Being distinctive is important to me”, 1= *not at all*, 5= *extremely*, see Appendix C). The measures were presented in a randomised order to each participant, followed by an online debrief.

### ***4.3.2 Results and Discussion***

Descriptive statistics and Pearson’s correlation coefficients are presented in Table 1. The effects of demographic variables on personal belief in conspiracy theories were tested. Gender differences were evident, with females having significantly higher belief in conspiracy theories (*M* = 3.38, *SD* = 1.35) than males (*M* = 2.51, *SD* = .97), *t*(109) = -2.32, *p* = .022, *d* = 0.66. There was no correlation between age and conspiracy belief (*r* = -.01, *p* = .939, *N* = 111).

As shown in Table 1, personal conspiracy belief significantly and positively correlated with the perceived belief in conspiracy theories of the in-group, of ‘typical’ university students and also of the out-group. Need for uniqueness did not significantly correlate with any variables. Level of social identification with each social group did not significantly correlate with any variables, except for the level of social identification with ‘typical’ university students, which significantly negatively correlated with age; thus older participants reported lower social identification with other university students.

**Table 1**

*Means, Standard Deviations, Cronbach’s Alpha, and Pearson Correlation Matrix (Study 1).*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Mean* | *SD* | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1. Personal CT belief | 3.27 | 1.34 | .82 |  | .78\*\* | .66\*\* | .22\* | -.04 | -.01 | -.10 | .08 | -.01 |
| 2. Perceived belief of in-group in CT | 3.27 | 1.43 | .88 |  |  | .56\*\* | .15 | -.03 | .04 | -.06 | .09 | -.05 |
| 3.Perceived belief of ‘Typical’ students in CT | 3.66 | 1.23 | .86 |  |  |  | .30\*\* | -.03 | .13 | -.05 | -.01 | -.04 |
| 4. Perceived belief of out-group in CT | 3.76 | 1.58 | .89 |  |  |  |  | .03 | .11 | -.16 | -.02 | -.09 |
| 5. Need for uniqueness | 2.65 | 0.77 | .78 |  |  |  |  |  | -.14 | .08 | .11 | -.01 |
| 6. Age (years) | 23.32 | 7.81 | - |  |  |  |  |  |  | .02 | -.20\* | -.02 |
| 7. In-group identification | 5.30 | 1.54 | - |  |  |  |  |  |  |  | .11 | .03 |
| 8. ‘Typical’ student identification | 3.75 | 1.42 | - |  |  |  |  |  |  |  |  | .13 |
| 9. Out-group identification | 1.48 | 0.92 | - |  |  |  |  |  |  |  |  |  |

*Note.* CT = Conspiracy theory. *N*= 111. \**p*<.05. \*\**p*<.01.

A one-way repeated measures ANOVA was conducted between participants’ level of social identification with the in-group they chose, the out-group they chose and ‘typical’ university students. This was to check whether participants had a higher level of social identification with the in-groups versus the out-group. As the assumption of sphericity was violated (*p* = .027), the Greenhouse-Geisser correction was used. There was a significant difference in level of social identification across the three groups, *F*(1.88, 204. 74) = 253.83, *p* < .001, $η\_{p}^{2}$= .7, $η\_{G}^{2}$ *= .59*. Pairwise comparisons using Bonferroni corrections indicated that participants identified with their chosen in-group significantly more than the prescribed in-group (‘typical’ university students) (*p* < .001) and the out-group (*p* < .001), and they identified with ‘typical’ university students significantly more than with the out-group (*p* < .001) (See Table 1 for means). Thus, the three groups successfully represented a proximal in-group, a distal in-group, and an out-group.

A hierarchal multiple regression analysis was then conducted to test the role of perceived conspiracy belief norms (the perceived belief of the in-group, of ‘typical’ university students and of the out-group) in predicting personal conspiracy beliefs. Personal conspiracy belief was entered as the dependent variable, with gender entered as the predictor variable in the first step of the regression. The model was significant, *F*(1, 109) = 5.38, *R²*  =  .05,  *p* = .022, and accounted for 4.7% of variance in conspiracy belief. In the next step, the perceived conspiracy beliefs of the three groups were entered (see Table 2). The multi-collinearity of the model was checked, and no issues were detected (all tolerances >.59 and all VIFs <1.7). The overall regression model was significant, *F*(4, 106) = 53.32, *R²* =  .67, *p* < .001, and accounted for 66.8% of the variance in personal conspiracy belief. As hypothesised, the perceived conspiracy belief norms of the in-group positively predicted actual conspiracy belief, as did the perceived conspiracy belief norms of ‘typical’ university students. The perceived belief of the out-group in conspiracy theories did not significantly predict personal conspiracy belief.

**Table 2**

*Results of the Hierarchical Multiple Regression Model Predicting Personal Conspiracy Belief (Study 1).*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Step | Predictor | B | SE B | β | *t* | CI (95%) |
| 1 | Gender | .87 | .38 | .22 | 2.32\* | .13, 1.62 |
|  |  |  |  |  |  |  |
| 2 | Gender | -.12 | .24 | -.03 | -0.52 | -.60, .35 |
|  | Perceived belief of in-group in CT | .57 | .07 | .61 | 8.36\*\* | .44, .71 |
|  | Perceived belief of ‘Typical’ students in CT | .31 | .08 | .29 | 4.99\*\* | .16, .47 |
|  | Perceived belief of out-group in CT | .04 | .05 | .05 | 0.77 | -.06, .14 |

*Note.* CT = Conspiracy theory. \**p*<.05. \*\**p*<.01.

Investigating the second hypothesis, a paired samples t-test was conducted to compare participants’ actual conspiracy belief (*M* = 3.27, *SD* = 1.34) and their predictions of other students’ belief in conspiracy theories (*M* = 3.66, *SD* = 1.23), to assess for the presence of misperceptions of conspiracy belief norms. Participants estimated that others endorsed conspiracy beliefs significantly more than they personally did *t*(110) = -3.83, *p* < .001, Cohen’s *dz*= 0.36, demonstrating a self-other discrepancy.

Moderation analysis was conducted using the PROCESS macro for SPSS (Hayes, 2017). Model 2 was used which allows for two moderators to be added to the model (W and Z), and thus the effect of X (predictor), W, Z, XW, and XZ on Y (outcome) can be calculated. Model 2 was run twice, once for each of the significant predictors of belief in conspiracy theories; (a) the perceived belief of the in-group (X) and (b) the perceived belief of ‘typical’ university students (X). Participants’ level of social identification with the group (W) and their need for uniqueness (Z) were added as moderator variables, whilst actual conspiracy belief was added as the dependent variable (Y). However, this analysis was non-significant for each of the predictor variables. The relationship between both the perceived belief of the in-group and the perceived belief of ‘typical’ university students in conspiracy theories and personal belief was not dependent on level of social identification with the group (in-group, *b* = -.00, *SE* = .04, *t*(105) = -.12, *p* = .91, 95% CI= -.07, .07; ‘typical’ university students, *b* = .09, *SE* = .05, *t*(105) = 1.72, *p* = .09, 95% CI = -.01, .19) or the need to feel unique (in-group, *b* = .03, *SE* = .08, *t*(105) = .42, *p* = .67, 95% CI = -.13, .19; ‘typical’ university students, *b* = .11, *SE* = .11, *t*(105) = .98, *p*= .33, 95% CI = -.11, .34).

Study 1 provides the first evidence that the perceived conspiracy belief norms of groups one identifies with are positively associated with personal belief in conspiracy theories. The findings show that this relationship is not significantly moderated by the extent to which participants identify with the in-group (both chosen and prescribed) or their need to feel unique. Moreover, this study demonstrates that conspiracy belief is perceived to be more normative amongst university students than it is.

## **4.4 Study 2**

This study aimed to replicate the findings of Study 1 in a non-student, British community sample. The importance of this is to demonstrate the relationship between perceived norms of conspiratorial beliefs and personal beliefs outside of a university setting, as it has been noted that research assessing the influence of perceived norms on behaviours is often confined to university settings (McAlaney et al., 2011). Therefore, the hypotheses and materials used in Study 2 mirrored those from Study 1; however, in this case, the prescribed in-group was ‘other British citizens’.

###  ***4.4.1 Method***

 **4.4.1.1 Participants and Design.** This study was pre-registered with the Open Science Framework (OSF; osf.io/4786a). Two hundred and five participants were recruited via Prolific, an online recruitment platform where volunteers can register for studies in return for small monetary rewards (£1.25 for this study). Screening criteria were applied via Prolific to ensure that all participants were British and had a high approval rating on the recruitment platform, meaning that they had a reputation for completing surveys satisfactorily[[2]](#footnote-3). Similar to Study 1, the questionnaire included attention check items (e.g. ‘This statement is an attention check. Please select 4 for this statement’); participants who failed an attention check (*n* = 19) and participants who failed to enter a sensical in-group and out-group (*n* = 9) were removed. The remaining participants (*N* = 177; 129 females, 48 males, *M* = 35.66 years, *SD* = 12.27) were included in the analyses.

This study replicated the design of Study 1, where the outcome variable was participants’ belief in conspiracy theories and the predictor variables were the perceived conspiracy beliefs of an in-group (chosen by participants), of an out-group (chosen by participants), and of ‘other British citizens’ (the prescribed in-group). Need for uniqueness and level of social identification with each of the groups were measured as moderator variables. Demographic variables, age and gender, were measured.

**4.4.1.2 Materials and Procedure**. Ethical approval was obtained from the relevant university’s ethics panel. Qualtrics was used to design and host the study, and participants gave their informed consent before taking part. First, participants were asked to complete the demographic questions, and then to state an in-group and out-group of their choice. Participants then completed the same measures as in Study 1, presented in a randomised order, followed by an online debrief.

### ***4.4.2 Results and Discussion***

Descriptive statistics and Pearson’s correlation coefficients are presented in Table 3. The effects of demographic variables on the personal belief in conspiracy theories were tested. Unlike in Study 1, no gender differences were present (females: *M* = 2.74, *SD* = 1.38; males: *M* = 2.71, *SD* = 1.36, *t*(175) = -.153, *p* = .879, *d* = .03). There was no significant correlation between age and conspiracy belief (*r* = -.11, *p* = .132, *N* = 177), so they were not controlled for in the analysis. Mirroring the correlations found in Study 1, personal conspiracy belief was significantly positively correlated with the perceived belief of the participants’ chosen in-group, the prescribed in-group (British citizens), and the out-group in conspiracy theories. Need for uniqueness did not correlate significantly with any of the variables. There was a weak but significant negative correlation between the perceived belief of the out-group in conspiracy theories and level of social identification with the out-group, suggesting that the less the participants identified with the out-group, the higher their estimations that the out-group endorsed conspiracy theories.

**Table 3**

*Means, Standard Deviations, Cronbach’s Alpha, and Pearson Correlation Matrix (Study 2).*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Mean* | *SD* | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1.Personal conspiracy theory (CT) belief | 2.73 | 1.37 | .85 |  | .79\*\* | .60\*\* | .26\*\* | .09 | -.11 | -.01 | .07 | .01 |
| 2. Perceived belief of in-group in CT | 2.87 | 1.29 | .87 |  |  | .60\*\* | .22\*\* | .11 | -.12 | -.10 | .08 | .03 |
| 3.Perceived belief of ‘Typical’ British citizens in CT | 3.22 | 1.11 | .84 |  |  |  | .42\*\* | .02 | -.09 | -.01 | -.12 | -.10 |
| 4. Perceived belief of out-group in CT | 3.49 | 1.44 | .88 |  |  |  |  | .04 | -.04 | .01 | .00 | -.16\* |
| 5. Need for uniqueness | 2.56 | 0.81 | .88 |  |  |  |  |  | -.11 | .00 | -.12 | -.08 |
| 6. Age (years) | 35.66 | 12.27 | - |  |  |  |  |  |  | -.03 | .04 | -.01 |
| 7. In-group identification | 5.18 | 1.48 | - |  |  |  |  |  |  |  | .35\*\* | -.20\*\* |
| 8. ‘Typical’ British citizen identification | 3.79 | 1.50 | - |  |  |  |  |  |  |  |  | .09 |
| 9. Out-group identification | 1.69 | 1.22 | - |  |  |  |  |  |  |  |  |  |

*Note.* CT = Conspiracy theory *N* = 177 \**p* < .05, \*\* *p* < .01.

A one-way repeated measures ANOVA was conducted between participants’ level of social identification with the in-group they chose, the out-group they chose and ‘Other British citizens’, to check whether participants had a higher level of social identification with the in-groups versus the out-group. The assumption of sphericity was violated (*p* = .003), thus the Greenhouse-Geisser correction was used. There was a significant difference in level of social identification across the three groups, *F*(1.88, 330.98) = 305.53*, p* < .001, $η\_{p}^{2}$ = .63, $η\_{G}^{2}$ *= .51*. Pairwise comparisons using Bonferroni adjustments indicated that the participants identified with their chosen in-group significantly more than the prescribed in-group (‘other British citizens’) (*p* < .001) and the out-group (*p* < .001), and they identified with ‘other British citizens’ significantly more than with the out-group (*p* < .001) (See Table 3 for means). This confirmed that the groups selected successfully represented a proximal in-group, a distal in-group, and an out-group.

To test the first hypothesis, a multiple regression analysis was conducted. Personal conspiracy belief was entered as the dependent variable and the perceived conspiracy beliefs of the in-group, of ‘other British citizens’, and of the out-group were entered as predictor variables (see Table 4). The multi-collinearity of the model was checked, and no issues were detected (all tolerances > .55 and all VIFs < 1.8). The overall regression model was significant, *F*(3, 173) = 108.75, *R2* = .65, *p* < .001, and accounted for 65.3% of the variance in conspiracy belief. As hypothesised, and mirroring the findings of Study 1, the perceived belief of the in-group in conspiracy theories significantly positively predicted participants’ personal belief in such theories, and the perceived belief of ‘other British citizens’ also significantly positively predicted participants’ conspiracy belief, but, as in Study 1, to a lesser extent. The perceived belief of the out-group did not significantly predict participants’ conspiracy belief.

**Table 4**

*Results of the Multiple Regression Model Predicting Personal Conspiracy Belief (Study 2).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predictor | B | SE B | β | *t* | CI (95%) |
| Perceived belief of in-group in CT | .72 | .06 | .68 | 12.14\*\* | .61, .84 |
| Perceived belief of ‘Typical’ British citizens in CT | .21 | .07 | .17 | 2.87\*\* | .07, .36 |
| Perceived belief of out-group in CT | .03 | .05 | .03 | 0.66 | -.06, .12 |

 *Note.* CT = Conspiracy theory \*\* *p* < .01.

A paired samples t-test was conducted to compare participants’ actual conspiracy belief (*M* = 2.73, *SD* = 1.37) and their predictions of the belief of other British citizens (*M* = 3.22, *SD* = 1.11), to check for the presence of misperceptions regarding conspiracy belief amongst British citizens. Replicating the findings of Study 1, participants significantly over-estimated the conspiracy beliefs of others, *t*(176) = -5.77, *p* < .001, Cohen’s *dz* = 0.43.

Following the same procedure as Study 1, moderation analysis was conducted for each of the significant predictor variables; (a) the perceived belief of the in-group (see Figure 1)[[3]](#footnote-4) and (b) the perceived belief of ‘other British citizens’ (see Figure 2). Need for uniqueness did not moderate the relationship between perceived belief of either in-group in conspiracy theories (chosen in-group, *b* = .04, *SE* = .06, *t(*171) = .73, *p* = .47, 95% CI = -.07, .16; ‘other British citizens’, *b* = -.02, *SE* = .10, *t*(171) = -.18, *p* = .86, 95% CI = -.21, .18) and personal belief. Level of social identification with the group did, however, significantly moderate the relationship between both perceived belief of the chosen in-group and perceived belief of ‘other British citizens’ with personal conspiracy beliefs (chosen in-group, *b* = .07, *SE* = .03, *t*(171) = 2.14, *p* = .03, 95% CI = .01, .14; ‘other British citizens’, *b* = .13, *SE* = .05, *t*(171) = 2.80, *p* = .01, 95% CI = .04, .21). The higher the level of social identification with each in-group, the stronger the relationship between the perceived conspiratorial beliefs of that group and personal conspiracy beliefs. However, the relationship between the perceived beliefs of both in-groups and personal conspiracy beliefs was significant for each level of social identification with the in-group (see Figures 1 and 2).

**Figure 1**

*Moderation effect of level of identification with the in-group on the positive association of perceived belief of the in-group in conspiracy theories and personal belief in conspiracy theories in Study 2.*

*Note.* Model 2 of PROCESS macro; *N* = 177. Error bars display the standard error.

**Figure 2**

*Moderation effect of level of identification with other British citizens on the positive association of perceived belief of other British citizens in conspiracy theories and personal belief in conspiracy theories in Study 2.* *Note*. Model 2 of PROCESS macro; *N* = 177. Error bars display the standard error.

Study 2 supports the findings from Study 1, demonstrating that perceived in-group conspiracy belief norms are positively associated with personal conspiracy belief. Further, as predicted, for the general population sample in Study 2, this relationship is moderated by participants’ level of social identification with the group. Participants also overestimated the extent to which others endorse conspiracy theories, showing again that conspiracy belief is perceived to be more normative than it is.

## **4.5 General Discussion**

### ***4.5.1 The Present Findings***

The current research supports the hypothesis that there is a positive relationship between perceived in-group conspiracy belief norms and personal belief in conspiracy theories. This association was found across both a student and community sample. This is the first evidence of the relationship between the perceived in-group conspiracy belief norms and personal conspiracy belief, where this relationship holds true for both the in-group chosen by participants and, to a lesser extent, a more generic in-group (students, British Citizens). These studies strongly demonstrate that if people perceive that those with whom they share a group membership with endorse conspiracy theories, then they themselves will be more likely to endorse such theories. The analysis did not yield a significant association between the perceived belief of out-groups in conspiracy theories and personal belief.

Further, the relationship between perceived in-group belief and personal conspiracy belief was not influenced by participants’ need to feel unique. This does not support the hypothesis which predicted that having a strong need to feel unique could weaken this relationship. These findings are important, as previous research shows that a stronger need to feel unique can buffer against social influence pressures (Imhoff & Erb, 2009). However, in these studies a stronger Need for Uniqueness did not impact the association with social influence. Similarly, the present studies do not support previous findings with regards to the relationship between need for uniqueness and belief in conspiracy theories (Imhoff & Lamberty, 2017; Lantian et al, 2017). Previous research has demonstrated that conspiracy belief is positively predicted by one’s need to feel unique, however, no such relationship was found here. This could be indicative of cultural differences with regards to need for uniqueness in the UK compared to other European countries and the US where this relationship has previously been evidenced (Imhoff & Lamberty, 2017; Lantian et al, 2017). Further research could explore these potential cultural nuances in the relationship between need for uniqueness and conspiracy belief.

The next moderator tested was the level of identification with the in-group. Indeed, Social Identity Theory (SIT) stresses the importance of using the group as a guide for personal beliefs and behaviours (Tajfel & Turner, 1979; Turner, 1982; 1991), and that this is accentuated when one more strongly identifies with the group (Terry & Hogg, 1996). Thus, it was predicted that the relationship between perceived in-group conspiracy belief norms and personal conspiracy belief would be strengthened for those who strongly identified with the in-group. In Study 2, level of social identification with the group was a moderator, such that, the more participants identified with the in-group, the stronger the relationship between the perceived norms of that group and personal conspiracy belief, consistent with our hypothesis. However, this relationship was not significant in Study 1. This could be because, in Study 1, the participants’ student identity was already salient (Hogg & Turner, 1987) as they were completing the study in exchange for course credit, and thus they saw themselves as a ‘student’ meaning they were influenced by the norms of this group without necessarily documenting higher identification with it. It is also worth noting that even in Study 2, the relationship between perceived beliefs of the in-groups and personal conspiracy beliefs was strong at each level of social identification with the group. Thus, the perceived belief of the in-group in conspiracy theories is still associated with personal belief even for those who don’t necessarily strongly identify with the in-group.

The originality of the findings from the two studies presented here is demonstrated firstly in their contribution to our knowledge of the antecedents of conspiracy belief. Previous research has demonstrated that personality factors, such as narcissism, Machiavellianism, and subclinical paranoid and schizotypal personality traits (Barron et al., 2018; Darwin et al., 2011; Douglas & Sutton, 2011; March & Springer, 2019), as well as psychological processes such as distrust in authority, higher political cynicism, and lower self-esteem (see Douglas et al., 2017 for a review) are predictive of conspiracy belief. Similarly, Chayinska and Minescu (2018) and Mashuri and Zaduquisti (2013) have demonstrated that there are social identity mechanisms at play within intergroup conspiracy theories. In an intergroup context with situational threat, a greater level of social identification with an in-group can influence endorsement of specific conspiracy theories targeted against the out-group. However, strong identification with the in-group does not always increase endorsement of conspiracy theories. Previous research has shown that defensive in-group identification, specifically, collective narcissism (and not secure identification with the in-group), is predictive of conspiracy beliefs against the out-group (Cichocka et al., 2015; Cichocka, Marchlewska et al., 2015; Marchlewska, et al., 2019). The current studies uniquely extend our knowledge of the role of social influence mechanisms in conspiracy belief, demonstrating that perceived in-group conspiracy belief norms are strongly associated with personal conspiracy theory endorsement in both a student and British community sample. And further, that strong identification with the in-group can amplify this relationship.A key explanation for the strong association between personal conspiracy beliefs and perceptions of the in-group’s conspiracy beliefs could lie in peoples’ desire to hold beliefs which align with those who they identify with; the more one identifies with a group, the more closely their beliefs and behaviours will align with the perceived norms of that group (Tankard & Paluck, 2015; Terry & Hogg, 1996). Similarly, these findings could also be explained by considering individuals’ increased accuracy when predicting the norms of groups that they are closer to. As we do not interact with everyone around us, and we interact with different groups to different degrees, our perceptions of other people’s beliefs are often inaccurate (Tankard & Paluck, 2015). However, as perceptions of proximal in-group’s conspiracy beliefs were more strongly associated with personal beliefs than perceptions of a more distal in-group’s conspiracy beliefs, this could be due to individuals being more accurate when predicting the beliefs of groups who they are closer to.

The findings also uniquely reveal that people have misperceptions about other people’s belief in conspiracy theories, estimating that others endorse them more than they do. Conspiracy theories are alternative viewpoints, which go against more mainstream accounts (Goertzel, 1994) and are generally considered a minority viewpoint (Lantian et al., 2017). However, conspiracy theories are gaining traction via the internet (Howell, 2013), specifically social media, and are often reported in mainstream news (e.g. Jolley & Patterson, 2020; Smith & Novella, 2007). The current findings suggest that belief in conspiracy theories is considered to be more normative than it actually is. This is important because if the conspiracy belief of in-groups is over-estimated, this could elicit unwarranted social pressure to also endorse conspiracy beliefs. Considering the negative social and health consequences of harbouring conspiracy beliefs (Jolley & Douglas, 2014a; Jolley & Douglas 2014b; Jolley et al., 2019, Thorburn & Bogart, 2005), specifically anti-vaccine conspiracy theories, it is concerning that perceived social norms could be driving conspiracy belief.

### ***4.5.2 Limitations and Future Research***

One limitation of the current research is that it is correlational, where we have identified a relationship between the perceived conspiracy belief of others identified with and personal belief in conspiracy theories, but the causal direction is not yet established. As social norms provide an expectation about appropriate social behaviour (Sherif, 1936; Cialdini & Trost, 1998), and as such, have continually been shown influence personal attitudes and behaviour (Asch, 1954; Cialdini et al., 1991; Sherif, 1936), it is plausible that perceived conspiracy belief norms influence personal belief in conspiracy theories. For example, previous research has shown that perceived social norms can predict a wide range of behaviours: college student drinking (e.g. Bosari & Carey, 2001), smoking (e.g. Piscke et al., 2015), eating habits (e.g. Lally et al., 2010; Perkins et al., 2010, 2018), gambling (e.g. Larimer & Neighbors, 2003; Meisel & Goodie, 2014) and sun protection (e.g Reid & Aiken, 2013). Thus, the current research extends this notion demonstrating the association between perceived in-group conspiracy belief norms and personal beliefs.

Social norms perceptions can also have a reciprocal relationship with behaviour. Perceived social norms could influence personal attitudes and behaviours, and/or personal attitudes and behaviours can be projected onto others to estimate social norms (i.e. social projection). Future research should consider employing longitudinal and/or experimental designs to unpick the cause-and-effect relationship between social norms perceptions and personal beliefs in conspiracy theories. On the one hand, it could be argued that perceived conspiracy belief norms and personal beliefs could reinforce one another since research has demonstrated that social projection plays an important role in shaping social norm perceptions, and the subsequent acceptance of these perceived social norms reinforces the continuation of that belief or behaviour (Cho et al., 2015; Neighbors et al., 2006). In the context of college student alcohol consumption, the effect of perceived norms on behaviour appears to be greater than the effect of personal behaviours on perceived norms (Neighbors et al., 2006). Moreover, the relationship between perceived norms of in-group conspiracy beliefs and personal beliefs was found across two different samples which indicates that the relationship is robust.

A second limitation of this research is that participants self-reported their level of conspiratorial belief using ‘The Belief in Real-World Conspiracy Theory Scale’ (Douglas & Sutton, 2011), and as such, how participants understand the scales is not clear-cut. These scales have been used previously in conspiracy theory research and have shown good reliability (Douglas et al., 2016). Although, some research has shown that endorsing conspiracy theories can be viewed as a source of social stigma and thus participants may be less willing to divulge their conspiracy beliefs (Lantian et al., 2018), this potential limitation was minimised as the survey was completed online meaning participants disclosed their beliefs privately.

 The key findings of this research support the proposition that interventions challenging misperceived norms could be effective in reducing conspiracy beliefs in the future, which has not been attempted before. The current studies have provided evidence for the two key tenants of the Social Norms Approach (SNA; Dempsey et al., 2018; McAlaney et al., 2011). The SNA begins with the premise that individuals are influenced by the beliefs and behaviours of others and often make misperceptions about how much others engage in certain behaviours. These misperceptions influence personal engagement in that behaviour (Perkins & Berkowitz, 1986). The SNA works by challenging these misperceptions of the belief and behaviours of others and thus reducing the social pressure to engage in a problem behaviour (Dempsey et al., 2018). Often used to reduce excessive drinking amongst college students (LaBrie et al., 2008; Neighbors et al., 2004; Walters et al., 2000), this approach is now gaining traction in other areas, for example, promoting energy conservation (Anderson et al., 2017) and reducing problematic gambling behaviours (Larimer & Neighbors, 2003). This could potentially be extended to reduce harmful conspiracy beliefs as the current study has demonstrated that (a) there is a relationship between perceived conspiracy beliefs of others identified with and personal conspiracy belief and (b) participants over-estimate the extent to which others endorse conspiracy beliefs.

This is important, as research to date suggests that conspiracy beliefs are associated with potentially harmful consequences, for example, anti-vaccine conspiracy beliefs can directly reduce intentions to vaccinate (Jolley & Douglas, 2014a). Jolley and Douglas (2017) have addressed anti-vaccine conspiracy using an inoculation technique. They demonstrated that exposure to anti-conspiracy arguments prior to exposure to anti-vaccine conspiracy theories could inoculate people against the potentially harmful effects of anti-vaccine conspiracy theories. However, this intervention was not successful when the anti-conspiracy arguments were presented after the anti-vaccine conspiracy theories; demonstrating that once these beliefs are established, they can be difficult to correct, limiting the success of this approach (Jolley & Douglas, 2017). Therefore, these findings provide the foundations for developing interventions like the SNA, challenging misperceived norms, and providing new avenues to reduce conspiracy beliefs in the future.

## **4.6 Conclusion**

In summary, across both studies, the current research demonstrates that the perceived belief of in-groups in conspiracy theories are strongly, positively associated with personal conspiracy belief. Further, the current research shows that people over-estimate the extent of conspiracy belief amongst their in-groups. This is important as it is the first study to directly link the perceived norms of in-groups to personal conspiracy belief and demonstrate that conspiracy beliefs of others are over-estimated. A challenge for researchers now is to determine the utility of information-based interventions which challenge such normative misperceptions of conspiracy belief as a means of reducing the negative outcomes of conspiracy belief.

# **Chapter 5: An Experimental Investigation into the Effects of Perceived Social Norms on Anti-Vaccine Conspiracy Beliefs.**

## **5.1 Abstract**

To address the limitations of the previous two studies, this Chapter reports an experimental study, utilising a 2\*3 design, aiming to show the causal link between perceived norms of conspiracy beliefs and personal belief. Two-hundred-and-thirty-seven British adults were randomly allocated to one of six conditions where they were exposed to an article discussing anti-vaccine conspiracy theories, accompanied by a statement that was manipulated across the six conditions. The first independent variable manipulated ‘perceived anti-vaccine conspiracy belief norms’, which had two levels (majority vs minority endorsed the anti-vaccine conspiracies) and the second independent variable manipulated the group which the first independent variable was referring to (British citizens vs North Macedonian citizens vs no group). It was hypothesised that participants informed that the majority of the in-group (British citizens) endorses the anti-vaccine conspiracy theories would have a heightened personal belief. However, the ANCOVA analysis did not support the hypothesis, the manipulation of the perceived norms of an in-group did not affect personal anti-vaccine conspiracy beliefs. Moderation analysis, however, demonstrated the effect of the interaction on personal belief in anti-vaccine conspiracy theories was dependent on level of identification with British citizens; those who were informed that the majority of British citizens endorsed anti-vaccine conspiracy theories had a higher belief themselves, only when they were highly identified with the in-group. A future challenge now is to decipher which groups are influential in shaping anti-vaccine conspiracy beliefs.

## **5.2 Introduction**

As Chapter 2 and Chapter 4 discussed, although conspiracy theories are often considered a minority point of view (Imhoff & Lamberty, 2017), conspiracy beliefs are in fact widespread; British polls indicate that over 60% of people endorse at least one conspiracy theory (YouGov, 2019). Belief in conspiracy theories can have potentially dangerous consequences, including reduced intentions to vaccinate (e.g. Allington et al., 2021; Jolley & Douglas, 2014a; Ruiz & Bell, 2020), and increased prejudice (e.g. Jolley et al., 2020). Findings reported in the previous Chapter demonstrated that the perceived beliefs of an in-group in conspiracy theories can predict personal conspiracy beliefs (see Chapter 4). The aim of this Chapter is to extend these recently developed ideas using an experimental design. The perceived norms of an in-group’s belief in anti-vaccine conspiracy theories will be manipulated and the influence of this on personal belief will be measured. This is important as if anti-vaccine conspiracy beliefs are influenced by perceptions of in-group belief, this suggests a potential target for future interventions to reduce personal conspiracy beliefs and ultimately change behaviour.

Vaccination uptake in the UK has been steadily decreasing (NHS, 2019; 2020), despite scientific consensus regarding the efficacy and safety of vaccines (Taylor et al., 2014). For example, Measles, Mumps, and Rubella Virus Vaccine Live (MMR2) coverage in the UK is down to 86.8%, below the target of 95% required for herd immunity (NHS, 2020). Herd immunity is where a large enough proportion of a population are vaccinated, so it is more difficult for a disease to spread to those people who cannot have vaccines (NHS, 2019). A delay in or refusal of vaccines despite availability of them is referred to as vaccine hesitancy (WHO, 2019a). The repercussions of vaccine hesitancy are already apparent in the UK and globally. Unicef (2019) reported that 500,000 children in the UK under the age of 10 are not protected from measles, mumps, and rubella. This trend is similar to other high-income countries and has resulted in a 30% rise in measles cases worldwide (The Lancet, 2019). This is particularly apparent in the US, where measles had been eradicated in 2000 but has now resurfaced (The Lancet, 2019). This demonstrates the potential dangers of not vaccinating against preventable diseases, with vaccine hesitancy being named by WHO as a top 10 threat to health in 2019.

Consequently, researchers have explored anti-vaccination attitudes as a means of understanding the reported decreases in vaccine uptake. For example, Hornsey and colleagues (2018) measured anti-vaccination attitudes, along with belief in conspiracy theories, reactance (defined as the tendency for people to have lower tolerance of any restriction of freedom), disgust sensitivity towards needles, and worldviews in 5,323 participants across 24 countries. The strongest predictor of anti-vaccine attitudes was belief in conspiracy theories, this was general conspiracy theories, rather than those specifically directed towards vaccinations. Moreover, Jolley and Douglas (2014a) found that people with greater beliefs in anti-vaccine conspiracy theories were significantly less likely to intend to vaccinate. Anti-vaccine conspiracy theories include the idea that powerful organizations with a vested interest in vaccinations exaggerate the benefits of vaccines and fail to report the dangers (Jolley & Douglas, 2014a). In a second study, Jolly and Douglas exposed participants to an article that was either (a) pro anti-vaccine conspiracy theories, (b) pro-vaccines (anti-conspiracy), or (c) a control condition where no article was given. Findings showed that exposure to anti-vaccine conspiracy theories reduced future intentions to vaccinate a fictional child. These findings evidence the role of conspiracy beliefs in shaping vaccination intentions. Thus, challenging anti-vaccine conspiracy beliefs could be one avenue to increase vaccination uptake.

Exposing individuals to explicit anti-conspiracy arguments has been investigated as one means of reducing conspiracy beliefs and promoting healthier intentions. For example, in an experimental study, Jolley and Douglas (2017) exposed participants to explicit anti-conspiracy (pro-vaccination) arguments either before, or after, being presented with pro-conspiracy arguments regarding vaccination. Participants’ intentions to vaccinate a fictional child were measured after exposure to this information. Exposure to anti-conspiracy arguments (pro-vaccination) prior to exposure to anti-vaccine conspiracy theories could increase participants’ intention to vaccinate. However, when the anti-conspiracy (pro-vaccination) arguments were presented *after* the anti-vaccine conspiracy theories, vaccination intention *did not* increase (Jolley & Douglas, 2017). Once participants were exposed to anti-vaccine conspiracy theories, their beliefs were unable to be changed. Importantly, this type intervention assumes that, in line with the deficit model of science communication (Rossen et al., 2016), a key reason for anti-vaccine attitudes is a lack of information about vaccines or a failure to understand information. But there is no clear evidence for this, in fact, people who hold these anti-vaccine attitudes have been shown to spend a large amount of time seeking information online about vaccinations (Jones et al., 2012). Thus, interventions simply giving people further information may not be an effective route to changing conspiracy beliefs and ultimately vaccination intentions.

Several interventions focusing on challenging vaccine-related misinformation and conspiracy beliefs have shown to be either unsuccessful in increasing vaccination intention or counterproductive (Hornsey et al., 2018). Rossen and colleagues (2016) argued that an unintended side effect to campaigns aiming to increase vaccination coverage is their tendency to bring attention to anti-vaccine attitudes. This approach is at odds with known social psychological ideas, specifically people’s motivations to act in accordance with social norms. As explained in Chapter 3, social norms guide one’s behaviour by implicitly outlining what is acceptable and normative and what is not in particular contexts (Cialdini & Trost, 1998). Therefore, highlighting the extent of anti-vaccine attitudes could inadvertently communicate that these beliefs are more normative than the reality and thus motivating the undesired behaviour (Cialdini & Trost, 1998). Indeed, studies across several contexts show that when people overestimate the prevalence of an undesirable behaviour (e.g, binge drinking, substance misuse) it increases the likelihood that they will engage in the undesirable behaviour themselves (LaBrie et al., 2008; Neighbors et al., 2004; Walters et al., 2000).

The findings in the previous Chapter provide evidence of the role of perceived norms in predicting conspiracy beliefs. Across two studies, participants stated their belief in several well-known conspiracy theories, and their estimations of how much different groups endorsed the same conspiracy theories. Perceived in-group conspiracy belief was found to be strongly associated with personal conspiracy belief. Similarly, it was also demonstrated that people overestimate the conspiracy beliefs of their in-groups. Therefore, if individuals already perceive conspiracy beliefs to be more normative than they are, and these perceptions are associated with personal beliefs, highlighting vaccine conspiracy theories and vaccine hesitancy could be problematic. However, the studies reported in Chapter 4 were cross-sectional. Thus, it is still unknown whether perceived social norms of conspiracy beliefs play a causal role in personal conspiracy endorsement.

The current study therefore adopts an experimental design and aims to influence belief in anti-vaccine conspiracy theories by manipulating the perceived beliefs of an in-group and an out-group in these theories, across six different conditions. Given that Study 2, in Chapter 4, demonstrated the strong association between the perceived belief of a participants’ national group in conspiracy theories and their personal beliefs, in the current study, the national group which participants belong to was used as the in-group (British). The out-group chosen was North Macedonian Citizens, as this represented a national group which participants did not belong to and were unlikely to be particularly knowledgeable about. This follows examples from previous studies which have utilised participants’ national identity as the in-group and other European countries, who participants are unlikely to identify with, as the out-groups (e.g. Cichocka et al., 2018). Participants were presented with an article which contained anti-vaccine conspiracy theories. To manipulate the perceived norms of endorsement of these conspiracy theories, it was indicated whether the ‘majority’ or ‘minority’ of an in-group or an out-group endorsed the conspiracy theory. As in Studies 1 and 2 (Chapter 4), participants’ need for uniqueness was measured as a moderator variable as previous research has shown that, for some people, conspiracy theories are attractive as they can bolster one’s need to feel unique (Imhoff & Lamberty, 2017; Lantian et al., 2017), and those who are high in uniqueness are less likely to be influenced by perceived social norms (Imhoff & Erb, 2009). Participants’ level of social identification to the group was also measured as a moderator variable, as the more people identify with a group, the more influence the group has on their attitudes and behaviour (Terry & Hogg, 1996).

The key hypothesis is that there will be an interaction between the type of group (in-group vs out-group vs no group specified) and the perceived norms of conspiracy endorsement (majority vs minority). Specifically, it is predicted that: 1) participants who are told that the majority of their national group (in-group) endorse anti-vaccine conspiracy theories will report a heightened belief in anti-vaccine conspiracy theories compared to the other groups; whereas 2) there will be no difference in belief between participants who are informed that either the majority or minority of an out-group endorse the anti-vaccine conspiracy theory, as perceived beliefs of the out-group are not influential. In other words, it is predicted that participants will be influenced by the perceived social norm (majority endorse the anti-vaccine conspiracy vs the minority endorse the anti-vaccine conspiracy) of an in-group, but not an out-group.

It is also hypothesised that these effects will be moderated by participants’ need for uniqueness and level of social identification with the in-group. Specifically, the second hypothesis is that the effect of the belief of the majority of the in-group on participants’ personal beliefs in anti-vaccine conspiracy theories will be moderated by need for uniqueness, such that this effect will be lessened in participants with a stronger need to feel unique. Finally, the third hypothesis is that the effect of the belief of the majority of the in-group on participants’ personal beliefs in anti-vaccine conspiracy theories will be moderated by their level of identification with the in-group, such that, the more participants identify with British citizens, the stronger the effect. Participants’ general conspiratorial beliefs were measured as a covariate, as participants’ beliefs in anti-vaccine conspiracy theories could be resultant of their general beliefs in conspiracy theories, rather than of the manipulation (Brotherton et al., 2013). Finally, demographic variables, gender, age, education level, and parental status were also measured. This research is important as it could be the first to demonstrate that manipulating perceived norms of an in-group’s belief in anti-vaccine conspiracy theories can shape personal belief. If successful, interventions utilizing social norms of anti-vaccine conspiracy belief could potentially be used in the future to increase vaccination intentions and ultimately uptake.

## **5.3 Methods**

**5.3.1 Participants.** Prolific was used to recruit 291 participants. Prolific is an online recruitment platform where volunteers can register for studies in return for small monetary rewards. Screening criteria were applied via Prolific to ensure that all participants were British and had a high approval rating on the recruitment platform, meaning that they had a reputation for completing surveys satisfactorily. However, 19 participants were removed as their data were incomplete, 9 participants were removed as they failed an attention check, and 26 participants were removed as their reading speed of the article was too fast (</= 17 secs) to be sure that they fully read the article (Forbes, 2012). Therefore 237 participants, all British citizens, were included in the analysis (172 females, 65 males, *M* = 36.80 years, *SD* = 11.82), please see Table 5 for breakdown across experimental conditions. This study is pre-registered: [osf.io/yasv7](https://osf.io/yasv7).

The sample size was determined using a priori power analysis (Cohen, 1992). As no previous studies had assessed the effect of perceived social norms of anti-vaccine conspiracy belief on *actual* belief, there were no clear expectations regarding the effect size. Therefore, previous research which used the same manipulation used in this study (the anti-vaccine conspiracy theory article) was referred to. Jolley and Douglas (2014a; 2017) used this manipulation and reported medium effect sizes across three studies (η2 = .15, η2 = .13 and η2 = .07 respectively). Therefore, based on these estimates, a medium effect size equivalent to a Cohen’s d of 0.25 was predicted, and with an α error of .05, and 80% power for ANCOVA analysis, it was determined that a minimum sample size of 211 participants was required.

**5.3.2 Design.** A between-subject 2\*3 experimental design was employed in this study. Participants were presented with an article to read where two independent variables were manipulated. The first independent variable was the manipulation of perceived norms, specifically the extent that other groups endorse the anti-vaccine conspiracy theory. This variable had two levels; participants are either informed that a recent poll found that the majority or minority of a group endorse the anti-vaccine conspiracy information in the article. The second independent variable was the group whose belief in anti-vaccine conspiracy theories participants are informed of. This independent variable has three levels. Participants are told that a recent poll has found that the information in the article is either endorsed by the in-group (British people) or the out-group (North Macedonian people) or it is not specified what the group is (control condition). The dependent variable measured is participants’ personal belief in anti-vaccine conspiracy theories. Participants’ need for uniqueness and level of social identification with the groups were measured as moderator variables. Participants’ general conspiratorial beliefs were measured as a covariate along with demographic variables, gender, age, education, and parental status. Parental status was measured as the article which participants were exposed to discusses anti-vaccine conspiracy theories which could be more persuasive to parents. Education level was measured as previous research has found a negative relationship between level of education and conspiracy belief (van Prooijen, 2017).

**5.3.3 Materials and Procedure.** Ethical approval was obtained from the relevant university’s ethics panel. The study was hosted by Qualtrics, an online software tool used to build questionnaires. Once the study was accessed, participants were first presented with an information page, followed by a consent form, where they provided their informed consent. First, participants were asked to complete the demographic questions, then the participants’ level of social identification to each of the national groups, in-group (British citizens) and out-group (North Macedonian citizens), was measured using the Inclusion of Other in the Self scale (Aron et al., 1992; Tropp & Wright, 2001). This is a one-item scale, as used in Studies 1 and 2 of this thesis, where participants are presented a series of seven Venn diagrams ranging from non-overlapping circles to almost fully overlapping circles. Participants were asked to indicate which diagram best represents their level of identification with both national groups. The measure was scored on a scale ranging from one to seven, with one representing completely non-overlapping circles (i.e. very low identification) and seven representing nearly completely overlapping circles (i.e. very high identification). Need for uniqueness was measured using the four-item Self-Attributed Need for Uniqueness (SANU) scale (Lynn & Snyder, 2002; e.g. “Being distinctive is important to me”, 1 = not at all, 5 = extremely). Participants’ general belief in conspiracy theories was measured using the 15-item Generic Conspiracist Belief Scale (GCB) (Brotherton et. al, 2013, e.g. “The power held by heads of state is second to that of small, unknown groups who really control world politics”, see Appendix D), scored on a scale of Definitely not true; Probably not true; Not sure/cannot decide; Probably true; Definitely true. These three measures were presented in a randomised order to each participant.

Then, participants reviewed a ‘short excerpt from a recent Internet article’, which contained information about anti-vaccine conspiracy theories (Jolley & Douglas, 2014a; 2017) where some of the text had been manipulated across the six conditions:

**Table 5**

The Six Conditions of the Experimental Design (Study 3)

|  |  |
| --- | --- |
|   | IV 1: Level of endorsement of anti-vaccine conspiracy theories  |
| IV 2: Type of group who participants are informed endorse anti-vaccine conspiracy theories   |   | Majority  | Minority   |
| In-group (British citizens)  | Condition 1  | Condition 2  |
| Out-group (North Macedonian citizens)  | Condition 3  | Condition 4  |
| Not disclosed   | Condition 5  | Condition 6  |

Participants were randomly assigned to one of the six conditions. Conditions 5 and 6 were included to decipher whether perceived social norms alone could influence belief in anti-vaccine conspiracy theories, or if the perceived social norms needed to be attributed to an in-group. The pro-conspiracy article was based upon that used by Jolley and Douglas (2014a, 2017) and began by arguing that people within the vaccine industry are guilty of misrepresenting data. It then provided a specific example of this, stating that “diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed, and these diseases still exist among the population”. However, in order to embed the manipulation, a poll was included, which in Condition 1 began:

*“A representative poll finds that over 80% of British people think yes, there are many reasons to think twice about vaccines.”*

And in Condition 4 began:

*“A representative poll finds that less than 10% of North Macedonians think yes, we should think twice about vaccines.”*

The full articles can be found in Appendix E. Then the dependent variable was measured using the Belief in Anti-vaccine Conspiracy Theories Scale (see Appendix F). This is a ten item self-report, Likert style scale adapted from Jolley and Douglas (2014a; 2017). Each item is measured on a scale from 1 (strongly disagree) to 7 (strongly agree), e.g. “Misrepresentation of the efficacy of vaccines is motivated by profit.” There were also four reverse coded items, e.g. “Vaccine safety data is accurate”. Once participants had completed this scale, they were debriefed and thanked for their time.

## **5.4 Results**

#### **5.4.1 Main Analysis**

Descriptive statistics are presented in Table 6. Normality of data was first checked, and the data met parametric assumptions. The effects of demographic variables on belief in anti-vaccine conspiracy theories were tested. Gender differences were evident, with females having significantly higher belief in anti-vaccine conspiracy theories (*N* = 172, *M* = 3.10, *SD* = 1.19) than males (*N* = 65, *M* = 2.74, *SD* = 1.24), *t*(235) = -2.10, *p* = .037, *Hedges g* = 0.20. There was also a significant positive correlation between age and anti-vaccine conspiracy belief (*r* =.18, *p* = .006, *N* = 237). There was a significant difference in anti-vaccine conspiracy beliefs across different levels of education *F*(6, 229) = 2.30, *p* = .035, *η2*= .057. Specifically, Bonferroni comparisons showed that, those who were degree level educated had lower belief in anti-vaccine conspiracy theories (*M* = 2.45 *SD* = 1.15) than those who were educated to GCSE level or equivalent (*M* = 3.50 *SD* = 1.18). Participants’ parental status influenced anti-vaccine conspiracy belief, with parents having an increased belief (*N* = 118, *M* = 3.20, *SD* = 1.13) than non-parents (*N* = 119, *M* = 2.81, *SD* = 1.26), *t*(232.93) = 2.57, *p* = .011, *d* = 0.33. The general conspiratorial beliefs of participants were significantly positively correlated with their personal belief in the anti-vaccine conspiracy theories, *r* = .506, *p* < .001, *N* = 237. Thus, these factors were controlled for in the subsequent analysis.

**Table 6**

Means, Standard Deviations and Cronbach’s Alpha of Key Variables (Study 3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  Variable  | *Condition*  | *N* | *M* | *SD* | *α* |
| Belief in anti-vaccine conspiracy theories (CT) | Condition 1: Majority of in-group endorse anti-vaccine conspiracy theories. (Majority in-group) | 43 | 3.33 | 1.30 | .93 |
|  | Condition 2: Minority of in-group endorse anti-vaccine conspiracy theories. (Minority in-group) | 40 | 2.80 | 1.10 |
|   | Condition 3: Majority of out-group endorse anti-vaccine conspiracy theories. (Majority out-group) | 37 | 3.13 | 1.20 |
|   | Condition 4: Minority of out-group endorse anti-vaccine conspiracy theories. (Minority out-group) | 38 | 3.10 | 1.31 |
|   | Condition 5: Majority (group not specified) endorse anti-vaccine conspiracy theories. (Majority control)  | 42 | 2.73 | 1.14 |
|  |  |  |  |  |
|  Variable  | *Condition*  | *N* | *M* | *SD* | *α* |
|   | Condition 6: Minority (group not specified) endorse anti-vaccine conspiracy theories. (Minority control) | 36 | 2.90 | 1.18 |  |
| General Conspiratorial Beliefs | - | 237 | 2.96 | .78 | .93 |
| Self- Attributed Need for Uniqueness  | - | 237 | 2.62 | .83 | .83 |
| Social identification with other British Citizens  | - | 237 | 4.64 | 1.64 | - |
| Social identification with North Macedonian Citizens  | - | 237 | 1.60 | 1.16 | - |

A paired samples t-test was conducted between participants’ level of social identification with the in-group, British Citizens, and with the out-group, North Macedonian Citizens, to check whether these national groups successfully represented an in-group who participants identify with and an out-group who participants identify less with. There was a significant difference in level of social identification between the two groups, *t*(236) = 25.02, *p* < .001, *d* = 1.62. Participants identified with British Citizens (*M* = 4.64, *SD* = 1.64) significantly more than they identified with North Macedonian Citizens (*M* = 1.60, *SD* = 1.16).

An ANCOVA analysis was conducted to investigate they key interaction hypothesis, that the extent that other groups endorse the anti-vaccine conspiracy theory (perceived norms of belief) would significantly affect participants’ beliefs in anti-vaccine conspiracy theories, when the group whose belief in anti-vaccine conspiracy theories participants are informed of is an in-group. Belief in anti-vaccine conspiracy theories was entered as the dependent variable and the first independent variable (majority or minority endorsement), and the second independent variable, (the group who participants are informed endorse the conspiracy theory), were entered as the fixed factors. Participants’ gender, education level and parental status were also entered as fixed factors, while their age and general conspiratorial beliefs were entered as covariates[[4]](#footnote-5). The ANCOVA indicated that there was no main effect of either of the independent variables (main effect of minority or majority endorsement of anti-vaccine conspiracy theories was *F*(1, 220) = .231, *p* = .632, *η2* = .001, and the main effect of the group who participants are informed endorse the anti-vaccine conspiracy theories was *F*(2, 220) = .801, *p* = .450, *η2* = .007 respectively). The interaction between the two independent variables, minority or majority endorsement and the group was also non-significant, meaning there was no significant difference in endorsement of anti-vaccine conspiracy theories across the six experimental groups; *F*(2,220) = 1.723, *p* = .181 partial *η2* = .015. Manipulating the perceived social norms of anti-vaccine conspiracy beliefs of the in-group did not significantly alter belief in anti-vaccine conspiracy theories, thus not supporting the hypothesis. The main effects of participants’ gender, *F*(1, 220) = 9.15, *p* = .003, *η2* = .040, age, *F*(1,220) = 14.16, *p* <.001, *η2*= .060, and general conspiratorial beliefs, *F*(1,220) = 92.73, *p* < .001, *η2* = .297, remained.

In relation to the moderator variables, there were no correlations between participants’ need for uniqueness and belief in anti-vaccine conspiracy theories, *r* = .12, *p* = .065, *N* = 237, or between participants’ level of social identification with British Citizens and personal belief in anti-vaccine conspiracy theories, *r* = -.02, *p* = .781, *N* = 237. To assess the second and third hypotheses, that the effect of the belief of the majority of the in-group on participants’ personal beliefs in anti-vaccine conspiracy theories will be moderated by 1) need for uniqueness and 2) level of social identification with the group, moderation analysis was conducted using the PROCESS macro for SPSS (Hayes, 2017). Model 1 was used which allows for a moderator variable to be added to the model (W), and thus the effect of X (predictor), W, and XW on Y (outcome) can be calculated. The Model was run for each moderator variable. PROCESS coded the six conditions into five categories, where each was compared to Condition 1, and this made the X variable.

In the first model, participants’ need for uniqueness (W) was added as the moderator variable, whilst belief in anti-vaccine conspiracy theories was added as the dependent variable (Y). The overall moderating effect of need for uniqueness was non-significant, *F*(5, 225) = 1.82, *p* = .109. However, there was a significant interaction when Condition 1 (Majority in-group) was compared with Condition 4 (Minority out-group), *b* = -.89, *SE* = .30, *t*(225) = -2.97, *p* = .003, *95% CI* [-1.48, -.30], such that, in Condition 1 (Majority in-group), as participants’ need for uniqueness increased, so did their belief in anti-vaccine conspiracy theories. However, in Condition 4 (Minority out-group), as the need for uniqueness increased, conspiracy belief decreased. Thus, when informed that the minority of the out-group endorse anti-vaccine conspiracy theories, those who having a higher motivation to feel unique are less likely to endorse the conspiracy theory.

In the second model, participants’ level of social identification with other British Citizens was entered as the moderator variable (W). The overall moderating effect of identification to British Citizens was non-significant, *F*(5, 225) = 1.33, *p* = .252, however, there was a significant interaction when comparing Condition 1 (Majority in-group) with Condition 2 (Minority in-group), *b* = -.33, *SE* = .16, *t*(225) = -2.06, *p* = .041, *95% CI* [-.64, -.01], and with Condition 6 (Minority control), *b* = -.36, *SE* = .17, *t*(225) = -2.09, *p* = .038, *95% CI* [-.70, -.02]. In Condition 1 (Majority in-group), participants with stronger identification with British Citizens had an increased endorsement of the anti-vaccine conspiracy theories. However, in Conditions 2 (Minority in-group) and 6 (Minority control), those with a heightened identification to British Citizens had a decreased belief in the anti-vaccine conspiracy theories. Taken together, this suggests that participants who identify more with the in-group are more susceptible to influence from them.

**Figure 3**

*Moderation effect of level of identification with other British citizens on the relationship between experimental condition and personal belief in anti-vaccine conspiracy theories.*

*Note.* Model 1 of PROCESS macro; N = 237. SI refers to Social Identification.

#### **5.4.2 Exploratory Analysis**

There was a difference in level of belief in the anti-vaccine conspiracy theories between parents and non-parents, with parents having an increased belief (*N* = 118, *M* = 3.20, *SD* = 1.13) than non-parents (*N* = 119, *M* = 2.81, *SD* = 1.26), and to explore this, an exploratory analysis was conducted. Previous research which had found the initial link between belief in anti-vaccine conspiracy belief and reduced vaccination intentions was conducted with participants who were all parents (Jolley & Douglas, 2014a). Also, it has been demonstrated that taking the perspective of potential victims of a conspiracy theory can promote belief in that theory (van Prooijen & Van Dijk, 2014). If parents who chose to vaccinate children are considered to be a victim of anti-vaccine conspiracy theories, then perhaps other parents would take this perspective and thus be more motivated to endorse the conspiracy theory.

Almost half of the participants in this study were parents. Thus, exploratory analysis (and therefore not included in the pre-registration) was conducted, where the ANCOVA was conducted again with only the parents in the sample included. When only participants who are parents (*N* = 118) were included in the analysis, the interaction term was significant *F*(2, 103) = 3.20, *p* = .045, *η2* = .059, indicating that there is a significant difference in belief in anti-vaccine conspiracy theories across the six conditions. The largest difference in means is between Condition 1 (Majority in-group), which has the strongest belief in anti-vaccine conspiracy theories (*M* = 3.79, *SD* = 1.11) and Condition 2 (Minority in-group) which has the weakest belief in anti-vaccine conspiracy theories (*M* = 2.77, *SD* = .91). This is suggestive that, as postulated above, messages from the in-group are more persuasive to parents than messages from the out-group and messages when the group isn’t specified.

In this study, perceived social norms of an in-group and an out-group were manipulated as, drawing on Social Identity Theory (Tajfel & Turner, 1979), in-groups exert more influence on beliefs and behaviours than out-groups. This is supported in several studies (Fielding et al., 2008; Terry & Hogg, 1996), and particularly in the context of conspiracy belief, where Chapter 4 of this thesis demonstrated that the perceived belief of an in-group could predict personal conspiracy beliefs, however the perceived beliefs of an out-group were not related to personal conspiracy beliefs. However, social influence can be nuanced (Oakes, 1987), for example, when one feels threatened, individuals are more likely to focus on their social identities, rather than on their individual identities (Hornsey, 2008). As parents are potential victims of anti-vaccine conspiracy theories, they may have found it more threatening and thus were more susceptible to influence from an in-group. This could explain why parents were more persuaded by the conspiracy theory and more receptive to the perceived norms of the in-group.

## **5.5 Discussion**

The main hypothesis (Hypothesis 1) that those informed that the majority of their national group endorse anti-vaccine conspiracy theories will report a heightened belief in anti-vaccine conspiracy was not supported. Overall, the current research did not support the hypothesis that manipulating the perceived belief of an in-group (participants’ national group) in anti-vaccine conspiracy theories can affect their personal beliefs in anti-vaccine conspiracy theories. Firstly, it was predicted that informing participants that the majority of an in-group believe in anti-vaccine conspiracy theories would heighten participants’ beliefs in these conspiracy theories, and particularly when compared to participants who were informed that the minority of an in-group endorse these conspiracy theories. However, findings revealed that participants’ beliefs in anti-vaccine conspiracy theories were not significantly influenced by perceived belief of the in-group or the out-group. Need for uniqueness was also not an important moderating factor; it was demonstrated that participants’ need for uniqueness was not suppressing the influence of perceived social norms on anti-vaccine conspiracy belief.

Participants’ level of social identification with British Citizens did moderate the effect of experimental condition on personal anti-vaccine conspiracy belief between Condition 1, where participants were informed that the majority of British citizens endorsed the anti-vaccine conspiracy theories, and Condition 2, where participants were informed that the minority of British citizens endorsed the anti-vaccine conspiracy theories. When participants were informed that the majority of British Citizens endorse anti-vaccine conspiracy theories, the subsequent belief in anti-vaccine conspiracy theories was increased in those participants who strongly identify with other British Citizens. Conversely, when participants were informed that the *minority* of British Citizens endorse these conspiracy theories, those with a higher identification to British Citizens had a lower endorsement of the anti-vaccine conspiracy theories. This is important, as it demonstrates that perceived norms of in-groups are most persuasive in participants who have a stronger identification to the group. Finally, exploratory analysis suggested that the perceived beliefs of the in-group did significantly influence belief in anti-vaccine conspiracy theories but only when the sample contained parents only. This is the first study to our knowledge which demonstrates the power of manipulating social norms of the in-group to influence anti-vaccine conspiracy beliefs in specific groups of participants (i.e. parents).

The main finding of this research, that manipulating the perceived social norms of belief in anti-vaccine conspiracy theories of an in-group did not influence participants’ beliefs in anti-vaccine conspiracy theories, is at odds with emerging ideas in previous research. Perceived social norms of the belief and behaviours of our in-groups have been shown to be strongly related to personal beliefs and behaviours across numerous contexts; for example, perceived drinking norms (LaBrie et al., 2008; Neighbors et al., 2004; Walters et al., 2000), energy conservation norms (Anderson et al., 2017), and sun protection norms (Reid & Aiken, 2013), are related to personal engagement in these activities. Specifically, the two studies in Chapter 4 demonstrated that the same was true of conspiracy beliefs. When the sample was restricted during exploratory analysis to include solely parents, however, the manipulation was successful; the perceived norms of the in-group influenced participants. Specifically, those in Condition 1 (Majority in-group) who were informed that the majority of British citizens endorse anti-vaccine conspiracy theories had a heightened belief in anti-vaccine conspiracy theories, while participants in Condition 2 (Minority in-group) who were informed that *the minority* of British citizens endorse anti-vaccine conspiracy theories had the lowest endorsement of conspiracy theories. This is, to our knowledge, the first suggestion that manipulation of perceived social norms of an in-group could be used to influence and even reduce anti-vaccine conspiracy beliefs, however, this is only with participants who are parents. This could be due to parents feeling more threatened by the conspiracy theory, particularly given the content of anti-vaccine conspiracy theories and thus be more motivated to look to an in-group to guide beliefs and behaviour (Hornsey, 2008).

This also sheds light on a limitation of this study. Social Identity Theory (SIT) stresses the importance of using the group as a guide for personal beliefs and behaviours (Tajfel & Turner, 1979; Turner, 1982; 1991) and that this is accentuated when one more strongly identifies with the group (Terry & Hogg, 1996). However, seeing oneself as part of a group and thus using the in-group as a guide for personal beliefs and behaviours is quite nuanced and is moderated by several factors, for example feelings of threat (Oakes, 1987; Tajfel & Turner, 1987). Even those who highly identify with a group will not be guided by group norms on every conceivable issue. Different group memberships impact beliefs and behaviour at different times; for instance, the group which we categorise ourselves and others into depends to a large extent on the social context (Oakes, 1987). Simon and colleagues (1997) demonstrated the importance of ‘meaningfulness’ of the social groups on seeing oneself as a member of a group. People are influenced by the beliefs and behaviours of the in-group, when the group basis is meaningful to the specific context. Therefore, a limitation of this study is that the in-group chosen, British Citizens, was not particularly meaningful to the context of the conspiracy belief- anti-vaccination attitudes- and thus the influence of the in-group would be minimal.

Similarly, Wyer, (2010) found across two experimental studies that messages from and in-group were only more influential than messages from an out-group when the issue being discussed was relevant to the groups. This makes intuitive sense as people have several different group memberships which impact our experiences and behaviours at different times (Markus & Kunda, 1986), and, therefore, some groups will be more influential in contexts which are relevant to the basis of that group membership. This is relevant to Oakes’ (1987) socio-contextual fit concept, which states that the influence of the in-group matters when there is a fit between the issue and the social groups. Therefore, a limitation of this study is the omission of the nuances of the influence of the perceived norms of an in-group on personal beliefs and behaviours.

Therefore, future research needs to address the issue of socio-contextual fit. In order to ascertain whether a manipulation of in-group norms regarding endorsement of anti-vaccine conspiracy theories can influence personal endorsement of that theory, there needs to be a ‘fit’ between the basis of belonging to the in-group and anti-vaccine conspiracy theories. This is important as if using an in-group which is relevant to the issue, ‘other parents’ for example, then participants may be significantly influenced by the perceived social norms of this group. As previous research indicates that people have the tendency to perceive conspiracy beliefs as more normative than they (see Chapter 4), then social norms-based interventions could be used as a new approach for reducing belief in anti-vaccine conspiracy theories and increasing vaccination intentions.

There is also another possible explanation for these findings. As explained above, Chapter 4 demonstrated that perceived beliefs of other British citizens in anti-vaccine conspiracy theories can predict personal beliefs in anti-vaccine conspiracy theories. However, it could be that this relationship is reciprocal, where personal beliefs in anti-vaccine conspiracy theories also predict norm perceptions, as previous research has indicated that in other contexts, adolescent alcohol use (Meisel & Colder, 2020) and alcohol use in young adult sexual minority women (Litt et al., 2015), the relationship between perceived norms and personal behaviour is significant both ways. However, it is also worth noting that the effect of perceived norms on behaviour has been demonstrated to be greater than the effect of personal behaviours on perceived norms (Neighbors et al., 2006), supporting the direction of the current endeavour.

This study also found no relationship between the need for uniqueness and belief in conspiracy theories. This is contradictory to previous research which has demonstrated that belief in conspiracy theories is positively predicted by one’s need to feel unique (Imhoff & Lamberty, 2017; Lantian et al, 2017). However, when this relationship has been previously tested with a British sample, like this one, there was no significant correlation (see Chapter 4). This could suggest that perhaps this relationship is not present within British samples and potentially indicative of culture differences with regards to need for uniqueness in the UK compared to other European countries and the US where this relationship has previously been evidenced.

To conclude, the current research demonstrates that manipulating the perceived belief of national in-groups in anti-vaccine conspiracy theories does not affect personal anti-vaccine conspiracy belief. Contrary to predictions, perceived social norms of the in-group could not guide personal belief in anti-vaccine conspiracy theories. However, when the sample was limited to just parents, parents *were influenced* by the perceived norms of the national in-group regarding belief in anti-vaccine conspiracy theories. Although this analysis has limited power and is exploratory, the potential for future hypothesis building should not be undervalued. Crucially, the beliefs of parents, who are key to making vaccination decisions, were significantly affected by manipulating in-group social norms. This also illuminated some key limitations of the current study, namely overlooking the importance of the ‘fit’ between the in-group and the context of the conspiracy theory. A future challenge now is to decipher which groups are influential to parents when faced with anti-vaccine conspiracy theories and how this can be used to attenuate the negative consequences of anti-vaccine conspiracy beliefs.

# **Chapter 6: Contagious Conspiracies: Exploring and Addressing Anti-Vaccine Conspiracy Beliefs in UK Parents Using Meaningful In-Groups.**

The first study (Study 4) presented in this Chapter has been published as part of the following journal article:

Cookson, D., Jolley, D., Dempsey, R. C., & Povey, R. (2021). “If they believe, then so shall I”: Perceived beliefs of the in-group predict conspiracy theory belief. Group Processes & Intergroup Relations, 24(5), 759-782. https://doi.org/10.1177/1368430221993907.

## **6.1 Abstract**

This Chapter comprises three studies which aim firstly to decipher which in-groups are most related to personal anti-vaccine conspiracy beliefs (Study 4) and whether anti-conspiracy counterarguments from this in-group, other parents, (Study 5) or anti-conspiracy counterarguments with embedded social norm messages from other parents (Study 6) could be used to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions. Study 4 (*N* = 197 parents) used a cross-sectional design to show, firstly, that the perceived anti-vaccine conspiracy belief of other parents is strongly associated with personal anti-vaccine conspiracy beliefs, and secondly, that parents over-estimated the anti-vaccine conspiracy beliefs of other parents. Study 5 (*N* = 191 parents) used a between-groups design to show that, after exposure to anti-vaccine conspiracy theories, counterarguments attributed to other parents did not reduce anti-vaccine conspiracy beliefs or increase vaccination intentions compared to a control. Finally, Study 6 (*N* = 207 parents of young children, aged ≤ 4 years) also used a between-groups design and showed that, after exposure to anti-vaccine conspiracy theories, receiving counterarguments reduced anti-vaccine conspiracy beliefs and increased vaccination intentions. However, counterarguments with embedded social norm messages from other parents did not alter anti-vaccine conspiracy beliefs or vaccination intentions. This Chapter suggests that future research further investigates the use of counterarguments to address anti-vaccine conspiracy beliefs and the potential for Social Norms Approach interventions as an avenue to address these beliefs.

## **6.2 Introduction**

Vaccines are the most effective way to prevent infectious diseases (NHS, 2019). The World Health Organisation (WHO) describes vaccines as one of the most cost-effective health interventions available, which save millions of people from illness, disability, and death each year (2020). Particularly during the current COVID-19 pandemic, where hopes over containing the virus rest on vaccine uptake (Acquah, 2021; Williams et al., 2020). However, the safety and efficacy of vaccines have long been embroiled in conspiracy theories, which centre on the arguments that big pharma companies and/or governments cover up information about vaccines for their own personal gains (Jolley & Douglas, 2014a; Kata, 2013). Despite scientific consensus regarding the efficacy and safety of vaccines (Taylor et al., 2014), vaccine uptake in the UK is decreasing, in 2019, coverage declined in all routine vaccinations, although there was a slight increase in 2020, UK vaccine uptake is still below optimal (NHS, 2019). Belief in anti-vaccine conspiracy theories has been shown to reduce vaccination intentions (Hornsey et al., 2018; Jolley & Douglas, 2014a). Thus, researchers have aimed to reduce belief in these conspiracy theories and increase vaccination intentions but have had limited success (see Chapter 2; Jolley & Douglas, 2017). Three studies are presented in this Chapter which aims to use underlying motives of conspiracy beliefs to aid the development of novel interventions to reduce anti-vaccine conspiracy beliefs of UK parents and in turn increase vaccination intentions.

A conspiracy theory is an alternative explanation of the ultimate cause of an event as a secret plot by a covert alliance of powerful individuals or organizations, rather than as an overt activity or natural occurrence (Douglas et al., 2019), with many examples given in previous Chapters (e.g. Chapter 2). Belief in a specific conspiracy theory is not usually held in isolation; instead, belief in one conspiracy theory is a strong, consistent predictor of belief in several others (Goertzel, 1994; Swami et al., 2010; Swami et al, 2011; Wood et al., 2012). This alludes to a conspiratorial mindset; the overall tendency to engage with conspiracist explanations for events. Belief in general conspiracy theories (e.g. about the 9/11 attacks and the assassination of JFK) positively correlates with several anti-science beliefs, including anti-vaccination attitudes (Lewandowsky et al., 2013). Several psychological factors, for example, heightened feelings of anxiety, powerlessness, distrust of authority and political cynicism have been associated with belief in conspiracy theories (Abalakina-Paap et al., 1999; Grzesiak-Feldman, 2013; van Prooijen & Acker, 2015, see Chapter 2). A novel antecedent to belief in conspiracy theories, evidenced in Chapter 4, is the perceived belief of in-groups in conspiracy theories; those who think that their in-groups believe in conspiracy theories are more likely to also personally hold these beliefs. Moreover, Chapter 4 showed that individuals demonstrated self-other discrepancies of conspiracy theory belief, where participants over-estimate the extent to which in-groups endorse conspiracy theories, perceiving conspiracy beliefs to be more normative than they actually are.

In the UK, a YouGov and Cambridge University nationally representative survey indicated that over 60% of people endorse at least one conspiracy theory (YouGov, 2019). Focussing on anti-vaccine conspiracy theories, 20% of respondents believe that vaccines have harmful effects that are not fully disclosed (YouGov, 2019; 2020). Belief in anti-vaccine conspiracy theories is considered particularly problematic as it is a lead contributor to anti-vaccine attitudes (e.g. Hornsey et al., 2018). Moreover, Jolley and Douglas (2014a) demonstrated that anti-vaccine conspiracy beliefs, induced after exposure to a pro-conspiracy online article, reduced a parent’s intentions to vaccinate, compared to a control condition. A delay in or refusal of vaccines despite availability of them is referred to as vaccine hesitancy (WHO, 2019a). Vaccine hesitancy is apparent in the UK, where vaccine uptake is decreasing, particularly for the Measles, Mumps, and Rubella Virus Vaccine (MMR2), where coverage in the UK is down to 86.8% of the population, below the target of 95% (NHS, 2020). Thus, this work presents a novel attempt to attenuate the potentially negative consequences of anti-vaccine conspiracy beliefs.

As discussed in previous Chapters, Jolley and Douglas (2017) utilised specific anti-conspiracy counterarguments as means to reduce belief in anti-vaccine conspiracy theories and in turn increase vaccination intentions, as previous research suggests that factual counterarguments were able to reduce belief in conspiracy theories about the 9/11 attacks (Banas & Miller, 2013). However, Jolley and Douglas (2017) found that these factual counterarguments only served to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions, compared to other experimental conditions, when they were presented before participants being exposed to anti-vaccine conspiracy theories. This suggests that factual counterarguments can inoculate people against the potential consequences of conspiracy beliefs but once people are exposed to anti-vaccine conspiracy theories, they are more difficult to correct. Online exposure to anti-vaccine misinformation can trigger a perceived risk of vaccination after only 5-10 minutes of exposure (Betsch et al., 2010), and is particularly enticing to concerned parents (Swingle, 2018). Thus, the development of further interventions is vital.

Chapter 5 presented an experimental study (Study 3) which aimed to capitalise on the potential ability of the perceived belief of in-groups in anti-vaccine conspiracy theories to influence participants’ beliefs in anti-vaccine conspiracy theories. Participants were presented with an article based upon one used by Jolley and Douglas (2014a; 2017) which was designed to be similar to articles found online supporting anti-vaccine conspiracy theories. Then, the article was manipulated across six conditions. Within the article, participants were told that a recent poll has found that the information in the article is endorsed by either the *majority* or *minority* of (1) an in-group (British citizens) or (2) an out-group (North Macedonian citizens) or (3) it is not specified what the group is (control condition). It was hypothesised that those informed that the majority of their national group (an in-group) endorse anti-vaccine conspiracy theories will report a heightened belief in anti-vaccine conspiracy theories and those informed that the minority of their national group (an in-group) endorse anti-vaccine conspiracy theories will report a reduced belief. However, the main hypothesis was not supported, experimentally manipulating the perceived beliefs of national in-groups in anti-vaccine conspiracy theories did not successfully influence participants’ personal beliefs. However, an exploratory post-hoc analysis showed that when the analysis was conducted solely on the *parents* within the study, the expected outcome was found; parents who were informed that the minority of the in-group endorsed anti-vaccine conspiracy theories had a reduced belief compared to parents who were informed that the majority of the in-group endorsed anti-vaccine conspiracy theories. This suggested that those in the study for whom the conspiracy theory topic is more relevant (childhood vaccinations), the perceived beliefs of the in-group were influential.

Social Identity Theory (SIT) states that part of an individual’s self-concept is defined by belonging to social groups (Tajfel & Turner, 1979). As such, in-groups are groups that are identified with and one is part of, whereas out-groups are groups which one does not identify with and is not part of. SIT stresses the importance of using the group as a guide for personal beliefs and behaviours (Tajfel & Turner, 1979; Turner, 1982; 1991) and that this is accentuated when one more strongly identifies with the group (Terry & Hogg, 1996, see Chapter 3). Aligned with these assumptions, the previous studies in this thesis demonstrated that the extent to which one perceived that an in-group endorses conspiracy theories were positively related to their own personal belief in conspiracy theories, whereas this relationship was not present for out-groups (see Chapter 4). However, manipulating the perceived norms of national in-groups and out-groups did not influence personal belief in anti-vaccine conspiracy theories (see Chapter 5). Self-Categorization Theory (SCT) extends SIT and explains under which circumstances an individual activates their social identity (Turner et al., 1987). According to SCT, the activation of one’s social identity is nuanced and depends on different factors, for example, the accessibility of a fit between the matter at hand and the social categories (Reid & Ng, 2000; Oakes, 1987), the meaningfulness of the social category to the self (Simon et al., 1997) and feelings of threat (Hornsey, 2008). Thus, a limitation of the experiment presented in Chapter 5 is that the social groups chosen (i.e. the national in-group and a national out-group), may not have activated participants’ social identities and consequently the norms of these groups were not influential to participants’ beliefs in anti-vaccine conspiracy theories.

How we categorise ourselves or others depends much on the current context; individuals have several group memberships which impact beliefs and behaviour at different times (Oakes, 1987). This has been noted as socio-contextual fit, for example, one might categorise themselves as a feminist and look to feminist groups for guidance on beliefs and behaviours when discussing voting in an election, but they would be less likely to place meaning on this categorisation when looking at other topics, for example, joining a choir. Thus, for the perceived norms of an in-group to influence beliefs in anti-vaccine conspiracy theories, the in-group needs to be carefully chosen to be meaningful to the context in order to activate individuals’ social identities. In Study 3, presented in Chapter 5, participants in the sample who were parents were responsive to the normative messages from the in-group. It is surmised that this could be due to parents finding the conspiracy theory more threatening, as it is more relevant to them as people who have made a decision about vaccinating children. This is important as, ultimately, interventions aiming to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions should be aimed at parents of young children who will be making these vaccination decisions.

### ***6.2.1 The Current Studies***

Chapter 6 comprises Studies 4, 5 and 6. To experimentally reduce anti-vaccine conspiracy beliefs and increase vaccination intentions in UK parents, using normative messages from in-groups, it is hypothesised that *other parents* would be a meaningful social category. This is because being a parent is relevant to the topic of vaccinations, and is a personally important aspect of the self, and thus is likely to provide a subjectively meaningful and salient basis for social categorisation. Thus, Study 4 investigates this assertion. UK parents completed measures of their belief in anti-vaccine conspiracy theories, along with their perceptions of how much other social groups endorse anti-vaccine conspiracy theories, an in-group (parents) and out-group (non-parents) meaningful to the context of anti-vaccine conspiracy theories, and an in-group and out-group less meaningful to the context (British citizens and North Macedonian citizens). It is hypothesised that the perceived beliefs of other parents in anti-vaccine conspiracy theories will be the strongest predictor of personal beliefs, and the perceived beliefs of other British citizens will also predict personal belief in anti-vaccine conspiracy theories but to a lesser extent, as although British citizens are an in-group, the group is not as meaningful in this context. In contrast, it is hypothesised that the perceived beliefs of non-parents and North Macedonian citizens will not be positively associated with personal beliefs. Chapter 4 showed that individuals perceive conspiracy beliefs to be more normative than they actually are, and thus it is also predicted that participants will demonstrate a self-other discrepancy, such that they over-estimate the extent to which parents endorse anti-vaccine conspiracy theories.

Study 5 aimed to utilise an experimental design to reduce parents’ beliefs in anti-vaccine conspiracy theories and increase vaccination intentions. Study 5 experimentally assesses the ability of counterarguments, attributed to a meaningful in-group source, to reduce UK parents’ beliefs in anti-vaccine conspiracy theories and increase vaccination intentions. It was hypothesised that, after exposure to anti-vaccine conspiracy theories, participants who were presented with counterarguments, from the point of view of other parents, would have a reduced belief in conspiracy theories and increased vaccination intentions. The third and final study presented in this Chapter, Study 6, extended Study 5 by embedding normative messages from other UK parents within the conspiracy theory counterarguments, to reduce UK parents’ beliefs in anti-vaccine conspiracy theories and increase vaccination intentions. Previous research has shown some promise of using counterarguments to reduce belief in conspiracy theories (Jolley & Douglas, 2017, see Chapter 2), however this had limited success. Therefore, in Studies 5 and 6, by combining counterarguments with two types of normative messages, it is hypothesised that anti-vaccine conspiracy beliefs will be reduced, and vaccination intentions increased.

Across studies, participants’ need for uniqueness and level of social identification with other UK parents were included as moderator variables as each has the potential to influence participants’ susceptibility to normative messages from the in-group. Heightened need for uniqueness can reduce the effects of social influence (Imhoff & Erb, 2009), but is positively associated with belief in conspiracy theories (Imhoff & Lamberty, 2017; Lantian et al., 2017). Increased social identification with other UK parents could amplify the influence that the perceived belief of other parents has on personal belief in anti-vaccine conspiracy theories, as demonstrates in Studies 2 and 3. Thus, it is possible that the current interventions tested here could be more successful with parents who have a strong identification with other parents and do not have a heightened need to feel unique. This research is important as it is the first to our knowledge to evidence the perceived belief of meaningful in-groups as a motive to anti-vaccine conspiracy beliefs, and to attempt to capitalise on this to develop original interventions to address anti-vaccine conspiracy beliefs of UK parents and increase vaccination intentions.

## **6.3 Study 4**

### ***6.3.1 Method***

**6.3.1.1 Participants**. Data were collected in May 2019 and participants were recruited using Prolific, an online recruitment platform, which includes a diverse sample of people of different ages, sexualities, employment status, education level, religions, and political orientations. On this platform, volunteers can register to take part in studies in return for small monetary rewards (£1.25 for this study). Screening criteria were applied via Prolific to ensure that all participants were British, were parents, and had a high approval rating on the recruitment platform, meaning that they had a reputation for completing surveys satisfactorily. Although a large effect size was expected, due to our previous research which indicated that the perceived beliefs of in-groups strongly predict personal conspiracy beliefs (see Chapter 4), a sample of 200 participants was sought in order to increase the stability of correlations (Schönbrodt & Perugini, 2013). Thus, 217 British parents took part in the survey. Once data were cleaned, six respondents were removed as their surveys were incomplete and 14 respondents were removed as they failed to accurately complete an attention check. A sample of 197 British parents were included in the analysis (135 females, 61 males, 1 trans/other *Mage* = 42.42 years, *SDag*e= 11.09). The study was pre-registered: [osf.io/9q5kt](https://osf.io/9q5kt).

**6.3.1.2 Design**. The design of the study was cross-sectional, where the outcome variable was participants’ belief in anti-vaccine conspiracy theories. The predictor variables were the perceived belief of the Majority of Other Parents (an in-group anticipated to be meaningful in this context), the Majority of Non-Parents (an out-group anticipated to be meaningful in this context), the Majority of Other British Citizens (an in-group anticipated to be less meaningful in this context) and the Majority of North Macedonian Citizens (an out-group anticipated not to be meaningful in this context). Participants’ need for uniqueness and social identification with each of the groups were measured as moderator variables. Participants’ personal demographic characteristics (gender, age) and age of their youngest child and education level were also measured.

**6.3.1.3 Materials and Procedure.** Ethical approval was obtained from the relevant university’s ethics panel. The study was hosted by Qualtrics, an online software tool used to build questionnaires. Once the study was accessed via Prolific, participants were first presented with an information page, followed by a consent form, where they provided their informed consent. First participants were asked to complete the demographic questions. To measure need for uniqueness, the four-item Self-Attributed Need for Uniqueness (SANU) scale was used (Lynn & Snyder, 2002; e.g. “Being distinctive is important to me”, 1 = not at all, 5 = extremely, α = .88).

Personal belief in anti-vaccine conspiracy theories was measured using the Belief in Anti-Vaccine Conspiracy Theories Scale, adapted from Jolley and Douglas (2014a). There were 10 statements for participants to complete (e.g. “Misrepresentation of the efficacy of childhood vaccines is motivated by profit”, 1 = strongly disagree, 7 = strongly agree). Participants completed this scale a further four times, where it was adapted to measure the perceived beliefs of the in/out-groups; *Majority of Other Parents*, *Majority of* *Non-parents*, *Majority of* *Other British Citizens* and *Majority of North Macedonian Citizens.* For example:

“Now, please think about other people who are also **parents**

Please indicate how much you think *the majority of parents* agree with each statement below by selecting the appropriate response in each case. 1 (strongly disagree) – 7 (strongly agree)”

Level of social identification with each of the social groups was measured in the same way as in the previous studies in this thesis, using the Inclusion of Other in the Self scale (Aron et al, 1992; Tropp & Wright, 2001). The measures were presented in a randomised order to each participant, followed by an online debrief and participants were thanked for their time.

### ***6.3.2 Results and Discussion***

Descriptive statistics and Pearson’s correlation coefficients are presented in Table 7. The effects of demographic variables on personal belief in anti-vaccine conspiracy theories were tested. Gender differences were evident, with male participants having significantly higher belief in anti-vaccine conspiracy theories (*M* = 3.00, *SD* = 1.42) than females (*M* = 2.56, *SD* = 1.14), *z* (196) = -2.02, *p* = .044. Education level was also significantly negatively associated with anti-vaccine conspiracy beliefs, *r* = -.23, *p* = .001, *N* = 197, participants who had a higher level of education had a lower belief in anti-vaccine conspiracy theories. The age of a participants’ youngest child was also significantly associated with their anti-vaccine conspiracy beliefs, *r* = .17, *p* = .015, *N* = 197, such that participants with older children had a heightened belief in anti-vaccine conspiracy theories. Thus, participants’ gender, education level, and the age of their youngest child were controlled for in the regression analysis. There was no correlation between participants’ age and anti-vaccine conspiracy belief, *r* =.12, *p* = .092, *N* = 197.

As shown in Table 7, personal anti-vaccine conspiracy belief was significantly positively correlated with the perceived belief of each of the groups; the perceived belief of other parents, the perceived belief of those who are not parents, the perceived belief of other British citizens and the perceived belief of North Macedonian citizens, in anti-vaccine conspiracy theories. This indicates that the perceived beliefs of others in anti-vaccine conspiracy theories is significantly positively correlated with personal beliefs in anti-vaccine conspiracy theories. Need for uniqueness was also significantly positively correlated with personal belief in anti-vaccine conspiracy theories.

First, the level of social identification to the in-groups (other parents and other British citizens) and out-groups (non-parents and North Macedonian citizens) were compared to check whether participants identified more with the in-groups than the out-groups. A one-way repeated measures ANOVA was conducted between participants’ level of social identification with other parents, non-parents, British citizens, and North Macedonian citizens. The assumption of sphericity was violated (*p* <.001), thus the Greenhouse-Geisser correction was used. There was a significant difference in identification cross the four groups; *F*(2.48, 486.85) = 130.775, *p* < .001, $η\_{p}^{2}$= .40. Bonferroni analysis indicated that participants identified significantly more with other parents (*M* = 4.76, *SD* = 1.73) than with non-parents (*M* = 3.39, *SD* = 1.73), *p* < .001. Likewise, participants identified significantly more with other British citizens (*M* = 4.43, *SD* = 1.78) than with North Macedonian citizens (*M* = 2.23, *SD* = 1.77), *p* < .001. Participants also identified with other parents significantly more than they identified with other British citizens, *p* = .009.

**Table 7**

*Means, Standard Deviations, Cronbach’s Alpha, and Pearson Correlation Matrix (Study 4).*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Mean* | *SD* | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1. *Personal* anti-vaccine CT belief | 2.69 | 1.24 | .93 |  | .74\*\* | .44\*\* | .62\*\* | .46\*\* | .24\*\* | .12 | -.23\*\* | -.02 | -.03 | -.07 | .15\* |
| 2. Perceived belief of *other parents* in anti-vaccine CTs | 3.07 | 1.22 | .93 |  |  | .45\*\* | .67\*\* | .35\*\* | .14 | .19\*\* | -.16\* | -.11 | -.06 | -.05 | .07 |
| 3.Perceived belief of *non-parents* in anti-vaccine CTs | 3.07 | 1.28 | .94 |  |  |  | .51\*\* | .36\*\* | .19\*\* | .20\*\* | -.09 | -.05 | -.10 | -.14\* | .01 |
| 4. Perceived belief of *other British citizens* in anti-vaccine CTs | 3.08 | 1.12 | .92 |  |  |  |  | .42\*\* | .20\*\* | .08 | -.18\* | -.11 | -.12 | -.13 | .03 |
| 5. Perceived belief of *North Macedonian citizens* in anti-vaccine CTs | 3.50 | 1.16 | .93 |  |  |  |  |  | .10 | -.01 | -.06 | .02 | -.07 | .03 | .06 |
| 6. Need for uniqueness | 2.41 | 0.86 | .88 |  |  |  |  |  |  | -.08 | .14\* | .02 | .01 | -.17\* | .03 |
| 7. Age (years) | 42.42 | 11.09 | - |  |  |  |  |  |  |  | -.14\* | -.03 | .08 | .04 | -.06 |
| 8. Education | 3.09 | 1.46 | - |  |  |  |  |  |  |  |  | .07 | .08 | -.01 | .05 |
| 9. Identification with parents | 4.76 | 1.73 | - |  |  |  |  |  |  |  |  |  | .43\*\* | .65\*\* | .11 |
| 10. Identification with non-parents | 3.39 | 1.73 | - |  |  |  |  |  |  |  |  |  |  | .46\*\* | .33\*\* |
|  | *Mean* | *SD* | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11. Identification with British citizens | 4.43 | 1.78 | - |  |  |  |  |  |  |  |  |  |  |  | .18\* |
| 12. Identification with North Macedonian citizens | 2.23 | 1.77 | - |  |  |  |  |  |  |  |  |  |  |  |  |

*Note. N* = 197. \**p* < .05. \*\**p* < .01

A hierarchal multiple regression analysis was conducted to test the first hypothesis, that the perceived beliefs of other parents and other British citizens in anti-vaccine conspiracy theories positively predicts personal belief. Personal anti-vaccine conspiracy belief was entered as the dependent variable. Then, gender, the age of participants’ youngest child, and participants’ education level were entered as the predictor variables in the first step. The initial model was significant, *F*(3, 192) = 6.56, *R²*  =  .093, *p* < .001, and accounted for 9.3% of variance in participants’ anti-vaccine conspiracy beliefs. In the next step, the perceived anti-vaccine conspiracy beliefs of the four groups were entered as predictor variables. The multi-collinearity of the model was checked, and no issues were detected (all tolerances > 0.47 and all VIFs < 2.12). The overall regression model was significant, *F*(7, 188) = 46.40, *R²*=  .63, *p* < .001, and accounted for 63% of the variance in personal belief in anti-vaccine conspiracy theories (see Table 8).

**Table 8**

*Results of the Hierarchical* [*Multiple Regression*](https://www.sciencedirect.com/topics/medicine-and-dentistry/linear-regression-analysis)*Model Predicting Personal Belief in Anti-Vaccine Conspiracy Theories (Study 4).*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Step | Predictor | B | SE B | β | *t* | CI (95%) |
| 1 | Gender | -.43 | .18 | -.16 | -2.36\* | -.79, -.07 |
|  | Education level | -.17 | .06 | -.20 | -2.78\*\* | -.29, -.05 |
|  | Age of youngest child | .01 | .01 | .12 | 1.66 | -.00, .03 |
|  |  |  |  |  |  |  |
| 2 | Gender | -.25 | .12 | -.09 | -2.09\* | -.48, -.01 |
|  | Education level | -.08 | .04 | -.10 | -2.03\* | -.16, -.00 |
|  | Age of youngest child | .00 | .01 | .03 | 0.60 | -.01, .01 |
|  | Perceived belief of other parents in anti-vaccine CTs | .54 | .06 | .53 | 8.67\*\* | .42, .67 |
|  | Perceived belief of non-parents in anti-vaccine CTs | .03 | .05 | .04 | 0.65 | -.07, .14 |
|  | Perceived belief of other British citizens in anti-vaccine CTs | .16 | .07 | .15 | 2.27\* | .02, .30 |
|  | Perceived belief of North Macedonian citizens in anti-vaccine CTs | .21 | .05 | .20 | 3.99\*\* | .11, .32 |

*Note*. \*p<.05. \*\*p<.01.

As hypothesised, the perceived beliefs of other parents in anti-vaccine conspiracy beliefs significantly positively predicted personal belief in anti-vaccine conspiracy theories. The perceived belief of those who were not parents did not significantly predict personal belief. Also, as predicted, the perceived belief of other British citizens predicted personal belief in anti-vaccine conspiracy theories, but to a lesser extent than the perceived belief of other parents. This supports our predictions that other parents are a meaningful in-group regarding anti-vaccine conspiracy theories, where the perceived beliefs of this group are strongly positively associated with personal beliefs. The perceived belief of North Macedonian citizens also significantly predicted personal belief in anti-vaccine conspiracy theories.

Moderation analysis was then conducted to test whether the relationship between the perceived belief of other parents in anti-vaccine conspiracy theories and personal belief was stronger for participants who highly identified with other parents, and/or participants who had a higher need to feel unique. Moderation analysis was conducted using the PROCESS macro for SPSS (Hayes, 2017). Model 2 was used which allows for two moderators to be added to the model (W and Z), and thus the effect of X (predictor), W, Z, XW, and XZ on Y (outcome) can be calculated. Both participants’ level of social identification with the group (W) and their need for uniqueness (Z) were added as moderator variables, whilst perceived belief of other parents in anti-vaccine conspiracy theories was added as the predictor variable (X) and personal beliefs was added as the dependent variable (Y). All significant predictors in the hierarchical multiple regression above were included as covariates. The overall model was significant *F*(10,185) = 38.56, *R2*= .68, *p* < .001, meaning that the new model predicted 68% of the variance in participants’ anti-vaccine conspiracy beliefs. Table 9 shows that both interaction terms were significant, along with significant main effects of the perceived beliefs of other parents, the perceived belief of the out-group (North Macedonian Citizens), education level and need for uniqueness. The addition of the interaction terms to the model significantly increased the variance in personal endorsement of anti-vaccine conspiracy theories explained, *F*(2,185) = 7.33, *ΔR2* = .03, *p* = .001. However, this effect is small, with the addition of the interaction terms explaining only an extra 3% of the variance (see Figure 4).

**Table 9**

*Moderation Analysis Predicting Personal Belief in Anti-Vaccine Conspiracy Theories (Study 4).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | B | SE B | *t* | CI (95%) |
| Sex | -.14 | .12 | -1.24 | -.37, .08 |
| Education level | -.12 | .04 | -3.14\*\* | -.20, -.05 |
| Age of youngest child | .01 | .01 | 1.18 | -.00, .02 |
| Perceived belief of Other British citizens in anti-vaccine CTs | .12 | .07 | 1.86 | -.01, .26 |
| Perceived belief of North Macedonian citizens in anti-vaccine CTs | .22 | .05 | 2.49\*\* | .12, .32 |
| Perceived belief of other parents in anti-vaccine CTs | .55 | .06 | 9.30\*\* | .43, .67 |
| Need for uniqueness | .16 | .07 | 2.39\* | .03, .29 |
| Social identification with other parents | .04 | .03 | 1.16 | -.03, .10 |
| Perceived belief of other parents in anti-vaccine CTs \* Need for uniqueness | .14 | .05 | 2.96\*\* | .05, .24 |
| Perceived belief of other parents in anti-vaccine CTs \* Social identification with other parents | .05 | .02 | 2.11\* | .00, .10 |

*Note.* \*p<.05. \*\*p<.01.

**Figure 4**

*Moderation effect of level of identification with other parents and need for uniqueness on the positive association of perceived belief of other parents in anti-vaccine conspiracy theories and personal belief in anti-vaccine conspiracy theories in Study 4*

*Note.* Model 2 of PROCESS macro; *N* = 197. Error bars display the standard error

Investigating the second hypothesis, that participants over-estimate the extent to which other parents endorse anti-vaccine conspiracy theories, a one-way repeated measures ANOVA was conducted. The assumption of sphericity was violated and thus the Greenhouse-Geisser correction was used (*p* = .046). There was a significant difference between perceived belief of others in anti-vaccine conspiracy theories and actual belief, *F*(1.94, 380.1) = 20.84, *p* < .001, $η\_{p}^{2} $= .1. Bonferroni analysis indicated that participants significantly over-estimated the belief of both other parents (*p* < .001) and other British citizens (*p* < .001) in anti-vaccine conspiracy theories.

Perceived norms of anti-vaccine conspiracy beliefs of other parents are significantly positively associated with the actual anti-vaccine conspiracy beliefs of parents. The relationship between the perceived belief of other parents in anti-vaccine conspiracy theories and personal belief is moderated by the extent to which participants identify with other parents, and participants’ need to feel unique; both heightened identification and need to feel unique strengthened this relationship. This study also demonstrated a self-other discrepancy, where parents estimated that other parents’ belief in anti-vaccine conspiracy theories was higher than their own. This study therefore provides evidence that *‘other parents’* is an in-group who is more meaningful to the topic of anti-vaccine conspiracy beliefs than using national in-groups, who were used in Chapter 4. Participants in this study had a stronger level of identification with other parents than they did with their national in-group, and the perceived beliefs of other parents in anti-vaccine conspiracy beliefs was a stronger predictor of personal beliefs. The next study aims to show experimentally how the perceived belief of other parents in anti-vaccine conspiracy theories could be used to reduce parents’ beliefs in anti-vaccine conspiracy theories and increase vaccination intentions.

## **6.4 Study 5**

Study 5 was conducted to experimentally replicate the findings of Study 4, such that participants were exposed to anti-vaccine conspiracy theories and were then given counterarguments to these conspiracy theories which were experimentally manipulated to be from different sources (other parents, non-parents, no source specified). It is hypothesised that participants who are given counterarguments from the point of view of other parents will have a reduced belief in anti-vaccine conspiracy theories and increased vaccination intentions compared to participants in the other conditions. Put another way, it is predicted that attributing the counterarguments to a meaningful in-group source will increase the utility of them to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions.

### ***6.4.1 Method***

#### **6.4.1.1 Participants.** The sample size was determined using a priori power analysis (Cohen, 1992). To estimate the effect size, previous research which used the same manipulation used in this study (the anti-vaccine conspiracy theory article) was referred to. Jolley and Douglas (2014a; 2017) used this manipulation and reported medium effect sizes across three studies (η2 = .15, η2 = .13 and η2 = .07 respectively). Therefore, based on these estimates, a medium effect size equivalent to a Cohen’s f of 0.25 was predicted, and with an α error of .05 and 80% power for ANOVA analysis, it was determined that a minimum sample size of 180 participants was required.

Prolific was used in this study, in the same way as in Study 4, to recruit 240 participants. Screening criteria were applied via Prolific to ensure that all participants were British, had children, had a high approval rating on the recruitment platform, and had not taken part in the previous study. Once data were cleaned, 40 participants were removed as they either failed an attention check or their reading speed of the article was too fast (</= 17 secs) to be sure that they fully read the article (Forbes, 2012). Therefore, *N* = 191 participants, were included in the analysis (132 females, 56 males, 2 trans/other, and 1 preferred not to say, *Mage* = 43.48 years, *SDage* = 11.67), please see Table 10 for breakdown across experimental conditions. This study was pre-registered: [osf.io/d4n5j](https://osf.io/d4n5j).

 **6.4.1.2 Design.**A between-subject single factor experimental design was employed in this study. Participants were exposed to an article that supports anti-vaccine conspiracy theories and then were given counterarguments to the anti-vaccine conspiracy theories, which were manipulated across four different conditions. The independent variable was the source of the counterarguments; specifically, the counterarguments were manipulated to be written either by (1) other parents (meaningful in-group), (2) non-parents (out-group), (3) no source is given (counterargument control) or (4) no counterarguments are given (control condition) in response to the anti-vaccine conspiracy article. Thus, participants were randomly assigned to one of the four conditions (see Table 10). The dependent variables measured were the participants’ personal belief in anti-vaccine conspiracy theories and participants’ intentions to vaccinate. Participants’ need for uniqueness and level of social identification with the parents and non-parents were measured as moderator variables. Participants’ demographic characteristics; gender, age, age of their youngest child and education level were also measured as potential co-variates.

**Table 10**

*Displaying the Four Conditions of the Experimental Design (Study 5)*

|  |  |
| --- | --- |
| Source of the anti-vaccine counterarguments  | Condition |
| Other parents (meaningful in-group) | Condition 1 |
| Non-parents (out-group) | Condition 2 |
| No source given (counterargument control) | Condition 3 |
| No counterarguments (control) | Condition 4 |

**6.4.1.3 Materials and Procedure.** Ethical approval was obtained from the relevant university’s ethics panel and this study was also hosted by Qualtrics. Once the study was accessed, participants were presented with an information page, followed by a consent form, where they provided their informed consent. First participants were asked to complete the demographic questions, followed by their level of social identification with other parents and non-parents, measured using the Inclusion of Other in the Self scale (Aron et al., 1992; Tropp & Wright, 2001) and their need for uniqueness, measured using the four-item Self-Attributed Need for Uniqueness (SANU) scale (Lynn & Snyder, 2002).

Then, participants were asked to read a ‘short excerpt from a recent Internet article’, in order to expose participants to anti-vaccine conspiracy theories. Participants were presented with an article to read, the same as used in Chapter 5 e.g.:

“There are many reasons to think twice about vaccines. For example, people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines. Evidence suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.”

Participants were then randomly assigned to one of the four conditions (see Table 10). In Condition 1, the counterarguments were accompanied by an introduction attributing the source of the counterarguments to other parents, and the arguments were given to be from the point of view of parents (e.g. “Parents know that the financial benefits of preventing illnesses far outweigh the profits made from vaccines by pharmaceutical companies”). In Condition 2, the counterarguments were attributed to non-parents and were given to be from the point of view of non-parents, and in Condition 3, the counterarguments were introduced, but no source was given. Condition 4 was a control condition, where participants did not receive any counterarguments after reading the anti-vaccine conspiracy theory article. The full counterarguments can be found in Appendix G. To check that enough attention had been paid to the source of the counterarguments, participants were asked: “The beliefs of which group of people were reported in the article?” with multiple choice answers of (1) Parents, (2) Non-parents, and (3) It didn’t specify.

The first dependent variable was measured using the Belief in Anti-vaccine Conspiracy Theories Scale, adapted from Jolley and Douglas (2014a; 2017) as used in Study 4. The second independent variable, participants’ intentions to vaccinate, was then asked. This was measured using a scenario used widely in previous research (Betsch et al., 2012; Betsch & Sachse, 2013; Jolley & Douglas, 2014a, 2017). In the scenario, participants were asked to imagine that they were the parent of an infant named Sophie, 8 months, and that their doctor had provided them with information regarding the (fictitious) disease ‘dysomeria’, which may lead to serious consequences with symptoms such as fever and vomiting. After reading the scenario, participants indicated their intention to have Sophie vaccinated: “*If you had the opportunity to vaccinate your child (Sophie, aged 8 months) against dysomeria next week, what would you decide”*; on a scale of 1-7, where 1 = definitely not vaccinate and 7 = definitely vaccinate (see Appendix H). Once participants had completed this scale they were debriefed and thanked for their time. The debrief thoroughly informed participants that the information presented in the article was fictional and created only for research purposes and pointed them towards websites containing factual information about vaccines.

### ***6.4.2 Results and Discussion***

Descriptive statistics are presented in Table 11. Normality of data was first checked, and the data met parametric assumptions, except participants’ intention to vaccinate was negatively skewed across conditions, therefore non-parametric tests were conducted for analysis using this variable. The effects of demographic variables on belief in anti-vaccine conspiracy theories were tested. There was no significant effect of gender (*z*(188) = -.55, *p* = .585), age (*F*(1,189) = .05, *p* = .816, R2 < .00), or participants’ youngest child’s age (*F*(1, 189) = .001, *p* = .945) on participants’ belief in anti-vaccine conspiracy theories. Similarly, gender (*z*(188) = -.79, *p* = .431), age (*F*(1, 189) = 1.16 *p* = .282, R2 = .006), and age of participants’ youngest child ( *F*(1, 189) = .77, *p* = .382, R2 = .004) did not significantly affect participants’ intentions to vaccinate. However, education level was significantly associated with belief in anti-vaccine conspiracy theories (*F*(1, 189) = 14.52, *p* < .001, R2 = -.07) and participants’ intention to vaccinate (*F*(1, 189) = .7.19, *p* = .008, R2 = .04), such that a higher level of education was associated with reduced belief in anti-vaccine conspiracy theories and an increased intention to vaccinate.

**Table 11**

Means, Standard Deviations and Cronbach’s Alpha of Key Variables (Study 5)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Variable* |  | *N* | *M* | *SD* | *α* |
| Belief in anti-vaccine conspiracy theories  | Condition 1 | 49 | 2.70 | 1.40 | .96 |
| Condition 2 | 40 | 2.91 | 1.47 |
| Condition 3 | 46 | 2.91 | 1.47 |
| Condition 4 | 56 | 3.01 | 1.50 |
| Intention to vaccinate | Condition 1 | 49 | 6.16 | 1.30 | - |
| Condition 2 | 40 | 5.88 | 1.38 |
| Condition 3 | 46 | 5.85 | 1.46 |
| Condition 4 | 56 | 6.01 | 1.29 |
| Self- Attributed Need for Uniqueness  |  | 191 | 2.47 | .80 | .88 |
| Social identification with other parents |  | 191 | 3.59 | 1.49 | - |
| Social identification with non-parents  |  | 191 | 3.21 | 1.34 | - |

A paired samples t-test was conducted between participants’ level of social identification with the meaningful in-group (other parents), and with the out-group (non-parents), to check that these groups successfully represented an in-group who participants identify with and an out-group who participants identify less with in this sample. There was a significant difference in level of social identification between the two groups, *t*(190) = 3.82, *p* < .001, *d* = 0.26. Participants identified with other parents (*M* = 3.59, *SD* = 1.49) significantly more than they identified with non-parents (*M* = 3.21, *SD* = 1.34).

An ANCOVA analysis was conducted to test the hypothesis that participants who are given counterarguments from the point of view of other parents (Condition 1) will have a reduced belief in anti-vaccine conspiracy theories compared to participants in the other conditions. Belief in anti-vaccine conspiracy theories was entered as the dependent variable and the experimental condition was entered as fixed factors. Participants’ education level was entered as a covariate. The ANCOVA indicated that there was a main effect of education, *F*(1, 186) = 14.17, *p* < .001, $η\_{p}^{2} $ = .07, but no main effect of experimental condition on anti-vaccine conspiracy beliefs, *F*(3, 186) = .36, *p* = .783, $η\_{p}^{2} $= .006. A non-parametric Kruskal-Wallis Test was then conducted to test the hypothesis that participants who are given counterarguments from the point of view of other parents (Condition 1) will have an increased intention to vaccinate compared to participants in the other conditions. Intention to vaccinate was entered as the dependent variable, the experimental condition was entered as the independent variable. Again, there was no main effect of experimental condition on vaccination intentions *χ2*(3) = 3.29, *p* = .349, with a mean rank vaccination intention score of 105.77 for Condition 1, 88.74 for Condition 2, 89.78 for Condition 3 and 97.75 for Condition 4. Thus, once participants were exposed to anti-vaccine conspiracy theories, receiving counterarguments to them either from the point of view of other parents (Condition 1), from the point of view of non-parents (Condition 2) or alone (Condition 3) had no effect on participants’ beliefs in anti-vaccine conspiracy theories or intentions to vaccinate compared to receiving no counterarguments (Condition 4).

As Study 4 showed that the relationship between the perceived belief of other parents in anti-vaccine conspiracy theories and personal belief in anti-vaccine conspiracy theories was stronger for participants who had a heightened level of social identification with other parents and a heightened need to feel unique, we investigated whether the intervention was successful, but only in these participants. To do this, moderation analysis was conducted using the PROCESS macro for SPSS (Hayes, 2017). Model 2 was used in the same way as in Study 4. The independent variable was the experimental condition, where PROCESS coded each condition to compare it with Condition 1 (e.g. 1 = Condition 1 vs Condition 2, 2 = Condition 1 vs Condition 3, and 3 = Condition 1 vs Condition 4), with the moderators being (1) participants’ need for uniqueness and (2) their level of social identification with other parents; education level was included as a covariate. The model was run twice; first with belief in anti-vaccine conspiracy theories as the dependent variable and then again with intentions to vaccinate as the dependent variable. However, neither participants’ need for uniqueness nor level of social identification with other parents were significant moderators. There was no difference in participants’ beliefs in anti-vaccine conspiracy theories or intentions to vaccinate across the experimental conditions even when differing levels of their need for uniqueness and social identification to other parents were taken into account (see Appendix I for Table 12 and 13).

The pre-registered mediation analysis (osf.io/d4n5j), investigating the mediating effect of belief in anti-vaccine conspiracy theories between experimental conditions and participants’ intentions to vaccinate was not conducted as there was no significant effect of experimental condition on vaccination intentions. However, a linear regression analysis was conducted, using the full sample, to test the relationship between belief in anti-vaccine conspiracy theories (predictor variable) and vaccination intentions (outcome variable). This demonstrated that belief in anti-vaccine conspiracy theories significantly negatively predicted vaccination intentions, *F*(1, 189) = 69.79, *R2* = .27, *p* < .001. This supports previous findings that belief in anti-vaccine conspiracy theories is a factor associated with reduced vaccination intentions (Hornsey et al., 2018; Jolley & Douglas, 2014a).

In summary, this study showed that attempts to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions after exposure to anti-vaccine conspiracy theories by using anti-conspiracy counterarguments attributed to different sources were not successful. Once participants had been exposed to the anti-vaccine conspiracy theory article, neither experimental condition reduced belief in anti-vaccine conspiracy theories or increased vaccination intentions compared to the control group (who were not given an intervention). This remained the case even for participants who highly identified with other parents and regardless of their need to feel unique. These findings are in line with previous research (Jolley & Douglas, 2017) in the sense that they also found that once people were exposed to anti-vaccine conspiracy theories, counterargument interventions did not reduce belief in these conspiracy theories or improve vaccination intentions. However, as the perceived belief of other parents had been shown to be strongly associated with parents’ personal endorsement of anti-vaccine conspiracy theories (Study 4), the findings of the current study did not support the hypothesis that counterarguments from this meaningful in-group would influence participants belief. This study does, however, support previous research, demonstrating that belief in anti-vaccine conspiracy theories is a factor associated with reduced vaccination intentions (Hornsey et al., 2018; Jolley & Douglas, 2014). Thus, the next study aims to reduce anti-vaccine conspiracy beliefs as a means to increase vaccination intentions, this time using social norm messages from the meaningful in-group. Social norm messages are messages suggesting that *the majority of* people adhere to a certain behaviour (Bewick et al., 2010; Perkins, 2002). It is possible that normative messages indicating that anti-vaccine conspiracy theories are not endorsed by the *majority* of the meaningful in-group, will reduce participants beliefs in anti-vaccine conspiracy theories and increase vaccination intentions.

## **6.5 Study 6**

Study 6 was conducted to address some of the limitations of Study 5. Study 5 did not significantly reduce participants’ beliefs in anti-vaccine conspiracy theories nor increase vaccination intentions using counterarguments from a meaningful in-group, and this could be due to the lack of indication that the counterarguments were the commonly held beliefs of that group. Study 4 showed that the perceived belief of other parents in anti-vaccine conspiracy theories was a strong predictor of personal anti-vaccine conspiracy beliefs, and that parents thought that other parents’ beliefs were stronger than their own. Moreover, Study 5 confirmed that anti-vaccine conspiracy beliefs significantly negatively predict vaccination intentions. Thus, the aim of Study 6 is to combine anti-conspiracy counterarguments with social norm messages from the meaningful in-group, highlighting that it is normative of other parents to reject anti-vaccine conspiracy theories, as a means to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions of UK parents.

### ***6.5.1 Method***

#### **6.5.1.1 Participants.** The sample size was determined using a priori power analysis (Cohen, 1992) in line with the estimate for Study 5’s sample size based on the effect sizes from a previous study using the same manipulation (Jolley & Douglas, 2014b; 2017). A medium effect size equivalent to a Cohen’s f of 0.25 was anticipated, and with an α error of .05 and 80% power for ANOVA analysis, it was determined that a minimum sample size of 180 participants was required for the present study. Participants were required to be UK parents either currently expecting a baby or parents who have a child aged 4 years or younger. This was more specific than the sample in Study 5 as it is important to ensure the parents in the sample had young children as interventions to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions would be targeted towards this group.

In total, 207 participants were included in the study. Due to cost, the initial 119 participants were recruited using posters that were distributed physically and via social media, from September 2019 to February 2020. As data collection using this method took several months, Prolific was then used to recruit the remainder of the sample *(N*= 88). Screening criteria were applied via Prolific to ensure that all participants were British, had children aged 4 years or younger, had a high approval rating on the recruitment platform, and had not taken part in the previous two studies. Thus, once data were cleaned, 207 participants were included in the analysis (173 females, 34 males, *Mage* = 32.73 years, *SDage* = 5.5)[[5]](#footnote-6), please see Table 14 for breakdown across experimental conditions. This study is pre-registered: [osf.io/fetvx](https://osf.io/fetvx).

**6.5.1.2 Design*.*** A between-subject single factor experimental design was employed in this study. In the same way as Study 5, all participants were exposed to an article which supports anti-vaccine conspiracy theories and then were given counterarguments to the anti-vaccine conspiracy theories, which were manipulated across four conditions. The independent variable was the type of social norm messages which participants received; alongside this manipulated norm message the same anti-conspiracy counterarguments used in Study 5 were presented. Participants received one of four types of social norm messages ; (1) indicating the majority of parents reject anti-vaccine conspiracy theories and think that vaccines are completely safe, (2) indicating the majority of non-parents reject anti-vaccine conspiracy theories and think that vaccines are completely safe, (3) counterarguments alone, without social norm messages and (4) a control condition without counterarguments or social norm messages. Participants were randomly assigned to one of the four conditions. The dependent variables measured were (1) participants’ personal beliefs in anti-vaccine conspiracy theories and (2) participants’ intentions to vaccinate. Participants’ need for uniqueness and level of social identification with parents were measured as moderator variables. Participants’ demographic characteristics (gender, age, and education level) were measured as potential covariates.

**6.5.1.3 Materials and Procedure*.*** Ethical approval was obtained from the relevant university’s ethics panel and this study was also hosted by Qualtrics. Once the study was accessed, participants were presented with an information page, followed by a consent form to provide their informed consent. In the same way as Study 5, participants were asked to complete the demographic questions, followed by their level of social identification with other parents and non-parents (Aron et al., 1992; Tropp & Wright, 2001) and their need for uniqueness, (Lynn & Snyder, 2002). Participants were then exposed to anti-vaccine conspiracy theories using the same ‘short excerpt from a recent Internet article’ from the previous study. Then, participants were randomly assigned to one of the four conditions. Participants were then given the same anti-conspiracy counterarguments they were given in Study 5, where Condition 1 had social norm messages from ‘other parents’ embedded:

“The large majority of parents stated that there is no reason to think twice about vaccines… Perhaps unsurprisingly, therefore, a recent representative poll of parents showed that an overwhelming majority of 81% believed that vaccines are completely safe.”

In Condition 2, social norm messages from non-parents were embedded:

“The large majority of those who are not parents stated that there is no reason to think twice about vaccines…Perhaps unsurprisingly, therefore, a recent representative poll showed that an overwhelming majority of 81% of non-parents believed that vaccines are completely safe.”

In Condition 3, participants were given the same counterarguments but without any social norm messages, and participants in Condition 4 were in the control condition where no counterarguments were presented after reading the anti-vaccine conspiracy theory article (see Appendix J for the full articles). As an attention check to ensure participants had read the articles properly, participants were asked; “The survey results of which group of people were reported in the article you just read?” with multiple choice answers of (1) Parents, (2) Non-parents, and (3) the article did not specify. The figure ‘81%’ was used to represent the ‘majority’ as it aligns with the results of the 2019 YouGov poll, indicating that one in five UK respondents believe that vaccines have harmful effects that are not fully disclosed (YouGov, 2019).

Following presentation of the article, the first dependent variable was measured using the Belief in Anti-vaccine Conspiracy Theories Scale, adapted from Jolley and Douglas (2014a; 2017) as used in Studies 4 and 5, and the second dependent variable, participants’ intentions to vaccinate, was then asked using the same scenario used in Study 5 (Betsch & Sachse, 2013; Betsch et al., 2013; Jolley & Douglas, 2014a; Jolley & Douglas, 2017). Once the study was completed, participants were debriefed and thanked for their time. The debrief thoroughly informed participants that the information presented in the article was fictional and created only for research purposes and pointed them towards websites containing factual information about vaccines.

### ***6.5.2 Results and Discussion***

Descriptive statistics are presented in Table 14. Normality of data was first checked, the first dependent variable, participants’ belief in anti-vaccine conspiracy theories was positively skewed and the second dependent variable, participants’ intention to vaccinate was negatively skewed across conditions. Therefore, non-parametric tests were used in the analysis. The effects of demographic variables on belief in anti-vaccine conspiracy theories were first tested. In line with Study 5, there was no significant effect of gender (*z*(207) = -.58, *p* = .558), however, there was a significant relationship between participants’ age and belief in anti-vaccine conspiracy theories, *F*(1, 206) = .5.11, *p* = .025, *R2* = .024, such that older participants had a heightened belief in conspiracies. Level of education also significantly negatively influenced belief in anti-vaccine conspiracy theories, *F*(1, 206) = 14.27, *p* < .001, *R2* = -.07. Then, the effects of demographic variables on vaccination intentions were tested. Neither, participants’ gender (*z*(207) = -.41, *p* = .680), age (*F*(1, 206) = .65, *p* = .422, *R2* = .003), or their level of education (*F*(1, 206) = .12, *p* = .730, *R2* = .001), significantly influenced intentions to vaccinate.

**Table 14**

 Means, Standard Deviations and Cronbach’s Alpha of Key Variables (Study 6)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Variable* |  | *N* | *M* | *SD* | *α* |
| Belief in anti-vaccine conspiracy theories   | Condition 1 | 51 | 2.51 | 1.33 | .95 |
| Condition 2 | 53 | 2.23 | 1.05 |
| Condition 3 | 45 | 1.93 | 1.10 |
| Condition 4 | 58 | 2.72 | 1.51 |
| Intention to vaccinate   | Condition 1 | 51 | 6.16 | 1.36 |
| Condition 2 | 53 | 6.55 | 0.85 |
| Condition 3 | 45 | 6.47 | 1.06 |
| Condition 4 | 58 | 6.07 | 1.17 |
| Self- Attributed Need for Uniqueness  |  | 207 | 2.29 | .81 | .87 |
| Social identification with other parents |  | 207 | 3.58 | 1.48 | - |
| Social identification with non-parents  |  | 207 | 3.38 | 1.55 | - |

A paired samples t-test was conducted to compare the level of social identification with parents and the level of social identification with non-parents, *t*(206) = 1.77, *p* = .078, *d* = 0.13. There was only a marginal difference between participants’ identification with parents and non-parents. When the participants in the sample who were not yet parents were removed (*n* = 9) (those who were currently expecting), participants identified with other parents (*M* = 3.51, *SD* = 1.47) significantly more than they identified with non-parents (*M* = 3.28, *SD* = 1.53), *t*(194) = 2.15, *p* = .033, *d* = .16.

A Kruskal-Wallis Test was conducted to test the first hypothesis that participants who are given counterarguments embedded with social norm messages from other parents (Condition 1) will have a reduced belief in anti-vaccine conspiracy theories compared to participants in the other conditions. In the same way as Study 5, belief in anti-vaccine conspiracy theories was entered as the dependent variable and the experimental conditions were entered as the independent variable. The analysis indicated that there was a main effect of experimental condition *χ2*(3) = 9.51, *p* = .023*.* Pairwise comparisons found a significant difference in anti-vaccine conspiracy beliefs between participants in Condition 3 (*M* = 1.93, *SD* = 1.01), who were given counterarguments alone without social norm messages, and participants in Conditions 1 (*M* = 2.51, *SD* = 1.33, *p* = .015), who were given counter-arguments with social norm messages from other parents and participants in Condition 4 (*M* = 2.72, *SD* = 1.51, *p* = .004), who were not given counterarguments. This was contradictory to our hypothesis, which predicted that embedding social norm messages from a meaningful in-group (other parents) would strengthen the counterarguments, rather than weaken them.

A Kruskal-Wallis test was then conducted to test the hypothesis that participants in Condition 1 who were exposed to counterarguments with social norm messages from other parents embedded will have an increased intention to vaccinate compared to participants in the other conditions. Intention to vaccinate was entered as the dependent variable and the experimental condition was entered as the independent variable. There was a main effect of experimental condition on participants’ intention to vaccinate, *χ2*(3) = 8.91, *p* = .031. Pairwise comparisons indicated that those who received counterarguments to the anti-vaccine conspiracy theories with social norm messages from non-parents (Condition 2, *M* = 6.55, *SD* = 0.85, *p* = .011) and counterarguments without social norms messages (Condition 3, *M* = 6.47, *SD* = 1.06, *p* = .022) had an increased intention to vaccinate compared to participants who received no intervention (Condition 4, *M* = .6.07, *SD* = 1.17). Again, this was contradictory to the hypothesis, which predicted that embedding social norm messages from a meaningful in-group (Condition 1) would be most effective in increasing vaccination intentions.

Next, we investigated whether the effect of the intervention was moderated by either (1) participants’ need for uniqueness or (2) their level of social identification with other parents. In the same way as Study 5, Model 2 from the PROCESS macro for SPSS (Hayes, 2017) was used, which allows for two moderators to be added. The independent variable was the experimental condition, and each condition was compared with Condition 1 (e.g. D1 = Condition 1 vs Condition 2, D2 = Condition 1 vs Condition 3, and D3 = Condition 1 vs Condition 4). The model was run twice, the first time with belief in anti-vaccine conspiracy theories as the dependent variable and the second time with intention to vaccinate as the dependent variable. However, for both dependent variables, participants’ need for uniqueness and level of social identification to other parents were not significant moderators. The effect of each condition on participants’ beliefs in anti-vaccine conspiracy theories or intentions to vaccinate was not dependent on participants’ need for uniqueness or the extent to which they identified with other parents (see Appendix K for full Tables 15 and 16).

Linear regression analysis was conducted to investigate the relationship between belief in anti-vaccine conspiracy theories (predictor variable) and vaccination intentions (outcome variable). This demonstrated that, regardless of experimental condition, belief in anti-vaccine conspiracy theories significantly negatively predicted vaccination intentions, *F*(1, 205) = 66.36, *R2* = .25, *p* < .001. This finding is aligned with Study 5 and adds further weight to previous findings that belief in anti-vaccine conspiracy theories is related to reduced vaccination intentions (Hornsey et al., 2018; Jolley & Douglas, 2014).

In summary, Study 6 showed that after exposure to anti-vaccine conspiracy theories, counterarguments successfully reduced participants’ beliefs and increased vaccination intentions. This is different to the findings of Study 5 and Jolley and Douglas (2017), where counterarguments alone did not successfully reduce participants’ anti-vaccine conspiracy beliefs after participants had been exposed to an article that promotes them. A difference between this study and both the previous study and the study conducted by Jolley and Douglas (2017) is that participants in the current study were parents of children aged 4 years and below (or currently expecting). Participants of children aged 4 years and below were included in the study as it is these parents who will be making the majority of childhood vaccination decisions (NHS, 2019) and thus future interventions should be targeted to this group. The effect of the counterarguments alone on participants’ belief in anti-vaccine conspiracy theories and vaccination intentions is contrary to the hypothesis. It was predicted that counterarguments would significantly reduce participants’ beliefs in anti-vaccine conspiracy theories only when they were accompanied by social norm messages indicating that ‘other parents’ also rejected anti-vaccine conspiracy theories. One reason why the social norm messages were not effective in reducing parents’ belief in anti-vaccine conspiracy theories could be that the social norm messages in Condition 1 were not persuasive. The messages stated that 81% of parents completely rejected the anti-vaccine conspiracy theories and thought vaccines were completely safe. As this 81% figure is lower than current childhood vaccine uptake in the UK (NHS, 2019), and lower than what is required for herd immunity, parents may not have considered this a strong or persuasive majority within this context. This study does, however, contribute further weight to research demonstrating that belief in anti-vaccine conspiracy theories is an important factor associated with reduced vaccination intentions (Hornsey et al., 2018; Jolley & Douglas, 2014a).

## **6.6 General Discussion**

The current research suggests, firstly, that the perceived belief of other parents in anti-vaccine conspiracy theories significantly influences parents’ own beliefs in anti-vaccine conspiracy theories (Study 4). Secondly, experimental attempts to utilise the influence of the beliefs of other parents on personal anti-vaccine conspiracy beliefs to reduce personal anti-vaccine conspiracy beliefs and increase vaccination intentions were not successful (Studies 5 and 6). Finally, the use of counterarguments to these conspiracy theories can reduce belief in them in parents of young children (Study 6). After exposure to anti-vaccine conspiracy theories, which previous research had shown to arouse conspiracy beliefs and reduce vaccination intentions (Jolley & Douglas, 2014a; 2017), neither counterarguments from an in-group source, nor counterarguments with in-group social norm messages embedded, proved to be a successful tool to address these beliefs and increase vaccination intentions compared with participants who received no intervention. This suggests that, in agreement with previous findings, once conspiracy theories are part of someone’s belief system, attempts to intervene are limited. These results also add further leverage to the problematic consequences of conspiracy beliefs; in both Study 5 and Study 6, belief in anti-vaccine conspiracy theories significantly negatively predicted vaccination intentions. This, therefore, suggests that combating the potentially negative consequences of beliefs in anti-vaccine conspiracy theories is a crucial endeavour that may be achieved if people who are currently making childhood vaccination decisions (parents of young children) are exposed to accurate scientific information or, if misperceptions of the belief of other parents in anti-vaccine conspiracy theories (Study 4) could be utilised in a more targeted way.

Study 4 replicated and extended previous research examining the role of the perceived in-group conspiracy beliefs in personal beliefs (see Chapter 4). Uniquely, Study 4 demonstrated that the perceived belief of other parents in anti-vaccine conspiracy theories significantly positively predicted parents’ own personal conspiracy beliefs. This relationship was moderated by the extent to which participants identify with other parents, and participants’ need to feel unique; both heightened identification and need to feel unique strengthened this relationship. However, the relationship was still significant for participants with a lower level of identification to other parents and a lower need to feel unique. Moreover, this study is the first to our knowledge to show that parents think that other parents have a higher belief in anti-vaccine conspiracy theories than themselves, demonstrating a self-other discrepancy. This is important as Study 4 demonstrates that parents can think anti-vaccine conspiracy beliefs are more commonplace than they actually are amongst other parents, and the perception that other parents have a heightened belief in anti-vaccine conspiracy theories is positively associated with their personal conspiracy beliefs.

Previous research (Study 3, see Chapter 5) experimentally manipulated the perceived anti-vaccine conspiracy beliefs of participants’ national in-group to attempt to influence participants’ personal belief in them. However, anti-vaccine conspiracy theories manipulated to be normative of the national in-group did not influence personal belief in them. However, a limitation of Study 3 was the lack of contextual fit between the topic of the conspiracy theory and the in-group (national in-group) (Reid & Hung Ng, 2000; Oakes, 1987; Simon & Hastedt, 1999). For social group memberships to impact personal beliefs and behaviours, people must see the social categorisation as directly relevant and meaningful to themselves and/or their context (McGarty et al., 1994; Oakes, 1987). Thus, Study 4 addressed the limitation of previous studies and demonstrated that an in-group more meaningful to the context of anti-vaccine conspiracy theories (other parents) was a stronger predictor of personal belief and thus has the potential to be used in future interventions aiming to reduce anti-vaccine conspiracy belief of parents.

Next, Study 5 attempted to utilize the findings from Study 4 to address conspiracy beliefs. In Study 5, participants were exposed to an article supporting anti-vaccine conspiracy theories, and were then given counterarguments to these theories, where the source of the anti-conspiracy counterarguments was manipulated. It was hypothesised that receiving counterarguments from a meaningful in-group would reduce participants’ anti-vaccine conspiracy beliefs and increase vaccination intentions, compared to the other conditions. However, Study 5 found that anti-conspiracy counterarguments did not reduce anti-vaccine conspiracy beliefs or improve vaccination intentions (when compared to the conspiracy only condition) even when these counterarguments were attributed to the in-group source (other parents). Thus, even when counterarguments were said to be from a meaningful in-group, they did not influence participants’ vaccination attitudes compared to receiving no counterarguments at all. However, there were limitations of this study. When participants were given the counterarguments, they were said to have been a response from *other parents* to the anti-vaccine conspiracy theories, which may not have indicated to participants that *the majority of* other parents reject anti-vaccine conspiracy theories. Thus, this condition may not have altered participants’ perceptions of what parents, in general, think about conspiracy theories and thus was not a strong enough manipulation to influence their beliefs, and in turn their behaviour intentions. For example, research has shown that when people are given persuasive messages where the source of the messages was salient, people are more likely to reject out-group messages rather than accept in-group messages, (McGarty et al., 1994). This suggests that merely informing people that a message is from an in-group is not strong enough to impact personal beliefs.

To address this, Study 6 used the same design as Study 5, however the manipulation was adjusted, such that the counterarguments included social norm messages. Social norm messages are messages suggesting that *the majority of* people adhere to a certain behaviour (Bewick et al., 2010; Perkins, 2002), and in this case that the majority of other parents reject anti-vaccine conspiracy theories and think that childhood vaccinations are completely safe. There was another adjustment in Study 6; participants were specifically parents of young children (aged four years and below). Contrary to the hypothesis, Study 6 showed that participants who were given the counterarguments alone (without social norm messages) had a reduced belief in anti-vaccine conspiracy theories and increased vaccination intentions compared to participants who were also exposed to the anti-vaccine conspiracy theory but without an intervention following. Firstly, this provides, to our knowledge, the first empirical evidence of the success of a technique to reduce belief in anti-vaccine conspiracy theories after participants have been exposed to them. This indicates that when considering interventions to reduce anti-vaccine conspiracy beliefs in parents of young children, there is scope to use counterarguments.

Interestingly, this Chapter shows that counterarguments reduced belief in anti-vaccine conspiracy theories and increased vaccination intentions in Study 6 but not in Study 5. A possible explanation for this lies in the sample differences between these two studies. All participants in Study 6 were parents of children aged 4 years or younger, whereas in Study 5, participants were all parents, but the ages of their children were not specified. Therefore, parents of young children could be more susceptible to counterarguments as they are currently seeking information about vaccines (Ashfield & Donelle, 2020) or haven’t already made their vaccination decisions. Supporting this explanation, previous research from Jolley and Douglas (2017) also found that anti-conspiracy counterarguments delivered after exposure to anti-vaccine conspiracy theories did not reduce belief in anti-vaccine conspiracy theories or increase vaccination intentions compared to a control condition and Jolley and Douglas’s sample also included parents generally rather than parents specifically of young children.

As mentioned earlier, there are limitations to Study 6, which could explain why the inclusion of social norm messages within the counterarguments were ineffective in reducing anti-vaccine conspiracy beliefs and increasing vaccination intentions. The social norm message from the in-group indicated that “a recent representative poll of other parents showed that an overwhelming majority of 81% believed that vaccines are completely safe.” Although vaccine hesitancy is apparent in the UK, particularly for the Measles, Mumps, and Rubella Virus Vaccine Live (MMR2), where coverage in the UK is down to 86.8%, which is much below the target of 95% (NHS, 2020), the large majority of children are vaccinated. Thus, where in several contexts “81%” would constitute a large majority (Cialdini et al., 1991), within this context this majority may not have been larger or as large as participants previously believed rejected anti-vaccine conspiracy theories. Therefore, this may not have been an example of a strong social norm message in this context (i.e. vaccination intentions), and could have drawn participants attention instead to perhaps 19% of parents endorsing anti-vaccine conspiracy theories.

Another limitation of Study 6 is the between groups design. In this design, all participants were exposed to the same conspiracy theory and then randomly assigned to the four experimental groups, each receiving a different intervention or no intervention (control). Thus, a limitation to this is the absence of a baseline assessment of anti-vaccine conspiracy belief and vaccination intentions prior to exposure to the intervention. As a result, it is unclear whether there were existing differences between groups in anti-vaccine conspiracy beliefs and/or vaccination intentions before participants were given the intervention. Thus, it cannot be ruled out whether or not the experimental conditions influenced conspiracy beliefs and vaccination intentions from pre to post intervention and such findings need to be interpreted with caution. Therefore, future research should employ within group measures. It is also worth mentioning that the level of anti-vaccine conspiracy belief, particularly in Study 6, for participants in the control condition (and thus received no intervention) was much lower (*M* = 2.72) than has been found in previous research (e.g. Jolley & Douglas, 2017, *M* = 4.11). One potential reason for this could be due to when data was collected for Study 6, as this was during the time of the 2020 COVID-19 pandemic. Thus, participants may have had different attitudes towards vaccinations during this time, given the extensive news coverage of COVID-19 vaccine development.

Given the infancy and mixed findings of the use of counterarguments to address anti-vaccine conspiracy beliefs, this finding that counterarguments can reduce anti-vaccine conspiracy beliefs and increase vaccination intentions of parents of young children should be further explored in future research. Firstly, future research should employ within groups experimental designs to assess the use of counterarguments to anti-vaccine conspiracy beliefs as an intervention tool to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions with parents of young children. This type of intervention could be successful when specifically targeted at the group currently making vaccination decisions and could provide a simple, cost-effective intervention. Furthermore, future research could also assess the credibility of the counterarguments used, to decipher which norm messages are considered credible and persuasive. However, other avenues should also continue to be explored. Study 4 demonstrated a strong association between the perceived belief of other parents in personal anti-vaccine conspiracy beliefs and demonstrated that parents think that other parents endorse these attitudes more than they do. Although attempts to experimentally manipulate the perceived belief of other parents in anti-vaccine conspiracy beliefs have not successfully influenced participants’ beliefs and behaviour in these studies, it should not be overlooked that the two key criteria of the Social Norms Approach (SNA) have been met (Dempsey et al., 2018). Pointedly, misperceptions of other parents’ beliefs in anti-vaccine conspiracy theories could have important implications for personal belief.

The SNA postulates that people are influenced by the beliefs and behaviours of others and often make misperceptions about how much others engage in certain behaviours, which influences personal engagement in that behaviour (Perkins & Berkowitz, 1986). Interventions based on the SNA aim to reduce negative and promote more positive behaviours by challenging and correcting these misperceptions. Specifically, if people have a false perception of anti-vaccine conspiracy belief amongst other parents, they will be influenced by their perception of the norm, as people are driven to match what they perceive to be normative (e.g. Festinger, 1994). Thus, participants perceiving uncertainty in vaccination attitudes of other parents (participants in Study 4 estimated anti-vaccine conspiracy belief of other parents to be M = 3.01 on a scale of 1-7), suggests that there is scope to correct this in a SNA based intervention. Thus, as Studies 5 and 6 demonstrated that giving participants (a) messages from the in-group, and (b) embedding social norm messages from the in-group was not an influential method to change belief and behaviour intentions, future research could investigate the use of a SNA intervention, a more tailored approach, as opposed to targeting all participants with the same social norms messages. Specifically, future research should *target* individuals’ misperceptions and provide participants with actual norms of anti-vaccine conspiracy beliefs and vaccination intentions as a new route to address the consequences of these beliefs.

## **6.7 Conclusion**

The current research demonstrates that the perceived belief of other parents in anti-vaccine conspiracy beliefs is strongly related to participants’ actual conspiracy beliefs, however, two different strategies of manipulating the perceived belief of other parents in anti-vaccine conspiracy theories did not affect personal anti-vaccine conspiracy belief or vaccination intentions. However, counterarguments given to participants after they were exposed to anti-vaccine conspiracy theories, contrary to predictions, did reduce personal belief in anti-vaccine conspiracy theories and increase vaccination intentions of parents with children aged 4 years and younger. This is important as this is, to our knowledge, the first empirical evidence that counterarguments can influence anti-vaccine conspiracy beliefs of parents of young children- who are key to making vaccination decisions. These studies also illuminated the potential to use a more tailored, SNA based intervention to address anti-vaccine conspiracy beliefs amongst parents in the future. Finally, these studies bolstered the assertion that anti-vaccine conspiracy beliefs are a factor in reducing vaccination intentions. Thus, future research should focus on exploring counterarguments and tailored, SNA based approaches as avenues which have the potential to address anti-vaccine conspiracy beliefs.

# **Chapter 7: A Social Norms Approach Intervention to Address Misperceptions of Anti-Vaccine Conspiracy Beliefs Amongst UK Parents**

The research outlined in this Chapter is published in the following paper:

Cookson, D., Jolley, D., Dempsey, R. C., & Povey, R. (under review). A Social Norms Approach intervention to address misperceptions of anti-vaccine conspiracy beliefs amongst UK parents. PloS one, 16(11), e0258985.

## **7.1 Abstract**

Anti-vaccine conspiracy beliefs among parents can reduce vaccination intentions (see Studies 5 and 6). Parents’ beliefs in anti-vaccine conspiracy theories are also related to their perceptions of other parents’ conspiracy beliefs (see Study 4). Chapter 6 also demonstrated that parents hold misperceptions of anti-vaccine conspiracy belief norms: UK parents over-estimate the anti-vaccine conspiracy beliefs of other parents. The present study tested the effectiveness of a Social Norms Approach intervention, which corrects misperceptions using normative feedback, to reduce UK parents’ anti-vaccine conspiracy beliefs and increase vaccination intentions. At baseline, 202 UK parents of young children reported their personal belief in anti-vaccine conspiracy theories, future intentions to vaccinate, and their perceptions of other UK parents’ beliefs and intentions. Participants were then randomly assigned to a normative feedback condition (*n* = 89) or an assessment-only control condition (*n* = 113). The normative feedback compared participants’ personal anti-vaccine conspiracy beliefs and perceptions of other UK parents’ beliefs with *actual* normative belief levels. Parents receiving the normative feedback showed significantly reduced personal belief in anti-vaccine conspiracy beliefs at immediate post-test. As hypothesised, changes in normative perceptions of anti-vaccine conspiracy beliefs mediated the effect of the intervention. The intervention, however, did not directly increase vaccination intentions at immediate post-test, however mediation analysis showed that the normative feedback increased perceptions of other parents’ vaccination intentions, which in turn increased personal vaccination intentions. No significant effects remained after a six-week follow-up. The current research demonstrates the potential utility of Social Norms Approach interventions for correcting misperceptions and reducing anti-vaccine conspiracy beliefs among UK parents. Further research could explore utilising a top-up intervention to maintain the efficacy.

## **7.2 Introduction**

Social norms are informal, unwritten expectations about appropriate social behaviour, outlining what is acceptable and not in particular contexts, and are important determinants of attitudes and behaviours (Cialdini & Trost, 1998; Sherif, 1936). Two types of social norms are commonly implicated in health behaviours: injunctive norms, which refer to one’s perception of what others approve or disapprove of and descriptive norms, which refer to one’s perception of how prevalent an attitude or behaviour is (Cialdini et al., 1990). Perceived social norms are an important predictor of health behaviours (Reid et al., 2010). Specifically, perceived norms of anti-vaccine conspiracy beliefs predict personal belief in anti-vaccine conspiracy theories among parents (see Chapter 6). Anti-vaccine conspiracy beliefs among parents can reduce intentions to vaccinate, which is problematic as UK childhood vaccination rates are below target (Public Health England, 2020). Social Norms Approach (SNA) interventions have been successfully used to improve health attitudes and behaviours by challenging commonly held misperceptions or misestimates of actual norms (Dempsey et al., 2018). Thus, the current study aims to utilise the SNA intervention to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions among UK parents.

The Social Norms Approach (SNA) begins with the premise that individuals are influenced by the beliefs and behaviours of others and often make misperceptions about how much others engage in certain behaviours (Dempsey et al., 2018; McAlaney et al., 2011). For example, people tend to over-estimate how much others engage in negative health behaviours, such as drinking alcohol (e.g Borsari & Carey, 2001), smoking tobacco (e.g. Brown et al., 2010; Pischke et al., 2015), and unhealthy snacking (Calvert et al., 2021). As social norms can provide an expectation about appropriate social behaviour (Cialdini & Trost, 1998; Sherif, 1936), individuals may be driven to match what they perceive to be the social norm (Festinger, 1954). An important consequence of such social norm misperceptions is the potential engagement in unhealthy behaviours due to a false belief that such behaviours are commonplace amongst peers (McAlaney et al., 2011; Perkins, 2002). The SNA works by challenging these misperceptions of the belief and behaviours of others, reducing the perceived social pressure to engage in a problem behaviour, to promote healthier personal behaviours (Dempsey et al., 2018). SNA interventions are often delivered online using computerised normative feedback to explicitly compare (a) personal beliefs and behaviours to (b) the perceived norms of peers and to (c) the actual norms of a certain belief or behaviour. Therefore, this feedback explicitly demonstrates existing misperceptions in people’s perceptions of peer norms and highlights their norm deviant behaviours (Dempsey et al., 2018). For example, normative feedback has often been used to reduce college student drinking (LaBrie et al., 2013), where correcting misperceptions has been shown to reduce perceived drinking norms and, in turn, reduce personal drinking. The SNA is also gaining traction in other areas, for example, increasing sun-protective behaviours (Reid & Aiken, 2013), increasing cancer screening intentions (von Wagner et al., 2019), and reducing problematic gambling (Grande-Gosende et al., 2020; Clayton Neighbors et al., 2015). The objective of the present study is to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions using an SNA intervention.

Conspiracy theories are alternative explanations for events that implicate secretive and powerful groups in covering up information to suit their interests (Douglas et al., 2017). Examples of conspiracy theories include the idea that climate change is a hoax (Jolley & Douglas, 2014b; van der Linden, 2015), COVID-19 is caused by electromagnetic waves transmitted by 5G technology (Jolley & Paterson, 2020), and that vaccines are dangerous, but this is covered up to maintain profits (Jolley & Douglas, 2014a). Belief in conspiracy theories can have potentially detrimental health consequences (Jolley et al., 2020). Of central interest to this research is that exposure to anti-vaccine conspiracy theories directly increases belief in them, which reduces intentions to vaccinate (Hornsey et al., 2018; Jolley & Douglas, 2014a). Specifically, Hornsey and colleagues (2018) found that anti-vaccination attitudes were highest among those who were higher in conspiratorial thinking, and Jolley and Douglas (2014a) showed that belief in anti-vaccine conspiracy theories was a causal factor in reduced vaccination intentions.

Vaccine hesitancy is defined by the World Health Organisation (WHO) as “the reluctance or refusal to vaccinate despite the availability of vaccines” and reduces vaccination intentions and uptake (e.g. On et al., 2020). The WHO listed vaccine hesitancy as a top ten threat to global health in 2019 (WHO, 2019a), and in the UK specifically, childhood vaccination rates have been steadily decreasing since 2013, with a slight increase from 2019-2020 (Public Health England, 2020). As a result, governments around the world have debated mandatory vaccinations, for example, Australia, France, and Italy have restricted school access for children who have not received their scheduled vaccinations (Drew, 2019). Highlighting the current urgency to address the challenges of vaccination access and uptake globally, The World Health Assembly has endorsed a new global Immunization Agenda 2030 (IA2030), aiming to maximise the potential of vaccines worldwide (WHO, 2019b). Since vaccines have been used in the UK, several childhood diseases which could be fatal (e.g. smallpox and polio) have been eradicated (NHS, 2019). However, some diseases, like measles and mumps are starting to appear again, where in the UK cases have almost doubled in recent years (NHS, 2019). Measles outbreaks continue to occur in Europe, resultant of suboptimal vaccine uptake (Dubé et al., 2014; Muscat, 2011). For example, a large measles outbreak in South Wales in 2012/2013 was attributed to low uptake of the measles-mumps-rubella (MMR) vaccine, where belief in conspiracy theories around that specific vaccine was reported by parents as an influence on their decision (Walsh et al., 2015). Considering the ongoing COVID-19 pandemic, where at least seven COVID-19 vaccines are being rolled out across the world (Acquah, 2021), it is imperative to understand how to increase vaccination intentions to promote their uptake (Williams et al., 2020). Research is already showing that anti-vaccine conspiracy beliefs are associated with the rejection of COVID-19 vaccines (e.g. Ruiz & Bell, 2020).

Previous research into interventions to increase vaccination intentions has been inconsistent (Sadaf et al., 2013). For example, two systematic reviews of interventional studies, aiming to address parental vaccine hesitancy and refusal, could not identify a specific form of interventional approach to reduce parental vaccine hesitancy and refusal (Dubé et al., 2015; Sadaf et al., 2013). Although research has consistently linked anti-vaccine conspiracy ideation with vaccine hesitancy (Hornsey et al., 2018; Jolley & Douglas, 2014a; Tomljenovic et al., 2020), little research has focussed on addressing these beliefs as a mechanism of increasing vaccination intentions. Jolley and Douglas (2017) employed an inoculation technique and demonstrated that exposure to anti-conspiracy arguments before exposure to anti-vaccine conspiracy theories could reduce belief. However, this intervention was not successful when the anti-conspiracy arguments were presented after the anti-vaccine conspiracy theories. Whilst inoculation approaches could be useful for reducing anti-vaccine beliefs, counterarguments may not be effective when conspiracy beliefs are already established. Therefore, there is a need to develop and test novel interventions to address anti-vaccine conspiracy beliefs and increase vaccination intentions in parents.

The current study aims to test the utility of a brief online normative feedback SNA intervention to reduce anti-vaccine conspiracy theories and increase vaccination intentions among UK parents of young children. Chapter 6 found that UK parents’ anti-vaccine conspiracy beliefs are strongly associated with perceived norms of other parents’ anti-vaccine conspiracy beliefs and that UK parents over-estimated the extent that other parents endorsed these conspiracy theories. Therefore, an SNA intervention using normative feedback to correct these misperceptions could reduce anti-vaccine conspiracy beliefs and, consequently, increase vaccination intentions. Previous research has used different lengths of time for a follow-up to the intervention to measure maintained efficacy, and while four weeks had been considered short (Reid & Aiken, 2013), the computer-delivered normative feedback employed in the current research is brief and as such, a six-week follow-up will be used. The current study randomly allocated participants to either the SNA condition, which uses normative feedback to correct misperceptions of anti-vaccine conspiracy beliefs and vaccination intentions, or to an assessment only control condition. The key hypotheses are that: 1) participants in the intervention condition will have a reduced belief in anti-vaccine conspiracy theories from baseline to immediate post-test and at the six-week follow-up, compared to the control condition; 2) participants in the intervention condition will have an increased intention to vaccinate from baseline, to immediate post-test and six-week follow up, compared to the control condition; 3) The effect of the intervention on belief in anti-vaccine conspiracy theories will be mediated by a change in perceived norms of other parents’ anti-vaccine conspiracy beliefs, and 4) The effect of the intervention on vaccination intentions will be mediated by the change in the perceived norms of other parents’ vaccination intentions (see Appendix L for Supplementary Materials, Hypothesis 5) .

This study was pre-registered (<https://osf.io/cdp53/?view_only=7f3686cb5d454e5c924ac21033e374b5>), and the materials and anonymous data can be accessed here: <https://osf.io/rhb5p/?view_only=c3080c4aaf154a719689a2ca56e98af1>

## **7.3 Method**

**7.3.1 Participants.** Figure 1 depicts the number of participants at each stage of the study. There have been no previous studies using an SNA based intervention to reduce belief in anti-vaccine conspiracy theories or to increase vaccination intentions, therefore, there were no clear expectations of effect size. Other studies using SNA interventions to improve health behaviours tend to find small to medium effect sizes (e.g. Reid & Aiken, 2013), and a previous intervention aiming to increase vaccination intentions using anti-conspiracy counterarguments found a medium effect size (Jolley & Douglas, 2017). For the main mixed factorial ANOVA analysis, a power analysis using GPower (Faul et al., 2007) was conducted and showed that to detect a small-medium effect using Cohen’s d (d = .35), a sample of 174 participants would be required for 80% power. Similarly, a sample size of at least 148 participants is recommended for mediation analysis expecting a small-medium effect (Fritz & MacKinnon, 2007). Therefore, anticipating incomplete data and potential drop-out, 257 participants were recruited using Prolific, an online recruitment platform where volunteers can register for studies in return for small monetary rewards.

Screening criteria were applied via *Prolific* to ensure that all participants were British and had a high approval rating on the recruitment platform, meaning that they had a reputation for completing surveys satisfactorily. To ensure participants were suitable for the intervention’s focus on vaccines, screening criteria on Prolific were also used to ensure that participants had a child aged 4 years or younger and had previously stated when signing up to the platform that they did not ‘totally agree’ that scheduled vaccines were safe for children. Several incomplete responses were removed from the dataset (*n* = 55). The remaining participants (*N* = 202; 160 females, 41 males, 1 trans/other, *M* = 34.16 years, *SD* = 5.39) were included in the analysis; *n* = 89 in the experimental condition and *n* = 113 in the control condition.

**Figure 5**

*Flow-chart Showing the Number of Participants in Each Stage of the Study (Study 7)*

257 participants initially recruited using Prolific to complete study.

55 participants removed as their data was largely incomplete.

89 participants randomly allocated to the normative feedback condition and completed baseline and immediate post-test measures.

113 participants randomly allocation to the control condition and completed baseline and immediate post-test measures.

72 participants retained in the normative feedback condition for the follow-up measures.

17 participants lost after the six-week follow-up.

93 participants retained in the control condition for the follow-up measures.

20 participants lost after the six-week follow-up.

**7.3.2 Design.** The study employed a 2\*3 (intervention condition by time) mixed experimental design. After completing baseline measures, participants were randomly allocated, using the Qualtrics block randomiser, to the experimental condition, where they would receive SNA normative feedback, or the assessment only control condition. The measures were completed at three time points: baseline, immediately after the intervention (for the control condition, this was immediately after a 60-second delay), and then a six-week follow-up, where participants were contacted again via Prolific. There were four dependent variables measured at each of the three-time points: 1) personal beliefs in anti-vaccine conspiracy theories; 2) perceived belief of other parents in anti-vaccine conspiracy theories; 3) vaccination intentions; and 4) perceived vaccination intentions of other parents. Demographic variables including participants’ own gender, age, age of youngest child and education level were also measured.

**7.3.4 Materials and Procedure.** Ethical approval was obtained from the relevant university’s ethics panel. The study consisted of three phases, each completed online using Qualtrics, an online software tool used to build questionnaires and experiments. The first phase was baseline assessment, followed immediately by the intervention (or control) and immediate post-test measures (August 2020), and finally the six-week follow up (September 2020).

Once the study was accessed, participants were presented with an information page, followed by a consent form. First, participants were asked to complete the demographic questions followed by a one-item scale to measure their general belief in conspiracy theories (Lantian et al., 2016, see Appendix M). Then, baseline measurements of the dependent variables were then taken. Personal belief in anti-vaccine conspiracy theories was measured using the Belief in Anti-Vaccine Conspiracy Theories Scale, adapted from Jolley and Douglas and used in Chapters 5 and 6). There were 10 statements for participants to complete (e.g. “Misrepresentation of the efficacy of childhood vaccines is motivated by profit”, 1 = strongly disagree, 7 = strongly agree, α = .96). Participants completed this scale for a second time, where it was adapted to measure the perceived beliefs of the “*majority of other UK parents”* (α = .95). Participants’ intentions to vaccinate was then measured using a scenario used widely in previous research (Betsch et al., 2012; Betsch & Sachse, 2013; Jolley & Douglas, 2014a, 2017). In this scenario, participants are asked to imagine that they were the parent of an infant named Sophie, aged 8 months, and that their doctor had provided them with information regarding the (fictitious) disease ‘dysomeria’, which may lead to serious consequences with symptoms such as fever and vomiting. After reading the scenario, participants indicated their intention to have Sophie vaccinated (“If you had the opportunity to vaccinate your child (Sophie, aged 8 months) against ‘dysomeria’ next week, what would you decide”) on a scale of 1-7 (1 = definitely not vaccinate to 7 = definitely vaccinate). Then participants were asked this question again, but to answer with their perception of how other British parents would respond.

Participants were then randomly allocated to the SNA normative feedback condition or to the assessment only control condition. Participants in the normative feedback condition received a page of feedback (see Appendix N) which included personal feedback comparing (a) their belief in anti-vaccine conspiracy theories; (b) their estimation of how much other UK parents believed in them; and (c) the *actual* belief of other parents in anti-vaccine conspiracy theories. The ‘actual’ belief of UK parents in anti-vaccine conspiracy theories was taken as an average from previous research conducted by the authors into UK parents’ belief in anti-vaccine conspiracy theories (Chapter 6). In line with the Social Norms Approach (e.g. Dempsey et al., 2018), these three norms could be compared to demonstrate that misperceptions of the beliefs and behaviours of others are common and that belief in anti-vaccine conspiracy theories is very low amongst other UK parents. The feedback also indicated that “The development of vaccines is one of the most important advances in the history of medicine” and that “The overwhelming majority of UK parents choose to vaccinate their children”. Participants were presented with this page for 60 seconds before they could proceed to the post-intervention assessment. Participants who were allocated to the control condition did not receive any feedback. Instead, they were instructed to click through some waiting screens for the same amount of time (60 seconds) before moving on to the post-intervention assessment.

Immediately after the intervention, all the dependent variables were measured again; the Belief in Anti-Vaccine Conspiracy Theories Scale (Jolley & Douglas, 2014a) from participants own point of view (Time 2 *α* = .97), and from the perspective of other UK parents (Time 2 *α* = .97), and the intention to vaccinate from their own point of view, and from the perspective of other UK parents’ intentions (Betsch & Sachse, 2013). Participants were then invited to complete a follow-up questionnaire after six weeks, given a shortened debrief, and thanked for their time.

At the six-week follow up, all four dependent variables were measured again, Belief in Anti-Vaccine Conspiracy Theories Scale (Jolley & Douglas, 2014a) from participants own point of view (Time 3 α = .96), and from the perspective of other UK parents (Time 3 α = .96), and the intention to vaccinate from their own point of view, and from the perspective of other UK parents’ intentions (Betsch & Sachse, 2013). Once these measures were completed, participants were thanked for their time and fully debriefed.

## **7.4 Results**

#### **7.4.1 Baseline Equivalence of Conditions.**

Baseline equivalence was measured using independent samples t-tests or chi-square models to ensure that the normative feedback condition and control condition were matched across key variables. Table 17 highlights no significant differences across baseline variables between the normative feedback condition and the control condition. There were also no significant differences between conditions in gender of participants (*χ²* (2, *N* = 202) = 3.32, *p* = .191). The data were also checked for parametric assumptions. The perceived belief of other parents in anti-vaccine conspiracy theories was positively skewed; thus, this variable was transformed at each timepoint using the square root transformation. Participants’ intentions to vaccinate and their perceived intention of other parents to vaccinate were both negatively skewed, and as such, these variables were transformed using the square transformation at each timepoint. The transformations addressed the skew.

**Table 17**

*Means, Standard Deviations and Equivalence Tests Between the Normative Feedback and Control Conditions of Baseline Measures.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Normative Feedback Condition | Control Condition |  |
|  | *Mean (SD)* | *Mean (SD)* | *t (df)* |
| Age | 33.91 (5.97) | 34.35 (4.91) | -.57 (169.13) |
| Age of youngest child | 2.46 (1.32) | 2.24 (1.36) | 1.13 (200) |
| Education level | 5.43 (1.06) | 5.39 (1.08) | .25 (190.32) |
| General belief in conspiracy theories | 3.87 (1.02)  | 3.81 (1.16) | .38 (200) |
| Baseline belief in anti-vaccine conspiracy theories | 2.85 (1.40) | 2.72 (1.36) | .67 (200) |
| Baseline perceived belief of other parents  | 3.23 (1.15)  | 3.16 (1.29) | .42 (200) |
| Baseline intentions to vaccinate | 5.83 (1.42) | 5.87 (1.36) | -.18 (200) |
| Baseline perceived intentions of other parents | 5.49 (1.11) | 5.43 (1.19) | .37 (200) |

#### **7.4.2 Baseline Support for SNA**

We first conducted regression analysis among variables at baseline to provide additional justification for an SNA-based intervention. This analysis largely replicated the findings of Study 4 (see Chapter 6). Consistent with the rationale, perceived norms of other UK parents’ belief in anti-vaccine conspiracy theories significantly positively predicted personal anti-vaccine conspiracy belief, *F*(4, 197) = 23.67, *R²* =  .32, *p* < .001. Similarly, a paired samples t-test, comparing participants’ anti-vaccine conspiracy beliefs and their perceptions of other parents’ beliefs, showed that participants significantly over-estimated the conspiratorial beliefs of others, *t*(201) = -4.56, *p* < .001, *d* = 0.32. The same pattern of results was found with participants’ intentions to vaccinate. At baseline, perceived norms of vaccination intentions of other UK parents significantly positively predicted personal vaccination intentions of UK parents *F*(2, 199) = 21.02, *R²* =  .17, *p* < .001. A paired samples t-test, comparing participants’ vaccination intentions and their perceptions of other parents’ intentions, demonstrated that participants significantly under-estimated the vaccination intentions of other UK parents, *t*(201) = 5.14, *p* < .001, *d* = 0.31. Thus, baseline analysis confirmed that anti-vaccine conspiracy beliefs and vaccination intentions meet the key criteria for an SNA based intervention (misperceptions of social norms and misperceptions being predictive of personal behaviours/intentions; e.g. Dempsey et al., 2018).

#### **7.4.3 Attrition**

A total of 165 from the 202 participants who agreed to be contacted completed the follow up questionnaire six weeks later (18% drop-out rate; normative feedback condition: *N* = 72, control condition: *N* = 93). Rates of attrition did not differ between conditions at follow-up, *χ²(*1, *N* = 202) = .07, *p* = .798. There were no differences in gender, *χ²(*2, *N* = 202) = .29, *p* = .866; age, *z*(2930.5) = -.38, *p* = .704; education level, *z*(3001) = -.17, *p* = .867; general conspiracy beliefs, *z*(3018.5) = -.11, *p* = .915; baseline beliefs in anti-vaccine conspiracy theories, *z*(2829) = -.70, *p* = .486; or baseline vaccination intentions, *z*(2848.5) = -.67, *p* = .503 between participants who completed the follow up measures and participants who did not. Thus, the following analyses were conducted with the 165 retained participants.

#### **7.4.4 Hypothesis 1: Impact of the Intervention on Personal Belief in Anti-Vaccine Conspiracy Theories**

Descriptive statistics are presented in Table 18. The impact of the intervention on personal beliefs in anti-vaccine conspiracy theories was investigated using a mixed factorial ANCOVA. Education level was entered as a covariate, as education level was related to personal beliefs in anti-vaccine conspiracy theories. Mauchly’s test of sphericity showed that the assumption of sphericity was violated (*p* < .001), therefore the Greenhouse Geisser correction was used. No main effects were significant (see Appendix O Table 19). There was a significant interaction between time and condition on belief in anti-vaccine conspiracy theories, indicating the effectiveness of the intervention, *F*(1.56, 253.27) = 4.73, *p* = .016, *ηp2*= .03. Pairwise comparisons showed no significant differences in anti-vaccine conspiracy belief across the three-time points in the control condition. However, in the normative feedback condition, anti-vaccine conspiracy beliefs significantly decreased from baseline (*M* = 2.81, *SD* = 1.41) to immediate post-test (*M* = 2.50, *SD* = 1.42) (*p* < .001). However, belief significantly increased again from immediate post-test to the six-week follow up (*M* = 2.79, *SD* = 1.27) (*p* = .020). There was no difference in belief in anti-vaccine conspiracy theories from baseline to the six-week follow up (p = 1).

**Table 18**

*Means and Standard Deviations of Each Dependent Variable for Each Condition Across the Three Time Points.*

|  |  |  |
| --- | --- | --- |
|  | Normative Feedback Condition | Control Condition |
|  | Baseline | Immediate post-test | Six-week follow-up | Baseline | Immediate post-test | Six-week follow-up |
|  | *Mean (SD)*  | *Mean (SD)* | *Mean (SD)* | *Mean (SD)* | *Mean (SD)* | *Mean (SD)* |
| Belief in anti-vaccine conspiracy theories | 2.81 (1.41) | 2.50 (1.42) | 2.79 (1.27) | 2.69 (1.32) | 2.71 (1.41) | 2.71 (1.42) |
| Perceived belief of other parents  | 3.19 (1.13) | 2.53 (1.23) | 2.97 (1.18) | 3.27 (1.29) | 3.14 (1.17) | 3.09 (1.22) |
| Intentions to vaccinate | 5.81 (1.51) | 5.87 (1.55) | 5.94 (1.35) | 5.96 (1.23) | 5.90 (1.29) | 6.03 (1.32) |
| Perceived intentions of other parents | 5.43 (1.16) | 5.78 (1.15) | 5.68 (1.09) | 5.42 (1.07) | 5.26 (1.23) | 5.60 (1.03) |

#### **7.4.5 Hypothesis 2: Impact of the Intervention on Personal Vaccination Intentions**

The impact of the intervention on personal vaccination intentions was then examined using a Mixed Factorial ANCOVA (Appendix O, Table 20). As in the previous analysis, education level was entered as a covariate. Mauchly’s test of sphericity was violated (*p* < .001) and the Greenhouse Geisser correction was used. The ANCOVA showed that there was no significant main effects (Appendices O, Table 20). There was also no significant interaction between time point and experimental condition, *F*(1.37, 222.57) = .55, *p* = .508. Therefore, there was no significant effect of the intervention on increasing vaccination intentions across the three time points. Overall, the SNA type intervention reduced UK parents’ belief in anti-vaccine conspiracy theories at immediate post-test but did not significantly increase vaccination intentions above the control condition.

#### **7.4.6 Hypothesis 3: The Mediating Role of Perceived Norm Change in the Impact of the SNA Intervention on Belief in Anti-Vaccine Conspiracy Theories.**

Mediation analysis was employed to examine the mechanism through which the normative feedback reduced belief in anti-vaccine conspiracy theories at immediate post-test. Specifically, this analysis tested the hypothesis that the change in perceived norms of other parents’ anti-vaccine conspiracy beliefs from baseline to immediate post-test mediates the influence of the SNA normative feedback on personal anti-vaccine conspiracy beliefs. The change in perceived norms of other parents’ anti-vaccine conspiracy beliefs variable was calculated by subtracting participants’ perceived beliefs after the intervention from their baseline perceptions. Therefore, a positive number indicates that perceptions of other parents’ beliefs in anti-vaccine conspiracy theories have decreased. The mediation analysis was conducted using Model 4 the PROCESS macro for SPSS, with 5000 bootstrapped samples (Hayes, 2017). Baseline belief in anti-vaccine conspiracy theories and perceived norms of anti-vaccine conspiracy theories were included in the model as covariates. The analysis supported the hypothesis (Figure 6). The normative feedback condition significantly reduced perceived norms of conspiracy belief at immediate post-test, *b* = -.58, *SE* = .14, *t*(161) = -4.22, *p* < .001, CI [-.85, -.31]. Similarly, a change in perceived conspiracy belief at immediate post-test significantly predicted personal anti-vaccine conspiracy beliefs immediately after the intervention, *b* = -.22, *SE* = .04, *t*(160) = -5.14, *p* < .001, CI [-.31, -.14]. The direct effect of the normative feedback intervention on personal belief in anti-vaccine conspiracy theories immediately post-test was also significant, *b* = .19, *SE* = .08, *t*(160) = 2.43, *p* = .02, CI [.04, .35], however, this effect is increased when the mediator (change in perceived norms) is included, *b* = .32, *SE* = .08, *t*(161) = 3.97, *p* < .001, CI [.16, .48], indicating mediation. Confirming this, the indirect effect, *b* = .13, *SE* = .05, 95% CI [.06, .25], shows that reducing the perceived norms of other parents’ beliefs in anti-vaccine conspiracy theories mediates the effect of the intervention on personal belief in anti-vaccine conspiracy theories.

**Figure 6**

*Model 4 Showing Partial Mediation of the Experimental Condition Reducing Anti-Vaccine Conspiracy Theories Through Reduced Perceived Norms of Anti-Vaccine Conspiracy Beliefs.*

Experimental condition

Change in perceived norms of anti-vaccine conspiracy beliefs at post-test

Personal belief in anti-vaccine conspiracy theories at post-test

 Path a

 -.58 (.14) \*\*

Path b

-.22 (.04) \*\*

Path c

.32 (.08) \*\*

Path c’

.19 (.08) \*

*Note.* \* = *p* < .05, \*\* = *p* < .001

#### **7.4.7 Hypothesis 4: The Mediating Role of Perceived Vaccination Intention Norm Change in the Impact of the SNA Intervention on Vaccination Intentions**

Mediation analysis was employed again to test the hypothesis that the change in perceived norms of other parents’ vaccination intentions from baseline to immediate post-test mediates the influence of the SNA normative feedback on personal vaccination intentions. The change in perceived vaccination intentions variable was calculated by subtracting participants’ perceived vaccination intentions of other parents at immediate post-test from their baseline perceptions. Therefore, a negative number indicates that perceptions of other parents’ vaccination intentions have increased. The mediation analysis was conducted using Model 4 the PROCESS macro for SPSS, with 5000 bootstrapped samples (Hayes, 2017). Baseline vaccination intentions and baseline perceived norms of vaccination intentions were included in the model as covariates. The analysis supported the hypothesis. The normative feedback condition significantly predicted a change in perceived norms of other parents’ vaccination intentions at immediate post-test, *b* = .55, *SE* = .14, *t*(161) = 4.02, *p* < .001, 95% CI [.28, .81]. Similarly, a change in perceived vaccination intention norms at immediate post-test predicted personal vaccination intentions immediately after the intervention, *b* = -2.02, *SE* = .48, *t*(160) = -4.23, *p* < .001, 95% CI [-2.97, -1.08]. However, neither the direct effect *b* = -.20, *SE* = .86, *t*(160) = -.23, *p* = .82, 95% CI [-1.91, 1.51 or the total effect *b* = -1.30, *SE* = .87, *t*(161) = -1.51, *p* = .13. 95% CI [-3.01, .41] of the normative feedback intervention on personal vaccination intentions immediately post-test were significant. The indirect effect of the normative feedback intervention on vaccination intentions was significant, b = -1.10, SE = .73, 95% CI [-2.84, -.02]. Meaning that the intervention increased perceived norms of vaccination intentions which in turn increased personal vaccination intentions.

**Figure 7**

*Model 4 Showing Indirect Only Mediation of the Experimental Condition on Personal Vaccination Intentions Through Increased Perceived Norms of Vaccination Intentions.*

Experimental condition

Change in perceived norms of vaccination intentions at post-test

Personal vaccination intentions at post-test

 Path a

 .55 (.14) \*\*

Path b

-2.02 (.48) \*\*

Path c

-1.30 (.87)

Path c’

-.20 (.86)

*Note.* \*\* = *p* < .001

## **7.5 Discussion**

The current research suggests that anti-vaccine conspiracy beliefs could be reduced via a brief normative feedback intervention based on the Social Norms Approach. Compared to an assessment only control, UK parents of young children who were exposed to the normative feedback intervention showed reduced belief in anti-vaccine conspiracy theories at immediate follow-up. Moreover, mediation analysis demonstrated the predicted mechanism; the intervention reduced perceived norms of anti-vaccine conspiracy beliefs, which in turn reduced personal beliefs. To our knowledge, our work is the first to showcase the possibility that normative feedback (as per the SNA) could be used as a technique to reduce anti-vaccine conspiracy beliefs. However, we also found that the effects of the intervention did not hold at the six-week follow-up, and there was no direct effect of the normative feedback on vaccination intentions. Mediation analysis however showed an indirect effect of the intervention on vaccination intentions; whereby the intervention increased perceptions of other parents’ vaccination intentions, which in turn increased personal vaccination intentions. Thus, further research exploring whether a top-up intervention could effectively maintain efficacy is warranted.

Our research has replicated and extended the work by Cookson et al., (see Chapter 6). Specifically, we found that personal belief in anti-vaccine conspiracy theories was positively predicted by perceived norms of other parents’ belief in anti-vaccine conspiracy beliefs participants overestimated the extent to which other parents endorsed them. Building on the findings from Study 4, this study also demonstrated a similar pattern for vaccination intentions. Personal vaccination intentions were positively predicted by the perceived intentions of other UK parents, and participants under-estimated the vaccination intentions of other parents. Our present work consolidates the reasoning that both anti-vaccine conspiracy beliefs and vaccination intentions can be amendable via a SNA type intervention that challenges and reduces these misperceptions.

Furthermore, our findings showcased that the normative feedback intervention was successful in reducing anti-vaccine conspiracy beliefs at immediate post-test (partially supporting Hypothesis 1). Participants who received normative feedback had a decreased belief in anti-vaccine conspiracy theories at the post-test measure. Our finding is important as this is the first time to our knowledge that a novel SNA type intervention has been used to reduce anti-vaccine conspiracy beliefs. Given the potential dangers of anti-vaccine conspiracy beliefs for health-protective behaviours (e.g. vaccine uptake), an intervention to address conspiracy beliefs has been long-awaited. However, the decrease in personal belief in anti-vaccine conspiracy theories did not hold for the six-week follow-up. At the six-week follow-up, participants’ conspiracy beliefs increased back to where they were at baseline. Previous research has used different lengths of time for a follow-up, and while four weeks had been considered short (Reid & Aiken, 2013), as the SNA intervention tested here was brief, it was unlikely to remain effective for longer. A recent systematic review and meta-analysis of the efficacy of personalised normative feedback interventions used to tackle hazardous alcohol use, problem gambling, illicit drug and tobacco use (Saxton et al., 2021) showed that these types of interventions generally showed a weakening in effectiveness over time. These weakening effects were attributed to the brevity of the type of intervention (Saxton et al., 2021). Thus, future research could investigate firstly, how long the effects of the intervention on reducing anti-vaccine conspiracy beliefs can hold, and secondly, whether a top-up intervention could be utilised to maintain changes in outcomes. For example, Neighbors et al., (2010) concluded that a personalised normative feedback intervention to reduce drinking in heavy drinking college students was more successful when administered biannually as opposed to annually. A key strength of normative feedback interventions is the relative ease of disseminating the intervention and subsequent top-up feedback, which may be fruitful avenues for future SNA interventions focusing on reducing anti-vaccine conspiracy beliefs.

The current study also provided evidence for the mechanism through which the normative feedback is effective. Supporting Hypothesis 3, mediation analysis demonstrated that the normative feedback reduced participants’ perceptions of other parents’ belief in anti-vaccine conspiracy beliefs, which in turn reduced their personal belief in anti-vaccine conspiracy theories. These findings support the focus on correcting misperceptions of anti-vaccine conspiracy beliefs and provide evidence that changing perceived norms directly influence anti-vaccine conspiracy beliefs.

 However, the normative feedback did not directly increase vaccination intentions, and thus Hypothesis 2 was not supported. One reason for this may be because the normative feedback was focused on correcting misperceptions of anti-vaccine conspiracy *beliefs* rather than correcting misperceptions of vaccination *intentions* (Appendix N). Therefore, future research, which includes normative feedback that specifically compares participants’ vaccination intentions with their perceived norms of other parents’ vaccination intentions, and the ‘actual’ norm of parents’ vaccination intentions, may be successful. The lack of effect of the intervention in increasing vaccination intentions could also be due to a ceiling effect; participants’ baseline intentions to vaccinate were very high (*M* = 5.85 out of 7). Therefore, the participants in this study already had high vaccination intentions before the intervention, even though we attempted to recruit more hesitant participants about vaccines. Future research could focus vaccination interventions more specifically on participants who are hesitant about using vaccines. The analysis did however support hypothesis 4, where an indirect effect of the intervention on vaccination intentions was demonstrated. Therefore, this intervention does have the potential to correct misperceptions of vaccination intentions of other parents, which then in turn increases personal vaccination intentions.

### ***7.5.1 Strengths and Limitations***

A limitation of the study lies in the way the feedback was presented to participants. In this study, participants in the normative feedback condition were given their normative feedback immediately after the baseline measures. The actual belief of other parents (which was compared to participants’ personal belief in anti-vaccine conspiracy theories at baseline) was taken from previous research by the authors (Chapter 6), and the graphical element of the feedback (Appendix N) did not include participants’ personal estimations of other parents’ beliefs in anti-vaccine conspiracy theories. The perceived norm was supplied in the feedback text only. Therefore, to further improve the intervention, the comparison of their own personal belief, their perceived norms and the actual norm could be more explicitly tailored to each participant. This could be important as if participants only paid full attention to the true norm presented in the graph, they could falsely construe their perceptions as accurate (Fischhoff, 1975). This is something that future research could incorporate, perhaps by taking baseline belief measures at a different time point. Similarly, as the experiment was delivered online, it is difficult to know how well the participants understood or attended to the normative feedback. Therefore, future research would benefit from qualitative approaches or a ‘think aloud’ (Marley et al., 2016) technique to help further refine this type of feedback to reduce belief in anti-vaccine conspiracy theories.

A further potential limitation of this study lies in the measurement of vaccination intentions used. The measure used in this study refers to a fictional disease ‘dysomeria’. Although this measure has been widely used in the literature (e.g. Betsch et al., 2012; Betsch & Sachse, 2013; Jolley & Douglas, 2014a, 2017), it may not be viewed as threatening by participants as this disease is fictional. Therefore, responses to this measure may not align with vaccination intentions for known childhood diseases. To combat this limitation, future research could measure uptake intentions of actual childhood vaccines or longitudinal designs could measure actual vaccination behaviour, where ethical procedures would need to be carefully considered. It is also important to acknowledge that this study's data collection was conducted during the COVID-19 pandemic. During this time, vaccination was an extremely topical issue, with them being described as the best chance to overcome the virus. Concurrently, anti-vaccine conspiracy beliefs associated with COVID-19 were emerging (e.g. Jolley & Paterson, 2020). Therefore, the backdrop of the pandemic could have influenced parents’ vaccination beliefs and intentions. However, baseline vaccination intentions of UK parents in this study (*M* = 5.85) were similar to those of UK parents measured in a previous study where data collection occurred in 2012 (Jolley & Douglas, 2014a Study 1) (*M* = 5.63).

A key strength of this study is that it is the first, to our knowledge, to utilise an SNA type intervention, using normative feedback, to reduce UK parents’ beliefs in anti-vaccine conspiracy theories successfully. This is crucial as anti-vaccine conspiracy theories have been shown to lead to vaccine hesitancy, as demonstrated in this current study and previous research (e.g. Hornsey et al., 2018; Jolley & Douglas, 2014a). Vaccine hesitancy was listed as a top ten threat to global health in 2019 (WHO, 2019a), and in the UK specifically, childhood vaccination rates are decreasing (Public Health England, 2020). Moreover, during the current COVID-19 pandemic, addressing vaccine hesitancy could be vital to ensuring uptake of the COVID-19 vaccines (Williams et al., 2020).

Consequently, future research should focus on continuing to develop SNA type interventions to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions. For example, this could involve ‘think aloud’ techniques, which involve participants talking aloud as they complete the intervention. Such an approach could be used to gain insights into how participants understand their feedback, particularly in regards to vaccination intentions. Moreover, future research could focus on tailoring personalised feedback about participants’ perceptions of anti-vaccine conspiracy beliefs *and* vaccination intentions and gauging a better understanding of how a top-up intervention could improve the longevity of the effects. Finally, it should be acknowledged that the current study included only UK parents in the sample, and it is important that future research moves beyond using WEIRD samples.

Although further fine-tuning this type of intervention is warranted, the practical implications of this work are timely. Effective interventions to tackle anti-vaccine conspiracy beliefs and reducing vaccination intentions have long been called for (e.g. Green & Douglas, 2018; Jolley & Douglas, 2017) but thus far have been limited. The SNA is one of the most widely used prevention approaches in the United States and is being used more globally (McAlaney et al., 2011). The versatility of the approach and ease of application suggests that an online SNA using normative feedback has the potential to be applied as a practical strategy to attenuate anti-vaccine conspiracy beliefs and their consequences. Moreover, this type of intervention could be suggested for new or expectant parents as a pre-emptive approach.

## **7.6 Conclusion**

In conclusion, this study has demonstrated that SNA normative feedback reduced perceptions of anti-vaccine conspiracy beliefs of other parents, which in turn reduced personal anti-vaccine conspiracy beliefs. Our work demonstrates the utility of normative feedback to address anti-vaccine conspiracy beliefs in UK parents and is the first time, to our knowledge, that this technique has been used to reduce anti-vaccine conspiracy beliefs. This research, therefore, provides an important step in utilising normative feedback, where future research should focus on further understanding the use of this type of intervention to combat the dangers of conspiracy beliefs.

# **Chapter 8: General Discussion**

## **8.1 Overview**

Conspiracy beliefs are defined as explanations for important events that involve secret plots from powerful malevolent groups (Douglas et al., 2019). Although described as alternative, minority viewpoints (Lantian et al., 2017), belief in them is widespread (Oliver & Wood, 2014). This thesis focused on the role of social norms in conspiracy beliefs and how we can reduce belief in conspiracy theories. This is important because belief in conspiracy theories is consequential (Jolley, Mari et al., 2020). For example, exposure to anti-vaccine conspiracy beliefs has been shown to increase belief in them and in turn, reduce vaccination intentions (Jolley & Douglas, 2014a). Social influence refers to how our beliefs and behaviours are determined by perceptions of what other people think and do (Cialdini & Trost, 1998). A key component of social influence is social norms; described as jointly negotiated rules for social behaviour (Sherif, 1936). Perceived social norms have been demonstrated to be a major determinant of attitudes and behaviour across diverse domains, for example, substance use (LaBrie et al., 2008; Neighbors et al., 2004; Walters et al., 2000), gambling (Larimer & Neighbors, 2003), infection control (Dickie et al., 2018), and green behaviours (Anderson et al., 2017). Aspects of social influence have been shown to be associated with belief in conspiracy theories (e.g. Mashuri & Zaduqisti, 2013; Chayinska & Minescu, 2018). However, the role of social norms in belief in conspiracy theories had not yet been investigated. This thesis addressed a key knowledge gap by exploring the association between perceived norms of conspiracy belief and personal belief, and how this knowledge could be utilised to reduce belief in anti-vaccine conspiracy theories.

The first Chapter in this thesis introduced the programme of research and outlined the key aims of the thesis. Chapter 2 then introduced the psychology of conspiracy theories, specifically highlighting the limited research exploring social norms and belief in conspiracy theories and how the potential dangers of endorsing conspiracy theories require focus on interventions to address these beliefs. Chapter 3 outlined social norms in psychology and the Social Norms Approach (SNA), indicating how this type of intervention is an unexplored possibility to addressing belief in more dangerous conspiracy theories.

Chapter 4 demonstrated that perceived conspiracy beliefs of groups identified with are strongly, positively associated with personal belief in conspiracy theories. This extends our knowledge of the role of social norms in predicting personal beliefs and behaviours and also our knowledge of motives of conspiracy beliefs. It was also found that individuals over-estimated the extent to which other students endorsed general conspiracy theories, demonstrating that there are misperceptions present in conspiracy belief. Chapter 5 focused on anti-vaccine conspiracy beliefs, specifically, it was shown that perceived anti-vaccine conspiracy belief norms of the national in-group did not determine personal belief in anti-vaccine conspiracy theories. However, when participants highly identified with their national in-group, the perceived beliefs of the in-group were influential on personal belief. This suggests that identification with the in-group is key in the association between perceived beliefs of the in-group in conspiracy theories and personal beliefs.

Chapter 6 firstly identified the strong association between the perceived beliefs of *other parents* in anti-vaccine conspiracy theories and personal anti-vaccine conspiracy beliefs. This knowledge was then utilised within two experimental studies aiming to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions. However, these interventions were not successful in reducing belief in anti-vaccine conspiracy theories or increasing vaccination intentions. Interestingly, it was revealed that counterarguments alone (without the embedded social norms messages) *were* successful in improving outcomes. Thus, this thesis extended scientific knowledge of addressing anti-vaccine conspiracy theories, showing that interventions with parents of young children could use anti-conspiracy counterarguments to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions.

Chapter 7 utilised the link between perceived norms of anti-vaccine conspiracy belief and personal belief to address these dangerous beliefs and increase vaccination intentions using a novel SNA normative feedback intervention. Findings showed that the SNA could be a suitable intervention to reduce belief in anti-vaccine conspiracy theories. This effect did not extend directly to vaccination intentions; however, the SNA intervention did increase perceptions of other parents’ intentions to vaccine which then indirectly increased personal vaccination intentions, highlighting a key area for further investigation. Therefore, this thesis has tested a novel SNA intervention that has successfully reduced belief in anti-vaccine conspiracy theories of parents of young children. This final Chapter will first review the overall aims of the thesis from Chapter 1 and how they have been addressed. The key implications and applications of the research presented in this thesis will be discussed. The potential limitations of this thesis will be considered, before the Chapter concludes by outlining how this thesis can inspire future research directions.

## **8.2 Revisiting the Thesis Aims**

In Chapter 1, six key aims of this thesis were outlined. In this section of the discussion, each of these aims will be revisited, and a summary provided of how the thesis has addressed each of these aims.

#### **8.2.1 Aim 1: To** **Understand the Role of Perceived Norms in Predicting Belief in Conspiracy Theories.**

Studies 1 and 2 in this thesis used a cross-sectional design to measure perceived belief of different groups in general conspiracy theories and personal belief in the same conspiracy theories. Participants completed measures of their personal belief in conspiracy theories (using the Belief in Real-World Conspiracy Theories Scale adapted from Douglas and Sutton, 2011) and then completed the scale again, but this time estimated how they expected an in-group of their choice, an out-group of their choice, and a prescribed in-group (Study 1, other students; Study 2, other British citizens) to answer. They also completed measures of their level of identification with each of the groups, and their need for uniqueness. The findings of these two studies demonstrated that the perceived belief of in-groups in conspiracy theories significantly positively predicted personal beliefs in a student sample (Study 1) and in a community sample (Study 2). These two studies have uniquely contributed to our understanding of belief in conspiracy theories as they are the first demonstration of the association between perceived social norms of in-group conspiracy belief and individuals’ personal conspiracy beliefs.

Study 4 of this thesis also utilised a cross-sectional design, but this time assessed the role of perceived social norms of anti-vaccine conspiracy belief in the personal beliefs of UK parents. Study 4 demonstrated that the perceived belief of in-groups (both the national in-group and other parents) in anti-vaccine conspiracy theories significantly positively predicted personal beliefs, with the perceived beliefs of other parents being the strongest predictor of personal anti-vaccine conspiracy beliefs. Overall, these three studies robustly demonstrate the link between perceived in-group conspiracy belief norms and personal conspiracy beliefs (Cookson et al., 2021, Studies 1, 2 and 4). Previous literature has demonstrated a link between perceived norms and personal beliefs and behaviour across a range of contexts; for example, perceived alcohol use, tobacco use, handwashing frequency, sugar-sweetened beverages and fast-food consumption have all been shown to predict personal beliefs and behaviours (Dickie et al., 2018; LaBrie et al., 2008; Lally et al., 2011; Maddock & Glanz, 2005; Pedersen, Osilla, et al., 2017; Perkins et al., 2010, 2018, 2019; Pischke et al., 2015). The current thesis extends these findings to include conspiracy beliefs, showing that our perceptions of other people’s engagement in conspiracy theories are associated with our personal belief in them. Not only does this contribute to social norms literature, but it also extends our knowledge of understanding belief in conspiracy theories, positing that conspiracy theories may be attractive when we perceive that our in-group are also drawn to them.

However, the three studies above are not without limitations. As these studies were cross-sectional in design, the causal direction between perceived norms of conspiracy belief and personal belief is not yet established. As social norms provide an expectation about appropriate social behaviour (Sherif, 1936; Cialdini & Trost, 1998), and as such, have continually been shown to influence personal attitudes and behaviour (Asch, 1954; Cialdini et al., 1991; Sherif, 1936), it is plausible that perceived social norms of conspiracy beliefs influence personal belief in conspiracy theories. However, social norms perceptions can also have a reciprocal relationship with behaviour. Perceived social norms could influence personal attitudes and behaviours, and/or personal attitudes and behaviours can be projected onto others to estimate social norms (i.e., social projection). Previous research investigating the association between perceived norms and personal behaviour in the context of student alcohol consumption utilised a longitudinal design to show that the effect of perceived norms on personal behaviour was greater than the reverse (Neighbors et al., 2006), suggesting a causal path from perceived norms to personal beliefs and behaviour.

In order to correctly test this assertion that perceived norms of anti-vaccine conspiracy beliefs are a causal factor in personal conspiracy beliefs, an experimental design was employed in Study 3. Two-hundred-and-thirty-seven British adults were allocated to one of six conditions. Each condition was exposed to an article discussing anti-vaccine conspiracy theories, but this article was accompanied by a statement which manipulated perceived social norms of these beliefs; indicating that either, the majority vs minority of British citizens (national in-group) vs North Macedonian citizens (national out-group) vs no group specified (control) endorsed the anti-vaccine conspiracies in the article. It was hypothesised that participants who were informed that the majority of the in-group (British citizens) endorses the anti-vaccine conspiracy theories would have a heightened belief themselves. However, this key hypothesis was not supported, as endorsement of the anti-vaccine conspiracy theories was similar across the six conditions, suggesting that perceived norms of the in-group do not directly influence personal endorsement of conspiracy theories.

Moderation analysis was then conducted in Study 3, which showed that the influence of perceived norms of anti-vaccine conspiracy beliefs on personal belief was nuanced. Being informed that the majority of the national in-group endorsed anti-vaccine conspiracy theories influenced a higher personal belief in them, compared to being informed that the minority of the in-group or that the minority with no group endorsed them, only in participants who highly identified with the national in-group. Therefore, this study demonstrates that perceived social norms of the national in-group could not guide personal belief in anti-vaccine conspiracy theories, unless participants highly identified with the in-group. This suggests that identification to the in-group is key in the association between perceived beliefs of the in-group in conspiracy theories and personal beliefs. Supporting this, Study 4 indicated that other parents are likely to be an influential in-group in anti-vaccine conspiracy beliefs.

#### **8.2.2 Aim 2: To Test for the Presence of Misperceptions in Individuals’ Estimations of Other Peoples’ Endorsement of Conspiracy Theories.**

Exposure to conspiracy theories has been shown to increase belief in them (Douglas & Sutton, 2008; Jolley & Douglas, 2014a, 2014b; Swami et al., 2011), yet research shows that we are unaware that this exposure influences our beliefs (Douglas & Sutton, 2008). As online exposure to conspiracy theories is omnipresent (Samory & Mitra, 2018), and they are reported in mainstream media outlets (Jolley & Paterson, 2020), this could not only influence personal beliefs in conspiracies but it was hypothesised that this could fuel a false consensus that endorsement of conspiracy theories is more typical than it actually is. To test this, Studies 1 and 2 asked participants their personal belief in seven general conspiracy theories and to estimate the extent to which they believe that others endorse them. Both Studies 1 and 2 showed that when participants were answering the scale on a personal level, they reported that their personal belief was less than they perceived the belief of other students (Study 1) and other British citizens (Study 2) to be. These findings were mirrored in Study 4, where British parents also over-estimated the belief of other British parents in anti-vaccine conspiracy theories.

These findings are in line with previous research within the Social Norms Approach literature, which shows that people tend to hold misperceptions of the beliefs and behaviours of others, generally over-estimating how much others engage in potentially negative behaviour (e.g. Dempsey et al., 2018). For example, research has shown that individuals over-estimate the extent that others drink alcohol, smoke marijuana, gamble, engage in risky driving and risky sexual behaviour (Borsari & Carey, 2001; Brooks-Russell et al., 2014; Carter et al., 2014; Larimer & Neighbors, 2003; Lewis, Lee, et al., 2007; Meisel & Goodie, 2014; Patrick et al., 2016). These misperceptions have been explained through the attribution error, whereby we have a tendency to attribute the behaviour of others to their disposition rather than to situational factors (Heider, 1958, cited in McAlaney et al., 2011). This means that if we see people engage in certain behaviours, for example, being drunk or smoking marijuana, we are likely to attribute this behaviour to dispositional factors of that individual and thus perceive that this is something that they often do. This can therefore distort our perception of how common these behaviours are. Thinking about the endorsement of conspiracy theories, if we encounter an individual discussing a conspiracy theory or if we see them shared on social media, in the same way, we could over-estimate belief in them, as shown in this thesis.

Similarly, pluralistic ignorance can also explain why individuals may over-estimate the conspiracy beliefs of others. Pluralistic ignorance refers to the assumption that one’s own private attitudes are more conservative than others, even when public behaviour is identical (Schroeder & Prentice, 1998). Consequently, individuals could misperceive the conspiratorial attitudes of others by thinking that their beliefs are deviant, more conservative, than the norm (Miller & Prentice, 1994). Overall, this thesis demonstrates across four separate samples (Studies 1, 2, 4 and 7) that individuals perceive that the majority of others believe in conspiracy theories more than they personally do.

#### **8.2.3 Aim 3: To Explore the Potential Moderating Role of Identification with the Group, on the Relationship Between Perceived Norms of Conspiracy Belief and Personal Belief.**

As well as demonstrating the relationship between perceived norms of conspiracy belief and personal belief, this thesis also aimed to show that this relationship would be enhanced when one strongly identifies with the group. This was hypothesised due to the principles of the Social Identity Approach, specifically Social Identity Theory and Self-Categorisation Theory which posits that we use our in-groups to guide beliefs and behaviours and that this influence is strengthened when one more highly identifies with the group (Tajfel & Turner, 1979; Terry & Hogg, 1996; Turner et al., 1987). This aim was explored primarily in Studies 1, 2 and 4, where the relationship between perceived norms of conspiracy beliefs of different in-groups and personal belief in the same conspiracies was investigated and level of social identification with each of the groups was measured and predicted to moderate the relationship.

The support of this hypothesis was mixed. In Study 1, the relationship between perceived conspiracy belief of the in-group which participants could input themselves or perceived conspiracy belief other students (a more distal in-group) and personal beliefs was not moderated by their identification with the group. In Study 2, on the other hand, this relationship was moderated by identification with the group; in line with the hypothesis, the relationship between perceived in-group conspiracy belief norms and personal beliefs was stronger for participants who more highly identified with the in-group. Similarly, in Study 4 which focussed on anti-vaccine conspiracy beliefs specifically, the relationship was strengthened the more that participants identified with the in-group (other parents). It is surmised that level of identification with the in-group was not a significant moderator in Study 1 as participants were completing the study for course credits and as such their student identification may have been salient, without necessarily them reporting an increased level of identification. It is worth noting that in Studies 2 and 4, the association between perceived in-group beliefs and personal beliefs was strong for each level of identification, suggesting that high identification with the in-group enhances this relationship, rather than being a prerequisite.

#### **8.2.4 Aim 4: To Explore Whether the Relationship Between Perceived Norms of Conspiracy Belief and Personal Belief is Buffered by One’s Need to Feel Unique.**

Although this thesis aimed to understand the role of perceived norms in predicting belief in conspiracy theories, it was anticipated that one’s need to feel unique might buffer this relationship, such that for those with a high need for uniqueness, this relationship would be weaker. This was of particular interest because previous research had shown that the need for uniqueness could predict belief in conspiracy theories (Imhoff & Lamberty, 2017; Lantian et al., 2017). Therefore, if need for uniqueness was related to belief in conspiracy theories, but can also buffer the influence of norms on personal beliefs and behaviours (Imhoff & Erb, 2009), then the need for uniqueness could limit the functionality of this relationship to develop interventions from in the future. For example, those who have a high need to feel unique may be more prone to conspiracy theories but be less influenced by perceived social norms.

This prospect was explored firstly in Studies 1 and 2. Participants completed the Self-Attributed Need for Uniqueness Scale (Lyn & Snyder, 2002) and this was assessed as a moderator variable, predicting that the relationship between perceived in-group conspiracy belief and personal conspiracy belief would be weaker for those who have a higher need to feel unique. However, these studies found that the relationship between perceived norms of conspiracy beliefs and personal beliefs was not moderated by one’s need to feel unique. This was similarly tested in Study 4, which focused on anti-vaccine conspiracy theories, where moderation analysis showed that the need for uniqueness actually strengthened this relationship between perceived norms of other parents’ anti-vaccine conspiracy beliefs and their personal beliefs. This finding in Study 4 could be because need for uniqueness was associated with personal belief in anti-vaccine conspiracy theories and also slightly positively associated with the perceived belief of other parents in anti-vaccine conspiracy theories. This finding is important as it suggests that interventions to reduce belief in anti-vaccine conspiracy theories, for example, the SNA intervention used in Study 7, would not be compromised when participants have a high need to feel unique.

#### **8.2.5 Aim 5: To Employ Experimental Methods to Reduce Individuals’ Endorsement of Anti-Vaccine Conspiracy Theories Through Manipulating Norm Perceptions.**

Belief in conspiracy theories has been previously shown to be difficult to reduce (Jolley & Douglas, 2017). Similarly, misinformation has been shown to be resistant to correction (Lewandowsky, et al., 2012). By uncovering the relationship between perceived norms of conspiracy beliefs and personal beliefs, this thesis aimed to reduce belief in conspiracy theories, specifically anti-vaccine conspiracy theories, and increase vaccination intentions. To achieve this aim, Study 5 used counterarguments to the anti-vaccine conspiracy theories, as used by Jolley and Douglas (2017), but these counterarguments were explained as being written by other parents. In this experimental study, 191 parents were exposed to anti-vaccine conspiracy theories before being randomly allocated to one of four conditions, where they received counterarguments to these conspiracies attributed to (a) other parents, (b) non-parents, (c) no source, or (d) a control condition which received no counterarguments. Then belief in anti-vaccine conspiracy theories and intentions to vaccinate a fictional child were measured. However, contrary to predictions, counterarguments attributed to other parents did not reduce anti-vaccine conspiracy beliefs or increase vaccination intentions compared to the control condition. Study 5, therefore, was unable to reduce belief in anti-vaccine conspiracy theories or increase vaccination intentions using counterarguments attributed to other parents.

This finding aligns with previous research (Jolley & Douglas, 2017) to the extent that counterargument interventions did not reduce belief in these conspiracy theories or improve vaccination intentions. However, there was a key limitation in Study 5, concerning how the social norm messages were presented to participants. By definition, social norm messages are messages suggesting that the majority of people adhere to a certain behaviour (Bewick et al., 2010; Perkins, 2002), however, the ‘social norm messages’ used in Study 5 simply attributed the counterarguments to coming from other parents, rather than stating that the ‘majority’ of other parents reject anti-vaccine conspiracy theories.

Following this, Study 6 improved upon a key limitation of Study 5, by providing participants with counterarguments that had social norm messages embedded within them, indicating that the majority of either parents, non-parents, or no group given (simply, the majority), rejected anti-vaccine conspiracy theories. There was also a control condition where participants did not receive any counterarguments. It was predicted that parents who are given counterarguments containing social norm messages indicating that the majority of other parents think that vaccines are completely safe would have a reduced belief in anti-vaccine conspiracy theories and increase vaccination intentions compared to participants in each of the other conditions. Similar to the previous study, Study 6 found that incorporating social norms messages into the anti-conspiracy counterarguments did not make them effective. However, Study 6 did find that counterarguments alone, without the social norm component, could reduce anti-vaccine conspiracy beliefs and increase vaccination intentions. This finding builds upon previous research and gives empirical support for the role of information-based counterargument interventions in addressing the dangers of anti-vaccine conspiracy theories. This finding provides some of the first evidence that anti-vaccine conspiracy beliefs and vaccination intentions could be altered.

All participants in Study 6 were parents of children aged 4 years or younger, whereas in previous studies the sample consisted of parents with children of all ages. Therefore, parents of young children may be more susceptible to the use of counterarguments. This may be because these parents are currently seeking information about vaccines (Ashfield & Donelle, 2020) or haven’t already made their vaccination decisions. There are however two key limitations of this study. The first lies in the social norm message which was embedded in the counterarguments, which stated that “a recent representative poll of parents showed that an overwhelming majority of 81% believed that vaccines are completely safe”. This 81% figure was used initially as it represents a large majority, and it aligns with recent polls, which have shown that around 1 in 5 people surveyed in the UK endorse anti-vaccine conspiracy theories to some extent (YouGov, 2019). However, it is also worth noting that 81% is lower than current childhood vaccine uptake in the UK (even for the lowest uptake of MMR2, it is still around 87%) (NHS, 2019), and this is much lower than what is required for herd immunity (95%). Therefore, participants in this condition may not have considered this a strong or persuasive majority within this context. A second limitation relevant to both Studies 5 and 6 is the between-subjects design. Although this design has been used in previous research (e.g. Jolley & Douglas, 2017), it can be argued that as no baseline measures of belief in anti-vaccine conspiracy theories were taken, the perceived effect of the intervention could instead show baseline differences in belief across the conditions. Therefore, future research needs to further investigate the potential of using counterarguments as an intervention tool using a within-groups design.

#### **8.2.6 Aim 6: To Test the Feasibility of a Brief SNA Intervention,** **Utilising Personalised Normative Feedback, to Reduce Belief in Anti-Vaccine Conspiracy Theories and Increase Vaccination Intentions of UK Parents of Young Children.**

The SNA is described as “a widely used intervention strategy for promoting positive health-related behaviours” (Dempsey et al., 2018 p. 2180). The approach is rooted in social psychological theory (SIT; Attribution Theory; Pluralistic Ignorance) and posits that individuals are influenced by the beliefs and behaviours of others, namely their peers, and that they also misperceive these beliefs and behaviours (Perkins & Berkowitz, 1986). These misperceptions of norms can amount to unwarranted social influence and pressure to engage in certain behaviours. Therefore, when these misperceptions are corrected behaviour can change to become more in line with actual reported norms (Dempsey et al., 2018). By achieving the previous aims of this thesis, the two underlying assumptions of the SNA had been met. This thesis has shown firstly that perceived norms of in-group conspiracy belief are associated with personal belief, and secondly that people over-estimate the extent to which their in-groups endorse conspiracy theories. Although Studies 5 and 6 attempted to use social norm messages within the intervention, they did not attempt to change misperceptions of anti-vaccine conspiracy belief norms, which has been noted as a limitation in SNA literature (Dempsey et al., 2018; McAlaney et al., 2011). Likewise, it has been suggested that when social norm messages are paired with other components, for example, the counterarguments used in Studies 5 and 6, there is a risk that these differing components may work against each other (McAlaney et al., 2011). For example, the use of counterarguments as an intervention tool may be useful to provide people with facts against harmful information (Sunstein & Vermeule, 2009), however they may work against social norm messages by instead drawing attention to potential conspiracies. Thus, to avoid these dangers and the potential difficulty to tease apart which intervention component may be effective, this intervention study focussed solely on providing participants with normative feedback, in line with the SNA, about their belief in anti-vaccine conspiracy theories and perceptions of other parents’ beliefs.

The intervention measured participants’ belief in anti-vaccine conspiracy theories and their perceptions of the belief of other parents in the same conspiracies and then participants’ vaccination intentions and their perceptions of other parents’ vaccination intentions. Participants were then randomly allocated to the intervention condition who received normative feedback or to an assessment only control condition, and the measures were then taken post-test. Participants who received the normative feedback, which aimed to correct misperceptions of anti-vaccine conspiracy beliefs, showed a reduced belief in anti-vaccine conspiracy theories, illustrating the potential of this type of intervention to reduce these beliefs. The intervention, however, did not directly increase vaccination intentions. One explanation for this could be that the focus of the feedback received in this intervention was on correcting misperceptions of anti-vaccine conspiracy beliefs rather than correcting misperceptions of vaccination intentions. Therefore, future research should expand this type of intervention to include an explicit challenge of misperceptions of vaccination intentions within the normative feedback. The intervention did indirectly increase vaccination intentions of UK parents; receiving the normative feedback increased participants perceptions of other parents’ vaccination intentions and this increased their personal vaccination intentions. Similarly, Study 7 showed that the advantages of this SNA intervention were not maintained at a six-week follow-up, suggesting that perhaps a top-up intervention would be needed to strengthen the impact of the normative feedback on anti-vaccine conspiracy beliefs. As discussed later in this Chapter, further research is needed to assess the full potential of this type of intervention to address the dangers of these beliefs in UK parents of young children.

Overall, the key findings and original contributions from the seven empirical studies presented in this thesis can be summarised as below:

1. Extending our knowledge of factors associated with personal belief in conspiracy theories, this thesis showcases that perceived belief of in-groups is strongly associated with personal beliefs.

2. This thesis demonstrates that although conspiracy beliefs have been considered minority viewpoints, belief in general conspiracy theories and belief in anti-vaccine conspiracy theories is over-estimated.

3. Anti-conspiracy counterarguments can be successfully utilised to reduce anti-vaccine conspiracy beliefs and increase vaccination intentions of parents of children aged 4 years and younger.

4. This thesis provided the first direct test of a SNA intervention, which successfully reduced parents’ belief in anti-vaccine conspiracy theories and indirectly increased vaccination intentions. This research opens a new avenue to address anti-vaccine conspiracy theories.

## **8.3 Implications of the Current Research**

The research outlined in this thesis has contributed to scientific knowledge on how we can reduce belief in potentially dangerous anti-vaccine conspiracy theories. This thesis found that the perceived beliefs of in-groups in conspiracy theories can predict personal beliefs, and this is emphasised when one highly identifies with the in-group. Therefore, this thesis also utilised the Social Identity Approach to further understand the antecedents to conspiracy belief and how this can be used to reduce them. The key implications of this research will be outlined below.

#### **8.3.1 Social Norms, Identification, and Belief in Conspiracy Theories**

The Social identity approach comprises Social Identity Theory (SIT) and Self-Categorization Theory (SCT). This approach posits that people define themselves as members of a social group which can have implications for their beliefs and behaviours. This is referred to as social identity, which is shared with other in-group members and provides a basis for shared group membership. The Social Identity Approach can be used to understand the behaviours of others, for example, leadership and crowd behaviour (e.g. Reicher et al., 2010). The current thesis has demonstrated the connection between this approach and understanding personal belief in conspiracy theories. When people are in a situation where a specific group membership is salient to them (e.g. when being asked about childhood vaccinations, then one’s identity as a parent is likely to be salient) they will be more inclined to define themselves in terms of group membership. Through this process, personal beliefs and behaviours are associated with one’s social identity, through shared group norms. A key implication of the current thesis is the application of this approach to belief in conspiracy theories. This thesis demonstrated that, in line with the Social Identity Approach, personal belief in conspiracy theories and specifically anti-vaccine conspiracy theories are strongly associated with the perceived belief of in-groups.

This is important as “our individual opinions about the nature of the world and of the significance of events in the world are always contingent until confirmed by others whose perspective we share and whose values we endorse – that is, by fellow group members” (Reicher et al., 2010 p. 53). Therefore, if one perceives that members of a relevant in-group endorse anti-vaccine conspiracy theories, this could strengthen potential conspiracy beliefs the individual may harbour. Much misinformation, including conspiracy theories, is available on social media and reported in mainstream news (Del Vicario et al., 2016; Jolley & Paterson, 2020), and experiments have shown that misinformation can often inadvertently be spread online (Pennycook et al., 2020). The work in this thesis linking together perceived in-group norms of conspiracy beliefs and personal beliefs, expands our knowledge of endorsement of conspiracy theories and further speaks to the importance of considering interventions rooted in the Social Identity Approach to reduce belief in harmful conspiracy theories.

A further related implication of the work in this thesis is the potential consequences of the finding that in-group belief in conspiracy theories is over-estimated. Although considered a minority point of view, and even an undesirable belief (Lantian et al., 2018), we know that beliefs in conspiracy theories are widespread (e.g. YouGov, 2019). The current research shows that individuals perceive that other in-group members endorse conspiracy theories more than they personally do, and perceived belief of in-group members in conspiracy theories is associated with increased personal belief. As explained previously, these over-estimations could be due to pluralistic ignorance and a false consensus effect. However, even if these beliefs are stigmatised, they are considered to be more normative than they actually are. These initial findings add to the importance of developing interventions that can tackle potentially dangerous conspiracy theories, and further indicate that a potential means to do this could be by reducing perceived norms of conspiracy beliefs or correcting these misperceptions of conspiracy belief norms.

#### **8.3.2 Reducing Belief in Conspiracy Theories**

Sunstein and Vermeule (2009) were the first to recommend different potential avenues to address the effects of conspiracy theories, such as the use of anti-conspiracy arguments. This suggestion was put to the test by Jolley and Douglas (2017), who showed that counterarguments could be successful as an inoculation method but were not effective once conspiracy beliefs were established. Our work, for the first time, has shown the positive impact of anti-conspiracy counterarguments on both beliefs and behavioural intentions, within a sample of parents of young children. Unlike Jolley and Douglas (2017), we found that anti-conspiracy counterarguments did reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions compared to a control condition, but in our study, we had a more targeted sample, consisting only of parents of children aged 4 years and younger, and those currently expecting. This finding therefore demonstrated that anti-vaccine conspiracy theories may actually be susceptible to counterarguments, as suggested by Sunstein and Vermeule (2009), but only for those who are currently making childhood vaccine decisions (as the UK routine childhood vaccines are scheduled during this period).

Further, this thesis attempted to strengthen the anti-conspiracy counterarguments in their ability to address endorsement of conspiracy theories by combining them with social norm messages. These social norms messages took two forms; firstly, in Study 5 the messages indicated that the source of the counterarguments were other parents. In Study 6, the social norm messages were in the form of a poll, indicating that the majority (81%) of other parents, rejected anti-vaccine conspiracy theories. As the Social Identity Approach posits that the in-group is looked to as a guide for personal beliefs and behaviours, particularly when the group is relevant and salient (e.g. Reicher et al., 2010), adding social norm messages was predicted to strengthen the arguments. This technique however was found to be ineffective in strengthening the anti-conspiracy counterarguments and did not influence participants’ beliefs and behaviours any differently to a control condition. A further implication of this thesis, therefore, is that social norm messages in these forms do not seem to be a successful strategy to address anti-vaccine conspiracy theories.

#### **8.3.3. The Social Norms Approach to Reducing Belief in Conspiracy Theories**

The Social Norms Approach, as previously explained in this Chapter, is “a widely used intervention strategy for promoting positive health-related behaviours” (Dempsey et al., 2018 p. 2180). Although this intervention has been successful in increasing positive health-related behaviours (e.g. sun protection behaviour, Reid & Aiken, 2013) and reducing harmful health-related behaviours (e.g. alcohol consumption, Neighbors et al., 2004; Lewis et al., 2007), this type of intervention has not previously been used to address endorsement of anti-vaccine conspiracy theories and vaccination intentions. In fact, other than the use of counterarguments as detailed above, research investigating other methods to address endorsement of anti-vaccine conspiracy theories is lacking.

A key implication of this thesis is the potential of SNA interventions, which challenge perceived norms, to address anti-vaccine conspiracy beliefs. Encouragingly, belief in anti-vaccine conspiracy theories were shown in this thesis to satisfy the two key tenets of the SNA; (1) the perceived anti-vaccine conspiracy beliefs of a referent group (other parents) and vaccination intentions of this group are strongly related to personal beliefs and behaviours, and (2) misperceptions of these perceived norms are present, whereby individuals overestimate the extent to which other parents believe in anti-vaccine conspiracy theories and underestimate other parents’ vaccination intentions. This opens up the opportunity to test this type of intervention to address these harmful beliefs.

This thesis builds on previous research by testing the feasibility of the SNA to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions. This feasibility test showed the potential of this type of intervention to address these harmful beliefs. Firstly, the intervention condition who received the normative feedback showed a reduced belief in anti-vaccine conspiracy theories, and although this didn’t lead to directly increased vaccination intentions, it is important to note that in this feasibility test, the normative feedback specifically corrected misperceptions of anti-vaccine conspiracy beliefs rather than misperceptions of vaccination intentions. This limitation will be discussed later in this Chapter. Secondly, the theoretical mechanism of action of the SNA was supported; those who received normative feedback firstly reduced their perceptions of other parents’ anti-vaccine conspiracy beliefs which led to a reduction in their personal beliefs and secondly increased their perceptions of other parents’ vaccination intentions which led to an increase in their personal intentions. Thus, this thesis supports that this type of intervention could be successful in reducing anti-vaccine conspiracy beliefs.

## **8.4 Applications of the Current Research**

Belief in anti-vaccine conspiracy theories is pertinent to tackle as these beliefs are consequential. For example, belief in anti-vaccine conspiracy theories has been robustly linked to reduced vaccination intentions (Hornsey et al., 2018; Hornsey et al., 2021; Jolley & Douglas, 2014a). Specifically, in Studies 5, 6 and 7, anti-vaccine conspiracy beliefs were significantly, negatively related to vaccination intentions. These studies include correlational, experimental, and longitudinal designs, each demonstrating the danger of anti-vaccine conspiracy beliefs to fuel vaccine hesitancy. Vaccine hesitancy refers to “the reluctance or refusal to vaccinate despite the availability of vaccines” and reduces vaccination intentions and uptake (e.g. On et al., 2020; WHO, 2019a). The WHO listed vaccine hesitancy as a top ten threat to global health in 2019 (WHO, 2019a), and this is especially critical during the current COVID-19 vaccine rollout.

Addressing vaccine hesitancy has been attempted but findings have been inconsistent (Sadaf et al., 2013). For example, two systematic reviews of interventional studies, aiming to address parental vaccine hesitancy and refusal, could not identify a specific form of interventional approach to reduce parental vaccine hesitancy and refusal (Dubé et al., 2015; Sadaf et al., 2013). However, very little research has focussed on addressing anti-vaccine conspiracy beliefs as a mechanism of increasing vaccination intentions. The findings of this thesis could be applied to strengthen how we respond to anti-vaccine conspiracy beliefs and the consequential vaccine hesitancy.

Firstly, there is a case for using counterarguments as a tool to address anti-vaccine conspiracy beliefs, as demonstrated in Study 6. Examples of counterarguments include *“For example, there is convincing and accurate evidence for the success of vaccines. Diseases such as smallpox and paralytic polio have been completely eradicated by vaccines. These once fatal diseases no longer exist among the population”*. Therefore, policymakers may be interested in how counterarguments to anti-vaccine conspiracy beliefs could be an effective method to reduce them, when given to parents of young children. This type of intervention could be successful when specifically targeted at the group requiring the vaccine and could provide a simple, cost-effective way of reducing anti-vaccine conspiracy beliefs and increasing vaccination intentions. As well as intervening to address childhood vaccine hesitancy, this method could also be utilised to reduce general anti-vaccine conspiracy beliefs and increase uptake of other vaccines. For example, COVID-19 vaccine uptake amongst young adults has been reported to be slowing (BBC News, 2021), and such this targeted group could benefit from specific anti-conspiracy counterarguments.

A multitude of research has investigated reasons why individuals might believe in conspiracy theories, however, there are limited examples of testing theoretical underpinnings of conspiracy beliefs. This thesis applied aspects of the Social Identity Approach to help understand why some people believe in conspiracy theories, and specifically anti-vaccine conspiracy theories. From this, the key criteria for using the Social Norms Approach (Perkins & Berkowitz, 1986) as an intervention tool to address these beliefs were met. The applications of this thesis therefore extend to the use of this tried and tested SNA of positive health behaviour change in the novel context of tackling anti-vaccine conspiracy beliefs and vaccination intentions. Policy makers should consider this type of approach when addressing anti-vaccine conspiracy beliefs and decreasing vaccination intentions.

The versatility of the SNA and ease of application suggests that an online SNA intervention using normative feedback has the potential to be applied as a practical strategy to attenuate anti-vaccine conspiracy beliefs and their consequences. Specifically, this type of intervention could be suggested for new or expectant parents as a pre-emptive approach. Childhood vaccinations are also not the only type of vaccine which can fall victim to anti-vaccine conspiracy beliefs. Research since the pandemic has demonstrated that anti-vaccine conspiracy beliefs are associated with the rejection of COVID-19 vaccines (Allington et al., 2021; Ruiz & Bell, 2020). Therefore, tackling anti-vaccine conspiracy beliefs is particularly pertinent to the ongoing COVID-19 pandemic, and as such, a SNA intervention using normative feedback could be targeted to certain groups less likely to be vaccinated (e.g. younger adults). Future work could look to apply the SNA to other types of conspiracy beliefs. Anti-vaccine conspiracy beliefs are not the only conspiracy beliefs that could be problematic. Belief in conspiracy theories is directly related to reduced intentions to engage in environmentally friendly behaviour, reduced engagement in politics (Jolley & Douglas, 2014b), and increased prejudice (Jolley et al., 2020), for example. As findings from Studies 1 and 2 indicate that general conspiracy beliefs satisfy the criteria of the SNA, this approach could be applied to tackle further problematic conspiracy beliefs.

In summary, the key implications of this body of research firstly expand our understanding of the social factors involved in conspiracy beliefs, concluding that the perceived norms of in-groups’ conspiracy beliefs are strongly associated with personal conspiracy theory endorsement and further, that strong identification with the in-group can amplify this relationship, which is in line with the Social Identity Approach. Moreover, this thesis concludes that counterargument interventions could be considered as a means to addressing anti-vaccine conspiracy beliefs and decreasing vaccination intentions. Finally, this thesis supports the use of the SNA as a novel and theoretically supported intervention tool to address anti-vaccine conspiracy beliefs. Following this, the key applications of this thesis lie in the robust research evidence for policymakers demonstrating the feasibility of novel ways to address dangerous conspiracy endorsement.

## **8.5 Limitations of the Research and Future Directions**

Along with the many strengths, there are, of course, limitations to this body of research. To begin with, the scale used in Studies 1 and 2 to measure personal belief and perceived belief of other groups in general conspiracy theories and the scale used in Studies 3, 4, 5, 6 and 7, to measure personal belief in and perceived belief of other groups in anti-vaccine conspiracy theories were self-report scales. Both the Belief in Real World Conspiracy Theories, and the Belief in Anti-Vaccine Conspiracy Theories scales have been used previously in conspiracy theory research and have shown good reliability (Douglas et al., 2016; Jolley & Douglas, 2014a; 2017). However, research has shown that endorsing conspiracy theories can be viewed as a source of social stigma and, thus, participants may be less willing to divulge their conspiracy beliefs (Lantian et al., 2018) meaning that self-report scales may not be the best way to measure true conspiracy belief. For example, the conspiracy beliefs reported could be lowered to avoid social stigma. This issue is minimised as each study in this thesis was completed online, meaning participants disclosed their beliefs privately.

Perhaps more problematic is the measurement of vaccination intentions in Studies 5, 6 and 7. To measure vaccination intentions a one-item scale was used, where participants were presented with a fictional scenario. In this scenario, participants are asked to imagine that they were the parent of an infant named Sophie, aged 8 months, and that their doctor had provided them with information regarding the (fictitious) disease ‘dysomeria’, which may lead to serious consequences with symptoms such as fever and vomiting. After reading the scenario, participants indicated their intention to have Sophie vaccinated (“If you had the opportunity to vaccinate your child (Sophie, aged 8 months) against ‘dysomeria’ next week, what would you decide”) on a scale of 1-7 (1 = definitely not vaccinate to 7 = definitely vaccinate). Although this measure has been widely used in the conspiracy theory literature (e.g. Betsch et al., 2012; Betsch & Sachse, 2013; Jolley & Douglas, 2014a, 2017), what has been measured in these studies is vaccination intentions rather than actual vaccination behaviour. It is known that the path between intentions and behaviour can be complex. Although it has been demonstrated that intentions and behaviours can be reliably linked (e.g. Ajzen, 1991; Armitage & Conner, 2001), with intentions being a sound indication of future behaviour, intentions do not always lead to actual behaviour (e.g. LaPiere, 1934; Sheeran, 2002).

To address this limitation, actual behaviour could be measured, rather than behavioural intentions. One method could be to employ longitudinal designs which could record future behaviour. For example, interventions could be conducted with parents of young children, and then follow-up measures could be taken of actual vaccination behaviours once participants’ children have passed the age for the scheduled vaccination. This type of measure could be an alternative to measuring vaccination intentions and demonstrate whether the interventions employed in this thesis could be successful at increasing actual childhood vaccine uptake. Similarly, a longitudinal study could investigate the ability of counterargument interventions and SNA interventions to reduce anti-vaccine conspiracy belief and increase vaccination uptake for other types of vaccines, for example, the flu vaccine or COVID-19 vaccines. Future research could also focus of developing public health campaigns to influence vaccination uptake within a population.

A further potential limitation of the vaccination intention measure is that it refers to a fictional disease ‘dysomeria’. As this disease is fictional, it may not be viewed as threatening by participants and therefore, responses to this measure may not align with vaccination intentions for known childhood diseases. Relatedly, the vaccination intention measure also related to a fictional child as well as a fictional disease. There is then the possibility that participants stated intentions may not mirror their actual intentions in real life. Along the same lines, across the four studies in this thesis where this measure was used, vaccination intention was extremely high. For example, the baseline intention to vaccinate from Study 7 was *M* = 5.85, from a scale of 1-7 (1 = definitely not vaccinate to 7 = definitely vaccinate), even though participants were screened when signing up to take part in the study to only include those who did not ‘totally agree’ that scheduled vaccines were safe for children. This ceiling effect, although attempted to be mitigated, could have reduced the potential of the interventions to increase vaccination intentions, as vaccination intentions were already high. However, this is reflective of the population; in the UK, childhood vaccination uptake is high, for example, MMR1 (Mumps, Measles, and Rubella vaccine 1) coverage at 24 months was 90.6% (NHS, 2020). Even with this seemingly high uptake, the need for interventions to increase vaccination intentions is still pertinent. In order to achieve herd immunity for measles, for example, 95% of the population are required to be vaccinated (NHS, 2020); so even small deviations from this can have a significant impact, as demonstrated by the continuation of Measles outbreaks in Europe, resultant of suboptimal vaccine uptake (Dubé et al., 2014; Muscat, 2011). However, it would be useful to target future interventions towards parents perhaps with lower intentions to vaccinate or higher beliefs in anti-vaccine conspiracy theories.

Looking specifically at Studies 5 and 6, some key limitations could be addressed in future research. Both of these studies exposed participants to an ‘excerpt from an online article’ which propagated anti-vaccine conspiracy theories and then gave participants anti-conspiracy theory counterarguments to try to combat the initial conspiracy theory material. These counterarguments have been used in previous research (Jolley & Douglas, 2017). However, neither Study 5 nor 6 included a measure of how credible the counterarguments were. This is a limitation as the materials used in this research had not been measured for their credibility which is important when designing messages for an intervention (e.g. Dempsey et al., 2018). Similarly, in both Studies 5 and 6, social norm messages were combined with the counterarguments in some conditions; these were also not checked for credibility. Research using SNA campaigns have reported that a potential barrier to their success is the credibility of the norm messages (Thombs et al., 2010). If these messages are not credible then the intervention will be compromised, therefore it is recommended that the social norm messages are authentically derived from the study population to maximise their credibility (Dempsey et al., 2018).

A further limitation of Studies 5 and 6 is the multiple components of the interventions, combining social norm messages and counterarguments. It has been noted that when using social norm messages within an intervention, there is a risk that adding other components may work against the mechanism of the SNA (Dempsey et al., 2018). For example, the use of counterarguments as an intervention tool may be useful to provide people with facts against harmful information (Sunstein & Vermeule, 2009), however they may work against social norm messages by instead drawing attention to potential conspiracies. This limitation was addressed in Study 7, where a SNA intervention was used which specifically corrects misperceptions in isolation. Future research using counterarguments as the sole intervention component to address anti-vaccine conspiracy beliefs and vaccination intentions needs to be further explored.

Study 7 employed a SNA intervention, where participants in the experimental condition received personalised normative feedback which compared (a) their belief in anti-vaccine conspiracy theories, (b) their perceptions of other parents’ belief in anti-vaccine conspiracy theories which were both taken from their baseline responses, and (c) actual belief of other parents in anti-vaccine conspiracy theories, which was taken as an average from the research conducted in this thesis. However, the normative feedback didn’t specifically correct misperceptions of vaccination intentions. Instead, the normative feedback compared their own vaccination intentions with their perceptions of other parents’ vaccination intentions, and this was in text form, rather than in a graph. The SNA intervention did not directly increase participants’ vaccination intentions, and this could be because these misperceptions, which were present, were not explicitly corrected.

In Study 7, the impact of the SNA on anti-vaccine conspiracy beliefs did not remain for the six-week follow-up period. Although initially effective, SNA approach interventions in this context may not elicit longer-term changes. To address this, future research could include an additional ‘top-up’ delivery of the normative feedback to help maintain the effectiveness of the feedback on perceived norms and personal beliefs and behaviour. Supporting this, Neighbors et al. (2010) found that a normative feedback intervention to reduce drinking in heavy drinking college students was more successful when administered biannually as opposed to annually. A key strength of normative feedback interventions is the relative ease of disseminating the intervention as it can be completed fully online. An additional ‘top-up’ feedback element to the intervention could be employed in future research as a way to improve the longevity of the impact.

### ***8.5.1 Summary for Future Directions***

In summary, this thesis provides important evidence for how we can address dangerous conspiracy beliefs, specifically anti-vaccine conspiracy beliefs. Future research can work to both address limitations of studies within this thesis and also to further expand the use of these interventions to tackle conspiracy beliefs. Firstly, this thesis shows that anti-conspiracy counterarguments could be a useful approach to reduce belief in anti-vaccine conspiracy theories and increase vaccination intentions of parents of young children. However, due to mixed findings, further research is needed to enhance our understanding of how this intervention tool could be most effective. Specifically, future research should use within-group designs, and assess the credibility of the counterarguments used. Secondly, this thesis showcases the potential for the SNA intervention to be employed to tackle anti-vaccine conspiracy beliefs. Further research is invited to fine-tune this approach, particularly to correct misperceptions of *vaccination intentions* as well as correcting misperceptions of conspiracy beliefs and to explore the use of top-up interventions as a means to lengthen the impact of the intervention. Future research could also incorporate more advanced measures of vaccination intentions, for example employing longitudinal designs which could measure actual vaccination behaviours. Taken together, the research presented in this thesis delivers actionable interventions which can successfully address anti-vaccine conspiracy belief at a particularly crucial time. In the future, fine-tuning these approaches and applying them to different types of dangerous conspiracy beliefs would most advantageous, given the potential dangers of harbouring conspiracy beliefs.

## **8.6 Conclusion**

Conspiracy beliefs are widespread in society and have been shown to influence choices one makes in their life (see Jolley, Mari et al., 2020). Specifically, belief in conspiracy theories can have potentially negative social and health consequences and thus researchers have highlighted the importance of developing strategies to reduce the harm of these beliefs. With this in mind, this thesis firstly endeavoured to further understand the role of perceived social norms of conspiracy beliefs in personal conspiracy beliefs. This thesis has demonstrated the strong association between perceived social norms of conspiracy beliefs and personal conspiracy beliefs, and that perceptions of conspiracy belief norms are prone to misperceptions, where individuals over-estimate the extent to which others endorse conspiracy theories. This thesis then focussed on anti-vaccine conspiracy beliefs due to their current significance. Experimental attempts to utilise social norms messages to reduce these conspiracy beliefs were unsuccessful, further showing the difficulty of addressing personal beliefs in conspiracy theories. However, this thesis did demonstrate, slightly contradictory to previous research, that anti-conspiracy counterarguments could be used to reduce belief and increase vaccination intentions amongst parents of young children, which warrants further investigation.

Finally, this thesis tested the effectiveness of an SNA intervention in reducing belief in anti-vaccine conspiracy theories and increase vaccination intentions. Although vaccination intentions were not directly improved, the assumptions of the SNA were explicitly tested in the context of anti-vaccine conspiracy belief for the first time, and this approach did reduce belief in anti-vaccine conspiracy theories and indirectly increase vaccination intentions, showing promise as a tool to intervene on these dangerous beliefs. Importantly, the mechanism of action of the SNA was supported in this context; normative feedback firstly corrected misperceptions of anti-vaccine conspiracy beliefs, which in turn was related to reduced personal anti-vaccine conspiracy beliefs and secondly increased perceptions of vaccination intentions, which in turn was related to increased personal vaccination intentions. Future research is invited to further calibrate these promising approaches to address dangerous conspiracy beliefs. Overall, this thesis concludes that social influences in the form of perceived norms of in-group conspiracy beliefs appear to be important in personal conspiracy beliefs and are prone to misperceptions. Correction of these misperceptions through an SNA intervention offers a timely and novel approach to addressing anti-vaccine conspiracy beliefs.

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# **Appendices**

## **Appendix A: Belief in Real-World Conspiracy Theories Scale Adapted from Douglas & Sutton (2011)**

*This scale was used in Chapter 4, Studies 1 and 2.*

Please indicate how much you agree with each statement below by selecting the appropriate response in each case. 1 (strongly disagree) – 7 (strongly agree)

Scientists are creating panic about climate change because it is in their interests to do so.

There was an official campaign by MI6 to assassinate Princess Diana, sanctioned by elements of the establishment.

The AIDS virus was created in a laboratory.

The attack on the Twin Towers was not a terrorist action but a governmental conspiracy

The American moon landings were faked.

Governments are suppressing evidence of the existence of aliens.

Lee Harvey Oswald collaborated with the CIA in assassinating President John F. Kennedy.

## **Appendix B: Inclusion of Other in Self Scale (Aron et al., 1992; Tropp & Wright, 2001)**

*This scale was used to measure level of social identification across each of the seven studies in this thesis.*



## **Appendix C: Self-Attributed Need for Uniqueness Scale (Lynn & Snyder, 2002)**

*This scale was used to measure need for uniqueness across each of the seven studies in this thesis.*

I prefer being different from other people.

(a) no, (b) slightly, (c) moderately, (d) very, (e) extremely

Being distinctive is important to me.

(a) not at all, (b) slightly, (c) moderately, (d) very, (e) extremely

I intentionally do things to make myself different from those around me.

(a) never, (b) seldom, (c) sometimes, (d) often, (e) always

I have a need for uniqueness.

(a) weak, (b) slight, (c) moderate, (d) strong, (e) very strong

## **Appendix D: Conspiracist Ideation Scale (Brotherton et al., 2013)**

*This scale was used to measure conspiratorial beliefs as a covariate in Study 3 (Chapter 5).*

There is often debate about whether or not the public is told the whole truth about various important issues. These following questions are designed to assess your beliefs about some of these subjects. Please indicate the degree to which you believe each of the following statements is likely to be true.

*<Response options: Definitely not true; Probably not true; Not sure/cannot decide; Probably true; Definitely true.>*

The government is involved in the murder of innocent citizens and/or well-known public figures, and keeps this a secret.

The power held by heads of state is second to that of small, unknown groups who really control world politics.

Secret organizations communicate with terrorists, but keep this fact from the public.

The spread of certain viruses and/or diseases is the result of the deliberate, concealed efforts of some terrorists/organizations.

The government manipulate, fabricate, or suppress evidence in order to deceive the public.

The government permits or perpetrates acts of terrorism on its own soil, disguising its involvement.

A small, secret group of people is responsible for making all major world decisions, such as going to war.

Evidence of assassinations is being concealed from the public.

Technology with mind-control capacities is used on people without their knowledge.

New and advanced technology which would harm current industry is being suppressed.

The government uses people as patsies to hide its involvement in criminal activity.

Certain significant events have been the result of the activity of a small group who secretly manipulate world events.

Some UFO sightings and rumours are planned or staged in order to distract the public from real alien contact.

Experiments involving new drugs or technologies are routinely carried out on the public without their knowledge or consent.

A lot of important information is deliberately concealed from the public out of self-interest.

**Appendix E: Full Manipulation Articles, Study 3**

*These are the full articles which were manipulated across the six conditions of Study 3 (Chapter 5)*

*Condition 1*

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A representative poll finds that **over 80% of British people** think yes, there are many reasons to think twice about vaccines.

For example, over 80% of British people agreed that people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines and also believe evidence which suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.

Moreover, over 80% of British people believe that hiding safety information about vaccines is purely motivated by profit and there are other reasons to doubt the efficacy and safety of vaccines… *[article continues]*

*Condition 2*

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A representative poll finds that **less than 10% of British people** think yes, we should think twice about vaccines.

For example, less than 10% of British people agreed that people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines and also believe evidence which suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.

Moreover, less than 10% of British people believe that hiding safety information about vaccines is purely motivated by profit and there are other reasons to doubt the efficacy and safety of vaccines… [*article continues]*

*Condition 3*

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A representative poll finds that **over 80% of Macedonians** think yes, there are many reasons to think twice about vaccines.

For example, over 80% of Macedonians agreed that people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines and also believe evidence which suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.

Moreover, over 80% of Macedonians believe that hiding safety information about vaccines is purely motivated by profit and there are other reasons to doubt the efficacy and safety of vaccines… *[article continues]*

*Condition 4*

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A representative poll finds that **less than 10% of Macedonians** think yes, we should think twice about vaccines.

For example, less than 10% of Macedonians agreed that people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines and also believe evidence which suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.

Moreover, less than 10% of Macedonians believe that hiding safety information about vaccines is purely motivated by profit and there are other reasons to doubt the efficacy and safety of vaccines… *[article continues]*

*Condition 5*

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A representative poll finds that **over 80%** think yes, there are many reasons to think twice about vaccines.

For example, over 80% of those polled agreed that people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines and also believe evidence which suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.

Moreover, over 80% of those polled believe that hiding safety information about vaccines is purely motivated by profit and there are other reasons to doubt the efficacy and safety of vaccines… *[article continues]*

*Condition 6*

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A representative poll finds that **less than 10%** think yes, we should think twice about vaccines.

For example, less than 10% of those polled agreed that people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines and also believe evidence which suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simply been renamed and these diseases still exist among the population.

Moreover, less than 10% of those polled believe that hiding safety information about vaccines is purely motivated by profit and there are other reasons to doubt the efficacy and safety of vaccines… *[article continues]*

## **Appendix F: Belief in Anti-Vaccine Conspiracy Theory Scale (Jolley & Douglas, 2014a)**

*This scale was used across studies 3-7 (Chapters 5-7)*

(1= strongly disagree, 7 = strongly agree)

1. Many diseases, said to have been eradicated by childhood vaccines, are still around today.
2. Misrepresentation of the efficacy of childhood vaccines is motivated by profit.
3. Vaccines harm children, and this fact is covered up.
4. Vaccine safety data is often fabricated.
5. Immunizing children is harmful and this fact is covered up.
6. People are deceived about the safety of childhood vaccines
7. Pharmaceutical companies cover up the dangers of childhood vaccines.
8. People are deceived about the efficacy of childhood vaccines
9. Vaccines are not harmful. \*
10. Vaccine efficacy data is often fabricated.

\* Item reverse-scored.

## **Appendix G: Counterargument Manipulations, Study 5**

Anti-vaccine -conspiracy manipulation excerpt (slightly adapted from Jolley & Douglas 2014).

**Please read this short excerpt from a recent Internet article about vaccines. We will ask you some questions about the excerpt later in the study, so please read it carefully.**

Should we be suspicious of vaccines? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

The answer is YES. There are many reasons to think twice about vaccines.

For example, people within the vaccine industry are guilty of misrepresenting data on the efficacy of vaccines. Evidence suggests that diseases such as smallpox and paralytic polio have not been eradicated by vaccines. They have simple been renamed and these diseases still exist among the population.

Further, there is a significant amount of evidence that vaccines can hurt more than they help. For example, by the year 2002, tens of thousands of reactions to vaccines, including deaths, were reported. One must magnify these figures tenfold, because it is estimated that 90% of doctors do not report incidents.

Hiding information about vaccines is purely motivated by profit. The increase in government recommended vaccines for children has more than doubled since 1985, making pharmaceutical companies very wealthy. The profit margins made by pharmaceutical companies are extremely high. According to market research, vaccine sales will more than double this year, from $19 billion in 2012 to $39 billion in 2013. This is nearly five times the $8 billion in vaccine sales in 2004.

There are other reasons to doubt the efficacy and safety of vaccines… [*article continues]*

Participants will then be presented with the below counter-argument article which is manipulated across 4 conditions:

1. Changes are highlighted in red
2. Changes are highlighted in green
3. Changes are highlighted in black
4. this is the control condition, where participants are not presented with counterarguments

**[A group of parents responded vs a group of non-parents responded vs there has subsequently been a response] to the article you have previously read. Please read their response below:**

Should we be suspicious of vaccinating children? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about childhood vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more children than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

[**Parents believe** vs **non-parents believe**] The answer is NO. [**Parents know** vs **non-parents know** vs **there**] is no reason to think twice about vaccines.

For example, there is convincing and accurate evidence for the success of vaccines. Diseases such as smallpox and paralytic polio have been completely eradicated by vaccines. These once fatal diseases no longer exist among the population.

Further, there is little evidence to suggest that vaccines are harmful to children. The side effects are minimal and whilst millions of people have been immunized over the years, less than .005% have ever had an adverse reaction to a vaccine.

**[Parents know** vs **non-parents know**] The financial benefits of preventing illnesses far outweigh the profits made from vaccines by pharmaceutical companies. For example, in 2001, routine childhood immunization in the USA was estimated to save over $40 billion per birth-year cohort in overall social costs including $10 billion in direct health costs. The government recommends vaccines for children to improve public health and save money, not to make a profit.

 [*article continues]*

## **Appendix H: Vaccination Intention Scale (Betsch & Sachse, 2013; Betsch et al., 2013)**

*This scale was used to measure vaccination intentions in Studies 5-7 (Chapters 5 and 6)*

**Please now imagine that you are the parent of an infant (Sophie, 8 months).**

Your doctor has provided you with the following information regarding the disease *dysomeria* and mentioned that there is a vaccination available.

*Dysomeria*: The DS-virus is a contagion spread by droplet infection. Early symptoms are fever and vomiting. Meningitis and impairment of motor and sensory functions are also common. In some cases, the DS-virus leads to permanent paralysis.

There is a vaccination against *dysomeria*. This vaccination effectively protects against infection and is highly recommended by the Centers for Disease Control and Prevention (CDC) for people of all ages.

Adverse events such as fever, rash, restlessness and dizziness have been reported following 12% of all vaccinations (indicated by the blue rectangles in the graph below). In 88% of all cases, no side effects occurred (grey rectangles).



**If you had the opportunity to vaccinate your child (Sophie, 8 months) against***dysomeria***next week, what would you decide?**

1 \_ *definitely not vaccinate*; 7 \_ *definitely vaccinate*.

## **Appendix I: Table 12 & 13 (Study 5).**

**Table 12**

*Moderation Analysis Predicting Personal Belief in Anti-Vaccine Conspiracy Theories (Study 5)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | B | SE B | *t* | CI (95%) |
| D1 | .61 | 1.23 | .50 | -1.82, 3.05 |
| D2 | -1.17 | 1.14 | -1.02 | -3.43, 1.09 |
| D3 | -1.39 | 1.11 | -1.26 | -3.58, .79 |
| Need for uniqueness | -.04 | .22 | -.16 | -.48, .40 |
| D1\* Need for uniqueness | -.27 | .39 | -.68 | -1.03, .50 |
| D2\* Need for uniqueness | .39 | .34 | 1.16 | -.27, 1.05 |
| D3\* Need for uniqueness | .29 | .34 | .86 | -.37, .96 |
| Social identification with other parents | -.26 | .13 | -2.03\* | -.52, -.01 |
| D1\* Social identification with other parents | .04 | .21 | .18 | -.37, .45 |
| D2\* Social identification with other parents | .06 | .21 | .29 | -.35, .47 |
| D3\* Social identification with other parents | .24 | .18 | 1.38 | -.11, .59 |
| Education level  |  .24 |  .08 |  3.14\*\* |  .09, .40 |

*Note.* Condition 1 (counterarguments from other parents) was coded as the representative condition and was compared to the Condition 2 (counterarguments from non-parents, D1), Condition 3 (no source given for the counterarguments, D2) and Condition 4 (no counterarguments control, D3) separately. \*p<.05. \*\*p<.01.

**Table 13**

*Moderation Analysis Predicting Personal Intentions to Vaccinate (Study 5).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | B | SE B | *t* | CI (95%) |
| D1 | -2.01 | 1.17 | -1.72 | -4.32, .30 |
| D2 | .33 | 1.09 | .30 | -1.81, 2.47 |
| D3 | -.80 | 1.05 | -.76 | -2.87, 1.28 |
| Need for uniqueness | .07 | .21 | .33 | -.35, .49 |
| D1\* Need for uniqueness | .20 | .37 | .54 | -.53, .93 |
| D2\* Need for uniqueness | -.53 | .32 | -1.65 | -1.15, .10 |
| D3\* Need for uniqueness | -.06 | .32 | -.18 | -.69, .57 |
| Social identification with other parents | -.09 | .12 | -.72 | -.33, .16 |
| D1\* Social identification with other parents | .35 | .20 | 1.76 | -.04, .74 |
| D2\* Social identification with other parents | .19 | .20 | .98 | -.20, .58 |
| D3\* Social identification with other parents | .21 | .17 | 1.27 | -.12, .55 |
| Education level  |  -.16 |  .07 |  -2.13\* |  -.30, -.01 |

*Note.* Condition 1 (counterarguments from other parents) was coded as the representative condition and was compared to the Condition 2 (counterarguments from non-parents, D1), Condition 3 (no source given for the counterarguments, D2) and Condition 4 (no counterarguments control, D3) separately. \*p<.05.

## **Appendix J: Counterargument Manipulations, Study 6**

**Condition 1**

Should we be suspicious of vaccinating children? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about childhood vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more children than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A recent representative survey found that the **majority of parents believe** the answer is NO. The large majority of parents stated that there is no reason to think twice about vaccines.

There is convincing and accurate evidence for the success of vaccines. Diseases such as smallpox and paralytic polio have been completely eradicated by vaccines. These once fatal diseases no longer exist among the population.

Further, parents agreed that there is little evidence to suggest that vaccines are harmful to children. The side effects are minimal and whilst millions of people have been immunized over the years, less than .005% have ever had an adverse reaction to a vaccine.

**Perhaps unsurprisingly, therefore, a recent representative poll of parents showed that an overwhelming majority of 81% believed that vaccines are completely safe.**

The financial benefits of preventing illnesses far outweigh the profits made from vaccines by pharmaceutical companies. For example, in 2017, routine childhood immunization in the USA was estimated to save over $40 billion per birth-year cohort in overall social costs including $10 billion in direct health costs. The government recommends vaccines for children to improve public health and save money, not to make a profit.

 [*article continues]*

**Condition 2**

Should we be suspicious of vaccinating children? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about childhood vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more children than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

A recent representative survey found that the majority of those surveyed who are not planning on having children believe the answer is NO. The large majority of those who are not parents stated that there is no reason to think twice about vaccines.

There is convincing and accurate evidence for the success of vaccines. Diseases such as smallpox and paralytic polio have been completely eradicated by vaccines. These once fatal diseases no longer exist among the population.

Further, respondents who haven’t got children agreed that there is little evidence to suggest that vaccines are harmful to children. The side effects are minimal and whilst millions of people have been immunized over the years, less than .005% have ever had an adverse reaction to a vaccine.

**Perhaps unsurprisingly, therefore, a recent representative poll showed that an overwhelming majority of 81% of non-parents believed that vaccines are completely safe.**

The financial benefits of preventing illnesses far outweigh the profits made from vaccines by pharmaceutical companies. For example, in 2017, routine childhood immunization in the USA was estimated to save over $40 billion per birth-year cohort in overall social costs including $10 billion in direct health costs. The government recommends vaccines for children to improve public health and save money, not to make a profit.

 [*article continues]*

**Condition 3:**

Should we be suspicious of vaccinating children? Should we consider the proposal that those in power, whether governments or pharmaceutical companies, hide crucial information about childhood vaccines from the public?

Several specific questions have been raised about vaccines. For example, are people within the industry faking data on vaccine efficacy? Do vaccines hurt more children than they help? Is the industry deceiving people purely to make a profit?

Questions such as these are widespread in the media and on the Internet, but should we pay any attention to them?

The answer is NO. There is no reason to think twice about vaccines.

For example, there is convincing and accurate evidence for the success of vaccines. Diseases such as smallpox and paralytic polio have been completely eradicated by vaccines. These once fatal diseases no longer exist among the population.

Further, there is little evidence to suggest that vaccines are harmful to children. The side effects are minimal and whilst millions of people have been immunized over the years, less than .005% have ever had an adverse reaction to a vaccine.

The financial benefits of preventing illnesses far outweigh the profits made from vaccines by pharmaceutical companies. For example, in 2017, routine childhood immunization in the USA was estimated to save over $40 billion per birth-year cohort in overall social costs including $10 billion in direct health costs. The government recommends vaccines for children to improve public health and save money, not to make a profit.

## **Appendix K: Table 15 &16, Study 6**

**Table 15**

*Moderation Analysis Predicting Personal Belief in Anti-Vaccine Conspiracy Theories (Study 6).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | B | SE B | *t* | CI (95%) |
| D1 | .21 | 1.10 | .19 | -1.96, 2.38 |
| D2 | -1.09 | 1.15 | -.94 | -3.36, 1.19 |
| D3 | .25 | 1.02 | .24 | -1.76, 2.25 |
| Need for uniqueness | .56 | .23 | 2.39 | .10, 1.02 |
| D1\* Need for uniqueness | -.30 | .33 | -.92 | -.95, .35 |
| D2\* Need for uniqueness | .10 | .36 | .29 | -.60, .81 |
| D3\* Need for uniqueness | -.25 | .29 | -.86 | -.83, .33 |
| Social identification with other parents | -.07 | .12 | -.55 | -.30, .17 |
| D1\* Social identification with other parents | .02 | .17 | .10 | -.32, .36 |
| D2\* Social identification with other parents | .06 | .18 | .33 | -.29, .41 |
| D3\* Social identification with other parents | .11 | .16 | .69 | -.21, .43 |

*Note*. Condition 1 (counterarguments with other parents norm messages) was coded as the representative condition and was compared to the Condition 2 (counterarguments with non-parents norm messages, D1), Condition 3 (counterarguments alone, D2) and Condition 4 (no counterarguments control, D3) separately.

**Table 16**

*Moderation Analysis Predicting Personal Intentions to Vaccinate (Study 6).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | B | SE B | *t* | CI (95%) |
| D1 | .98 | 1.00 | .98 | -1.00, 2.96 |
| D2 | 1.05 | 1.05 | 1.00 | -1.02, 3.12 |
| D3 | -.09 | .93 | -.09 | -1.93, 1.75 |
| Need for uniqueness | .00 | .21 | -.01 | -.42, .42 |
| D1\* Need for uniqueness | -.15 | .30 | -.49 | -.74, .44 |
| D2\* Need for uniqueness | -.42 | .33 | -1.29 | -1.07, .22 |
| D3\* Need for uniqueness | .14 | .27 | .51 | -.39, .67 |
| Social identification with other parents | .04 | .11 | .36 | -.17, .25 |
| D1\* Social identification with other parents | -.07 | .16 | -.42 | -.37, .24 |
| D2\* Social identification with other parents | .06 | .16 | .38 | -.26, .38 |
| D3\* Social identification with other parents | -.09 | .15 | -.59 | -.38, .21 |

*Note.* Condition 1 (counterarguments with other parents norm messages) was coded as the representative condition and was compared to the Condition 2 (counterarguments with non-parents norm messages, D1), Condition 3 (counterarguments alone, D2) and Condition 4 (no counterarguments control, D3) separately.

## **Appendix L: Supplementary Material, Study 7 Hypothesis 5**

The effects of the intervention will be most pronounced in participants who had the largest misperceptions of how much other parents endorsed anti-vaccine conspiracy theories at baseline and in participants who had a heightened level of identification to other parents.

It was predicted that the impact of the intervention on reducing personal belief in anti-vaccine conspiracy theories would be most pronounced in participants who had the largest misperceptions of how much other parents endorsed anti-vaccine conspiracy theories at baseline and in participants who had a heightened level of identification to other parents. To test this, an index was created where the actual belief of participants in anti-vaccine conspiracy theories (taken from their mean baseline measures) was subtracted from participants’ perceived beliefs of other parents at baseline. Thus, larger scores indicate larger over-estimations of anti-vaccine conspiracy belief norms. Moderation analysis was conducted using Model 2 of the PROCESS macro for SPSS (Hayes, 2017). Experimental condition was entered as the predictor variable and belief in anti-vaccine conspiracy theories at immediate post-test was entered as the outcome with the new index added as the first moderator variable, and level of identification with other parents added as the second moderator variable. However, neither the size of baseline misperceptions, b = .19. SE = .16, t(157) = 1.19, p = .23, nor level of social identification with other parents, b = .02. SE = .11, t(157) = .15, p = .88, moderated the effect of the intervention on belief in conspiracy theories.

Similarly, it was predicted that the impact of the intervention on increasing vaccination intentions would be increased in participants who had the largest misperceptions of the vaccination intentions of other parents at baseline and in participants who strongly identified with other parents. Therefore, a second index was created, which represented misperceptions of vaccination intentions of other parents, by subtracting actual vaccination intentions of participants (taken from their mean baseline measures) from perceived vaccination intentions of other parents at baseline. Thus, smaller scores indicate a larger under-estimation of vaccination intention norms. However, neither the size of baseline misperceptions, b = 1.78, SE = 1.24, t(157) = 1.44, p = .15, nor level of social identification with other parents, b = 1.47, SE = 1.08, t(157) = 1.36, p = .17 moderated the effect of the intervention on vaccination intentions.

## **Appendix M: Single Item Belief in Conspiracy Theories Measure (Lantian et al., 2016)**

*This scale was used in Study 7 (Chapter 7)*

Some political and social events are debated (for example 09/11 attacks, the death of Lady Diana, the assassination of John F. Kennedy). It is suggested that the “official version” of these events could be an attempt to hide the truth to the public. This “official version” could mask the fact that these events have been planned and secretly prepared by a covert alliance of powerful individuals or organizations (for example secret services or government). What do you think?

To answer, please indicate to what extent the sentence below represents how you think about this:

I think that the official version of the events given by the authorities very often hides the truth

Completely false 1 2 3 4 5 6 7 8 9 Completely true

## **Appendix N: Personalised Normative Feedback Example (Study 7)**

*This is an example of the personalised normative feedback received in the experimental condition in Study 7 (Chapter 7). This feedback was presented online using Qualtrics, and participants had to spend at least 60 seconds on this page before they could move forward.*

**The development of vaccines is one of the most important advances in the history of medicine.**
Anti-vaccine conspiracy theories are conspiracy theories which attempt to discredit the effectiveness and safety of vaccines.
According to the information you provided us during the computer assessment, this is your level of belief in anti-vaccine conspiracy theories after viewing an article that promotes them \_\_\_
You also indicated how likely you would be to vaccinate a child against dysomeria. This was your answer, on a scale of 1 to 7, with 7 meaning that you would definitely vaccinate \_\_\_
You also completed questions asking what you believed other parents’ attitudes towards childhood vaccinations were. You told us that you believed the typical level of belief in anti-vaccine conspiracy theories of other parents was \_\_\_
You also estimated that they were this likely to vaccinate against dysomeria: **\_\_\_**
Other parents’ belief in anti-vaccine conspiracy theories is actually very low, with average UK parents scoring 2 out of 7.

The graph below shows your belief, how much you predicted other British parents believed in anti-vaccine conspiracy theories and the actual belief of other parents in anti-vaccine conspiracy theories:



We significantly over-estimate how much other parents believe in these conspiracy theories and therefore have a distorted view of how common they are. Parents’ actual belief in anti-vaccine conspiracy theories is much lower than people think it is.

**The overwhelming majority of UK parents choose to vaccine their children.**

**Appendix O: Table 19 & 20, Study 7**

**Table 19**

Analyses of Variance of the Effect of the Intervention on Personal Beliefs in Anti-Vaccine Conspiracy Theories.

|  |  |  |  |
| --- | --- | --- | --- |
|  | F(df) | P value | *ηp2* |
| Time | .04 (1.56, 253.27) | .932 | <.001 |
| Condition | .00 (1, 162) | .993 | <.001 |
| Education  | 3.53 (1, 162) | .062 | .021 |
| Time\*Condition | 4.73\* (1.56, 253.27) | .016 | .028 |

 *Note.* \**p*<.05

**Table 20**

Analyses of Variance of the Effect of the Intervention on Personal Vaccination Intentions.

|  |  |  |  |
| --- | --- | --- | --- |
|  | F(df) | P value | *ηp2* |
| Time | 2.39 (1.37, 222.57) | .113 | .015 |
| Condition | .09 (1, 162) | .767 | .001 |
| Education  | 1.33 (1, 162) | .250 | .008 |
| Time\*Condition | .55 (1.37, 222.57) | .508 | .003 |

1. In both studies 1 and 2 general conspiratorial mindset of participants was also measured using the Generic Conspiracist Beliefs Scale (Brotherton et al., 2013). This was initially considered as a potential moderator variable, however, this is highly correlated with the Belief in Real-World Conspiracy Theory Scale (Study 1 = .66\*\*) and (Study 2 = .71\*\*), this variable was not analysed any further. [↑](#footnote-ref-2)
2. The pre-registration stated that all participants would be British, however the approval rating criteria was not pre-registered. The approval rating criteria was not pre-registered for any of the studies in this thesis. [↑](#footnote-ref-3)
3. The moderation graphs (Figures 1 and 2) were made with the help of the templates provided here: http://www.jeremydawson.co.uk/slopes.htm [↑](#footnote-ref-4)
4. For exploratory purposes, the ANCOVA analysis was run again but without controlling for general conspiratorial beliefs (as this could have been masking the interaction effect). However, with this variable removed the results were unchanged; neither the main effect of minority or majority endorsement of anti-vaccine conspiracy theories F(1, 221) = .151, p = .698, η2 = .001, nor the main effect of the group who participants are informed endorse the anti-vaccine conspiracy theories was F(2, 221) = 1.314, p = .271, η2 = .012 were significant. The interaction effect also remained non-significant, F(2,221) = 2.144, p = .120 partial η2 = .019. [↑](#footnote-ref-5)
5. Before the two samples were combined, they were checked to ensure they were comparable. Both samples were of British parents of children aged 4 years or younger and each sample had more females than males. Two t-tests were conducted to investigate if the two dependent variables were matched in each sample. There was a significant difference in anti-vaccine conspiracy belief across the two samples, *t*(206) = -2.09, *p* = .038. In the non-prolific sample, belief was slightly lower (*M* = 2.21, *SD* = 1.20) than in the prolific sample (*M* = 2.59, *SD* = 1.39). However, Levenes’ Test confirmed that there was homogeneity of variances across the two samples, *p* = .273. There was no difference in vaccination intentions across the two samples, *t*(206) = .29, *p* = .771, and there was homogeneity of variance, *p* = .948. [↑](#footnote-ref-6)