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**EXPLORING THE RELATIONSHIP BETWEEN THINKING STYLE AND BELIEF
IN COMMON MISCONCEPTIONS AND CONSPIRACY-RELATED CLAIMS**

by

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Abstract

Misinformation is being widely spread in society around the world. Researchers have investigated how believing in misinformation affects our lives. It is hard to completely avoid, not to mention its costs to people are extensive. There are various forms of false beliefs, such as conspiracy theories, urban myths, fake news, and paranormal beliefs. In this study, we mainly focus on common misconceptions and conspiracy theories. The question that we wonder is: why do people believe in misinformation or make unwarranted claims? Why do people hold these beliefs and continue to hold them when many others do not? Therefore, exploring how their thinking affects people to believe in misconceptions and conspiracy theories is critical. Many reasons and factors are affecting people to believe more than others in false beliefs, such as personality traits and past experiences. Here, we focus on individuals' thinking style as a factor, and how it differs from people's beliefs in common misconceptions and conspiracy-related claims. Thinking style affects how we think and make decisions. It also differs in individuals' beliefs and values. Different thinking styles have their own ways of processing information. Many researchers have studied the relationship between thinking styles and beliefs in misinformation. Most of them suggest that thinking styles is a significant factor which influences how we believe in conspiracy theories. What we will do differently is to use a different measure to examine people's thinking styles. We aim to explore the relationships between thinking styles and beliefs in common misconceptions and conspiracy-related claims. We would like to understand if both relationships are the same or different to each other to see if these findings can contribute to preventing people from believing in misinformation. The results showed that common misconception beliefs do correlate with conspiracy beliefs, and people who tend to think intuitively are more likely to believe in common misconceptions and conspiracy-related claims compared to people who do not. We found that there are differences and similarities in relationships between thinking styles and beliefs in common misconceptions and beliefs in conspiracy-related claims. Also, we suggest different measures for future studies to further examine the relationships between thinking styles and beliefs in misinformation.

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Exploring the relationship between thinking style and belief in common misconceptions and conspiracy-related claims

Misinformation is being spread extensively in society around the world. One survey in New Zealand found that half of New Zealanders believe in some form of COVID-19 misinformation (Classification Office, 2021). 80 per cent of the people in the survey were concerned about the spread of misinformation in New Zealand. 90 per cent of respondents believe different forms of misinformation related to COVID-19 can negatively affect people's views on public health. 75 per cent of them think the misinformation about COVID-19 is a pressing and serious threat. More than half of them had encountered misinformation in the past six months. Furthermore, almost 20 per cent of the respondents hold at least three or more false beliefs (Classification Office, 2021). The misinformation related to COVID-19 includes the statement of seriousness. For example, COVID-19 is a normal flu, or most people survive after getting COVID-19 (Wiles, 2021). Also, trying to sway people's choice whether to get vaccinated by talking about the danger or the risk of the COVID-19 vaccine (Wiles, 2021). Another survey in the US found that 30 per cent of the respondents think COVID-19 was created in a lab (Schaeffer, 2020). Half of the American adults stated that they have come across misinformation about COVID-19 (Schaeffer, 2020). Many researchers have been studying why people are unable to determine between true and false information and belief in myths and conspiracy theories has been widely studied (DiFonzo & Bordia, 2007; Douglas et al., 2019). Both misinformation and disinformation can be harmful. Regarding medical and health contexts, for instance, misinformation or disinformation related to health lead to health workers' mental distress (Nelson et al., 2020). Confusion and conflict, as well as conspiracy theories spreading on news media, worsened their emotional state (Nelson et al., 2020). Misinformation is false information that is being circulated, whether people intend to mislead the information or not (Guess & Lyons, 2020). Claims that cannot be verified and not being able to strictly speak are said to be

misinformation. Whereas disinformation is being deliberately spread (Guess & Lyons, 2020). Tucker et al. (2018) also suggested that disinformation is a subset of misinformation. Overall, the differences between misinformation and disinformation can distinguish whether the information is being spread intentionally. Disinformation attempts to deceive but misinformation is not (Guess & Lyons, 2020).

Due to the mass misinformation that exists in societies, which is difficult to completely avoid and hard not to be deceived. Its costs and negative effects on people are extensive. As a result, we would like to understand different forms of false beliefs and how they might be similar or different to each other. More specifically, we mainly focus on common misconceptions and conspiracy-related claims regarding false beliefs. Also, we would like to find out possible reasons why individuals tend to believe false information. A variety of reasons and factors are affecting people to believe more than others in false beliefs, such as personality traits and past experiences. In this study, we will focus on individuals' thinking style as a factor, and how it differs from people's beliefs on common misconceptions and conspiracy-related claims. We will also explain why we think that the thinking style is an important factor to measure both different claims, as well as explain the reasons that we use a different measure to test people's thinking styles. Subsequently, we will identify the gaps between past research and the current study. Finally, our aim is to explore the relationships between thinking styles and beliefs in common misconceptions and conspiracy-related claims. We would like to understand if both relationships are the same or different to each other.

Types of 'false belief'

Misinformation exists in several forms such as common misconceptions, fake news, urban legends, anomalous beliefs, and conspiracy theories, but we will restrict our focus to common misconceptions and conspiracy theories. These unwarranted beliefs have their own characteristic. Fake news often refers to news content that spreads online and which seems to be legitimate news, when it is inaccurate and fabricated (Pennycook & Rand, 2021). Urban legends and urban myths are often referred to as stories, statements, or events that are probably untrue but often repeated and

believed by people (Heath et al, 2001). Furthermore, the origin of these stories is unclear. They often contain sensational and dramatic content and spread in many forms (Dagnall et al., 2017; Heath et al., 2001). Anomalous beliefs include paranormal beliefs and supernatural beliefs. Paranormality refers to a phenomenon that infringes the fundamental and scientifically built principles of nature (Broad, 1953). UFO experiences, one form of this phenomenon, are still reported by many believers (Lewis-Kraus, 2021). Another important form of misinformation that other researchers have been studying is the existence, spread and acceptance of conspiracy theories. A conspiracy theory often indicates events or situations that relate to a secret plan or agreement involving powerful groups or people (Keeley, 1999). It also relates to prejudice and insufficient evidence (Goertzel, 1994).

Conspiracies often try to take over political or economic power, violate rules and regulations, and withhold crucial secrets (Douglas et al., 2019). These false beliefs are generally different from each other. In some ways, they might be similar from various perspectives, such as belief, entertainment, intention to deceive, affiliation, and appeal for justice (van Prooijen, 2021). Firstly, individuals who make claims regarding common misconceptions and anomalous beliefs believe these claims to be true. Secondly, fake news has an apparent feature which is the intention to deceive others. People who make claims related to common misconceptions, urban myths, and anomalous beliefs are not likely to mislead others intentionally. With regard to entertaining perspective, common misconceptions and urban myths may hold this characteristic compared to other false beliefs. As for claims regarding conspiracy theories and urban myths, they are made mostly to signal the importance of social identity in relation to social affiliation. Lastly, most of the false beliefs do not attempt to invoke justice apart from claims associated with conspiracy theories (van Prooijen, 2021).

Conspiracy beliefs in New Zealand and Australia

In New Zealand, it is suggested that almost seventy-five per cent of people believe at least one conspiracy theory (Marques et al., 2021; Marques et al., 2021; Woolf, 2019). In this survey, the conspiracy claims included the national rugby team being poisoned during the 1995 World Cup held in South Africa. Also, world governments tried to conceal the presence of aliens as well as the event

of the NASA moon landing may not be as truthful as it was. Another conspiracy theory in New Zealand is the Canterbury earthquakes in 2011 were said to be triggered by a U.S. military ionosphere research programme-- the High-Frequency Active Auroral Research Programme (HAARP) which is based in Alaska (Bridgeman, 2011). Recent conspiracy-related claims are mainly about COVID-19. Many claims stated that getting the COVID-19 vaccine would cause health issues such as cancer, fertility, and miscarriage (Rouquette, 2021; Schraer, 2021). Many people also question the reliability and effectiveness of the vaccine. Stating the vaccine cannot be trusted because of the fast pace of the development of the vaccine and the rate of hospitalisation is still high (Rouquette, 2021). However, they are already being proven that those were false claims by epidemiologists, immunologists, and scientists (Rouquette, 2021; Schraer, 2021).

Australians hold a similar awareness of conspiracies to New Zealanders on sporting and local conspiracy-related claims. They reported that being aware of sporting conspiracies is easier than local conspiracies (Marques et al., 2021). Some familiar conspiracy claims, for instance, Harold Holt, the 17th Australian Prime Minister, drowned while swimming, but many claimed that he was taken away in a Chinese submarine in the Cold War back fifty years ago (Frame, 2005). More recently conspiracy-related claims which are often related to technologies have spread in Australia, for example, the 5G telecommunications network will lead to serious illnesses in the future (Zappone, 2019). These large amounts of uncertain information lead individuals and communities to seek meanings to random events (Douglas et al., 2019). Some researchers have focused on the beliefs of people in myths, paranormal events, and fake news (Dagnall et al., 2017; Pennycook & Rand, 2021), Douglas et al. (2019) have explored why people believe in conspiracy theories and did a further investigation (Douglas et al., 2019).

Why do people believe in unwarranted beliefs? Why do people make unwarranted claims?

What is not fully understood is why people hold these beliefs and continue to hold them, when many others do not. Exploring how their thinking and thinking styles affect the reasons that induce people to believe in misconceptions and conspiracy theories is critical. Because believing in

conspiracy theories results in the unfairness of decision-making. These conspiracy-related claims are unproven and often contained biased rhetoric. Multiple domains such as science, education, humanities, health, environment and so on, largely affect people's thoughts, behaviours, decision-making, and relations with others or societies (Douglas et al., 2019). According to psychologists and other researchers, people often attempt to believe information that aligns with their viewpoint even though that information is unreliable (Douglas et al., 2019). Individuals are likely to seek stability to reduce their anxiety and worry about societies when the world is in turmoil and unstable (Dagnall & Drinkwater, 2017). These types of misinformation, such as false news or urban myths, which existed in societies, can be manipulated by social media (Dagnall & Drinkwater, 2017).

Douglas and her colleagues (2019) also suggested that people's tendency of believing conspiracy theories is due to association with a range of factors. They are psychological factors, epistemic motives, existential motives, social motives, and demographic factors. Psychological factors are associated with our monological belief system. It is a system where beliefs comprise a self-enclosed and expanding network of thinking that mutually reinforce each other (Goertzel, 1994). People who believe in one conspiracy theory are likely to believe other conspiracy theories. Also, one conspiracy theory becomes 'evidence' for other conspiracy theories (Goertzel, 1994). For example, Miller (2020) found that individuals who believe one COVID-19-related conspiracy theories tend to believe other COVID-19-related conspiracy theories. These COVID-related conspiracy claims include COVID-19 as a biological weapon, and COVID-19 being released by China or US (Miller, 2020). On the other hand, researchers also argued that conspiracy theories sometimes contradict each other rather than supportive (Franks et al., 2017). Therefore, the better explanation is those conspiracy theories are related to each other when they cohere with a higher-level belief system (Douglas et al., 2019).

Epistemic motives refer to our desire for understanding, subjective certainty, and accuracy (Douglas et al., 2019). People tend to believe conspiracy theories when the situations are under a great number of uncertainties (van Prooijen & Jostmann, 2013). Also, when individuals sense

patterns in randomness (van Prooijen et al., 2018) and when they attempt to seek meaning or patterns in their environment, such as paranormal and supernatural phenomena (Burder et al., 2013; Drinkwater, Dagnall, & Parker, 2012). Furthermore, people's need for cognitive closure is associated with conspiracy beliefs (Marchlewska et al., 2018). Conjunction fallacy and thinking styles are also related to conspiracy theories with epistemic motives. Conjunction fallacy is an error in decision-making where people believe that two events occurring in conjunction are more likely than one of those events occurring alone (Brotherton & French, 2015; Dagnall et al., 2017). Individuals who fall into the conjunction fallacy often overestimate the likelihood of co-occurring events (Tversky & Kahneman, 1983). Similarly, Douglas and Sutton (2011) suggested that conspiracy theories are related to people's personal beliefs projecting onto others. For instance, the belief that 'they commit harmful acts' is in part the consequence of the belief that 'I would commit harmful acts'. Swami et al. (2014) and Swami et al. (2018) found that people with lower levels of analytic thinking are likely to hold conspiracy beliefs. Swami et al. (2014) examined if promoting analytic information processing can reduce belief in conspiracy theories. They initiated two sessions in two groups. Testing session and manipulating session; Analytic condition and Control condition. Participants were given a priming task. In the Analytic condition, there were sets of word relating to rational reasoning (analyse, think, reason, rational). In the Control condition, sets of word contained neutral words (shop, chair). During the sessions, they were asked to unscramble words from sentences. For example, "man away the walked" becomes "the man walked away". The results showed that there was no difference in the testing group. However, in the post-manipulation session, participants in the Analytic condition had a significantly lower belief in conspiracy theories compared to participants in the Control condition. This shows that experimental manipulation did activate analytic thinking (Swami et al., 2014). Mikušková (2017) had a similar finding where people who scored lower in rational thinking style tended to hold conspiracy beliefs. Many of the researchers considered cognitive-perceptual factors to be strongly associated with unwarranted beliefs which are related to reality deficits and schizotypy (Dagnall et al., 2017).

Existential motives refer to peoples' desire for control and security. When individuals' existential needs are threatened, we tend to believe in conspiracy theories (Douglas et al., 2019). Individuals are likely to believe in conspiracy theories to regain their sense of control and possess a better account when they consider losing control (Nyhan, 2017; van Prooijan & Acker, 2015). Moreover, people who possess anxious attachment styles (Green & Douglas, 2018), and feelings of powerlessness (Zarefsky, 2014) are likely to believe in conspiracy theories. Conspiracy beliefs are also associated with a lack of understanding of the social world, feeling isolated from the political system (Bruder et al., 2013; Nyhan & Zeitzoff, 2018), and when the economy is getting worse (Krouwel et al., 2017). Social motives suggested that Individuals possess the desire to maintain a positive image of themselves or their group, the desire of being special to fulfil their self-esteem, and the need for others' validation (Cichocka, Marchlewska, & Golec de Zavala, 2016; Douglas et al., 2019). Therefore, people turn to believe in conspiracy theories (Douglas et al., 2019).

Some demographic factors are associated with conspiracy beliefs, such as gender, marital status, level of education, amount of income, and whether to get employed (Douglas et al., 2019; Freeman & Bentall, 2017; Uscinski & Parent, 2014). Men compared to women; unmarried, unemployed individuals are more likely to believe in conspiracy theories (Freeman & Bentall, 2017). Uscinski and Parent (2014) found that individuals who hold higher levels of conspiracy beliefs are less educated and have lower incomes. Also, people who belonged to an ethnic minority group, and have weaker social networks tend to fall into conspiracy theories (Freeman & Bentall, 2017).

Fortunately, Pennycook and Rand (2021) found that not many people actively share misinformation. In general, people tend not to share information that is inaccurate (Pennycook et al., 2021). Also, they are good at distinguishing whether the news is legitimate or misleading (Pennycook et al., 2021). Researchers also suggested that people tend to fall into misinformation due to their way of thinking which often refers to intuitive versus analytic thinking. Penny and Rand (2019) found that people who tend to think analytically are better at distinguishing whether the information is real or fake. Whereas Marques et al. (2021) suggested that analytic thinking is a

significant predictor, other predictors are more important to predict conspiracy beliefs such as trust in others, political ideology and religiosity.

Studies have shown that the continued influence effect contributes to our beliefs in misinformation (Ecker et al., 2011 & Johnson & Seifert, 1994). The idea of the continued influence effect is that the phenomenon that discredited and obsolete information continues to influence our behaviours and beliefs (Johnson & Seifert, 1994). Ecker et al. (2010) suggested that people often rely on misinformation which causes adverse consequences in public settings, such as evidence being disregarded by jurors in the courts. Jurors may rely on unacceptable evidence when they claim they obeyed the instructions while proceeding with their judgement or decisions. Ecker et al. (2010) conducted experiments and showed that two factors can reduce the continued influence effect and people's reliance on misinformation. They are (1) providing a causal alternative (i.e., the warehouse fire was caused by arson, and replacing the statement to the fire was caused by volatile materials in a nearby closet) and (2) increasing suspicion about the origin of the misinformation (i.e., reminding participants that media may publish biased information to deliberately manipulate jury's thinking). Although Ecker et al. (2010) found these two factors can reduce the influence on belief in misinformation. However, it cannot eliminate the continued influence effect. Hence, we can see how formidable the continued influence effect on believing misinformation is.

Researchers use thinking style as a predictor to examine associations with false beliefs. We would like to know if the relationship between thinking styles and common misconceptions and conspiracy theories will be similar or different. For instance, Bensley, Lilienfeld, and Powell (2014) investigated the relationship between thinking styles and psychological misconceptions. Psychological misconceptions included topics related to psychological treatment, memory, intelligence and learning, social psychology, emotion and motivation, mental illness, brain and behaviour, psychology and the law, personality, and consciousness (Lilienfeld et al., 2010). They used four measurements to assess individual differences in thinking styles, the intuitive-experiential and

rational-analytic scales from the Rational-Experiential Inventory of Pacini and Epstein (1999), the Objectivism scale to measure the tendency to be objective and rational, and thinking dispositions associated with psychology. They assessed thinking dispositions by using the Inventory of Thinking Dispositions in Psychology- Revised which investigate active, open-minded attentiveness in psychology, as well as the tendency to take a rational, scientific approach to psychology. The results showed that people who engaged more in the rational-analytic process held fewer psychological misconceptions. Whereas people who trust their intuition are more likely to believe in paranormal claims. The misconceptions in this study are more related to the psychological field. Swami et al. (2012) did similar work with more scientific-related claims. They investigated the relationship between beliefs in science-related myths and individual differences. They measured participants' personalities, anti-scientific attitudes, and New Age beliefs, such as reincarnation, and the spiritual energy in objects. They found that people who are more extravert and high on anti-scientific attitudes tend not to reject inappropriate claims. The predictor was the individual difference, but we could argue that anti-scientific attitude is somewhat related to thinking style.

Conspiracy theories are relatively discussed more among researchers as a type of false belief (Douglas et al., 2019). Marques et al. (2021) investigated the relationships between different factors and beliefs in conspiracy theories. Different factors include epistemic, existential, and relational motives which are corresponded to Douglas et al. (2017). Epistemic motives include an analytic thinking style. Existential motives contained trust, political, and religious ideologies. Relational motives include anomie and disillusionment. The results showed beliefs in conspiracy theories are associated with decreasing in analytic thinking, lower levels of trust in others, increasing in levels of anomie, disillusionment, and the importance of religion and spirituality. Also, having preferences for social political and conservative economic ideology. However, the more important implication was that epistemic motive was a significant factor that correlates to beliefs in conspiracy theories. Existential and relational motives may be more meaningful in individuals' experiences and suggest that both existential and relational motives can better understand the reason why people believe in

conspiracy theories. As discussed above, we believe that there is no existing study that investigates individuals' beliefs in common misconceptions and conspiracy theories and their relationship to thinking styles. We also predict that common misconceptions will be more strongly related to thinking style than conspiracy theories. Because there are other factors that drive individuals to believe conspiracy claims, such as political and cultural reasons.

Thinking styles

Thinking style plays an important role in our life. It affects how we think and predict, and make decisions and judgement (Dewberry et al., 2013; Petty et al., 2009). It also differs in individuals' beliefs and values (Baron et al., 2015). Different thinking styles have their own way of processing information. Dual-Process Theory plays an important role when it comes to distinguishing intuitive and analytic thinking and processing. It suggests that there are two types of processes of human cognition, System 1 or Type 1 versus System 2 or Type 2 processes (Petty & Cacioppo, 1986). System 1 refers to automatic, unconscious, and fast-speed cognitive processes. Whereas System 2 is more about conscious and slow cognitive processes (Chaiken & Trope, 1999; Kahneman, 2011). Many researchers have also argued that there are various types of thinking processes such as intuitive and analytic (Hammond, 1996), or conscious and nonconscious which are all associated with dual-process theory (Wilson, 2002).

Need for Cognition has been the most common scale across the literature for measuring thinking styles. It was described as the tendency for people to engage in and enjoy thinking (Cacioppo & Petty, 1982). This scale is also directed towards the component of the System 2 thinking process of dual-process theory, saying people who tend to engage in the System 2 thinking process have higher needs for cognition (Newton et al., 2021). Subsequently, further development of dual-process theory, for instance, the Rational-Experiential Inventory (Pacini & Epstein, 1999). This measurement includes the Need for Cognition scale which is to measure rationality and the Faith in Intuition scale which is to assess experientiality. Rationality is to test individuals' ability to think logically and analytically as well as reliance on and enjoyment of thinking in a logical, analytical

manner. Experientiality is to assess people's ability regarding their intuitive impressions and feelings as well as reliance on and enjoyment of feelings and intuitions in making decisions (Pacini & Epstein, 1999). The Rational-Experiential Inventory was motivated by Cognitive-Experiential Self-Theory (CEST) which emphasises System 1's fast pace and costs little effort of our cognitive resources (Epstein, 1999). It suggests that most information processing happens outside of conscious awareness, which in turn, makes researchers further study the limited capacity of the rational system.

Evans et al. (1983) provided evidence of dual-process theories of reasoning by studying belief-logic conflict. It is also called the 'Belief-bias effect' which is when a person's value, beliefs, and prior knowledge affects the reasoning process through the acceptance of invalid arguments or statements. This happens when an observer presumes the results of an experiment prior to the experiment and believes it distorts the results (Evans, 2003). The belief-bias experiment showed that participants found it difficult to suppress their prior beliefs when they did try to reason logically on tasks given. Goel and his colleagues (2003) also found neuropsychological evidence of dual processes in reasoning by using the fMRI methodology. They used the belief-bias paradigm which was identical to the results of Evans et al. (1983) and focused on the conflict problems. According to Goel et al. (2003), the conflict problems provided key evidence for dual-process theories of reasoning. Therefore, motivating them to use fMRI techniques and discover different neurological activities in the brain which differentiated either belief or logic processing regarding conflict problems. For instance, attempting to correct decisions logically was associated with activation of the right inferior prefrontal cortex. Whereas belief-biased responses were related to the activation of the ventral medial prefrontal cortex (Goel et al., 2003). This strong evidence has shown that there are different mental processes that are in accordance with the dual-process theory.

However, Cognitive-Experiential Self-Theory was criticised as not broadly aligned with other research in reasoning and decision-making, and this will problematize how thinking styles are measured and conceptualized (Newton et al., 2021). For example, in Cognitive-Experiential Self-

Theory, the traits of the experiential system are automatic, rapid, associative, effortless, holistic, unconscious, evolutionary old, primarily nonverbal, and not much demanding of cognitive resources. Whereas the characteristics of the rational system are analytical, relatively slow, effortful, conscious, evolutionary young, and more demanding on cognitive resources (Newton et al., 2021). Many researchers have argued that these characteristics are not supported by the data (Evans, 2012; Keren & Schul, 2009; Melnikoff & Bargh, 2018; Osman, 2013). For instance, nonconscious processing can be slow and inefficient (Melnikoff & Bargh, 2018), and intuitions can be logical (De Neys & Pennycook, 2019). By characterizing analytic thinking as rational undermined the evidence that people engage in rationalization as well as motivated reasoning (Pennycook, Fugelsang, & Koehler, 2015b; Kaplan et al., 2016). These theoretical developments suggest that there is more to thinking styles than is captured in Cognitive-Experiential Self-Theory which is distinct between Need for Cognition (Preference for Effortful Thinking) and Faith in Intuition (Preference for Intuitive Thinking). Therefore, there is a need to further develop a more advanced way to measure thinking style. A growing number of dual-process theorists suggest that building models of how both intuitive and analytic processing interact and operate will be better off than simply characterizing the distinction between two different types of processes into categories (De Neys, 2017; Pennycook, Fugelsang, & Koehler, 2015b). There are perhaps other characteristics of how individuals engage in intuitive or analytic thinking styles that are not listed as a preference or a feature in theories. There are also possibly other types of thinking styles than merely intuitive versus analytic thinking (Newton et al., 2021). Moreover, people may engage in both intuitive and analytic thinking (Newton, Feeney, & Pennycook, 2021). As a result, Newton et al. (2021) believed that there is a need to investigate what measurement is the best way to measure thinking style.

Measuring thinking style using Comprehensive Thinking Style Questionnaire (CTQS)

There are many measures to examine people's thinking styles. As mentioned, many measurements contain the same or similar dispositions and factors which are overlapping with each other, in a way creating a jangle fallacy (Newton et al., 2021). Many of the major measures of

thinking styles may not capture individuals' thinking patterns in a wide range of differences in how people think (Newton et al., 2021). The Cognitive Reflection Test (CRT) is the most common one to measure thinking styles, but it cannot distinguish various aspects of intuitive and analytic thinking styles. In other words, CRT is too broad to measure analytic thinking. As a result, it may not have enough predictive validity (Newton et al., 2021).

It is hard to tell if we are engaging in intuitive or analytic thinking styles in any situation. Researchers found that people's low initial feelings of confidence can lead to an increase in analytic thinking (Thompson et al., 2011). When there is a conflict between different intuitive responses (thinking about which intuitive response is the best to react), our analytic thought may engage at the same time (Pennycook et al., 2015b). Therefore, finding out whether analytic thinking mostly overrides intuitions can be a criterion to consider if other related measurements have been covered as a feature (Newton et al., 2021). The Actively Open-Minded Thinking scale is one of the scales that measure the characteristic towards reflectivity, which Stanovich and Toplak (2019) stated that the willingness to reflect on evidence that is opposite to existing beliefs, and the willingness to think about alternative viewpoints and explanations. In other words, the Active Open-Minded Thinking scale evaluates the tendency to engage in analytic processing as it obtains to restraining and overriding incorrect intuitive responses.

In Newton et al. (2021) study, they investigated over 260 items from Cognitive Reflection Test (CRT) from Frederick (2005) and Thomson and Oppenheimer (2016), and other related questionnaires of thinking styles measures that are commonly employed in relevant studies which are shown in Table 1. They first narrowed down many items from various measures of thinking style to make the measure stronger in testing thinking style (shown in Table 1). They also investigated if intuitive-analytic thinking styles can be measured behaviourally through CRT. Newton et al. (2021) suggested that CRT can help them narrow down items that are most correlated with a behavioural outcome but not able to identify separate aspects of thinking styles. They also tested underlying factors, such as decision-making style, resistance to change, or demographic factors. Consequently,

they did further studies to find out suitable factors by using Principal Component Analysis (PCA) to decrease the correlated observed variable to a smaller subset. They revealed that a four-factor structure that includes 24 items was the best to measure individuals' thinking styles. They are Actively Open-Minded Thinking (AOT), Close-Minded Thinking (CMT), Preference for Intuitive Thinking (PIT), and Preference for Effortful Thinking (PET). Newton et al. (2021) also tested these four factors' predictive validity using various measures which are associated with thinking styles. For example, religious beliefs, paranormal beliefs, conspiratorial beliefs, moral judgements, bullshit receptivity, empathizing quotient, and subjective happiness. This measure Newton et al. (2021) suggested the Comprehensive Thinking Style Questionnaire (CTQS) which they believe can reveal individual differences in thinking disposition.

Table 1. *Various thinking styles measures that commonly used in relevant studies*

Name of measures	Description of scale and representative item	Source
Actively Open-Minded Thinking Scale	Assesses “the Tendency to weigh new evidence against a favored belief, to spend sufficient time on a problem before giving up, and to consider carefully the opinions of others in forming one’s own.” Example item: “Certain beliefs are just too important to abandon no matter how good a case can be made against them.”	Stanovich & West (2007)
Actively Open-Minded Thinking Scale-10	Assess how an individual’s beliefs are related to how they think people should think. Example item: “People should take into consideration evidence that goes against their beliefs.”	Baron (2019)
Comprehensive Intellectual Humility Scale	Assess “openness to revising one’s viewpoints, lack of overconfidence about one’s knowledge, respect for the viewpoints of others, and lack of threat in the face of intellectual disagreements.” Example item: “I am willing to change my mind once it’s made up about an important topic.”	Krumrei-Mancuso & Rouse (2016)
Epistemic Curiosity Scale	“Assess the degree to which people desire knowledge because they have high intrinsic interest (the interest subscale) and because they are troubled when they lack information (the Deprivation subscale).” Example item: “I enjoy exploring new ideas.”	Litman & Spielberger (2003)
Faith in Intuition Scale	Assess an individual’s trust in their own intuition when making decisions.	Epstein et al. (1996)

	Example item: "I believe in trusting my hunches."	
General Decision-Making Style Questionnaire	Assess how individuals respond when faced with a decision and distinguishes between 5 decision styles that are used: rational, avoidant, dependent, intuitive, and spontaneous. Example item: When making a decision, I consider various options in terms of a specified goal."	Scott & Bruce (1995)
Importance of Rationality Scale	Assess "the strength of one's preference to be epistemically rational", i.e., "how important people think it is that their own beliefs are based on logic and evidence." Example item: "It is important to me personally to be skeptical about claims that are not backed up by evidence."	Ståhl, Zaal, & Skitka (2016)
Intolerance of Ambiguity Scale	Assess "the tendency to perceive ambiguous situations as desirable." Example item: "It is more fun to tackle a complicated problem than to solve a simple one."	Budner (1962)
Need for Closure Scale	Assess "the desire for a definite answer on some topic, <i>any</i> answer as opposed to confusion and ambiguity." Example item: "When thinking about a problem, I consider as many different opinions on the issue as possible."	Kruglanski, Atash, De Grada, Mannetti, & Pierro (2013)
Need for Cognition Scale	Assess "individuals' tendency to engage in and enjoy effortful cognitive activity." Example item: "Thinking is not my idea of fun."	Cacioppo & Petty (1982)
Need for Evidence Scale	Assess the "importance of consistency between empirical evidence and beliefs." Example item: "A hunch needs to be confirmed with data."	Garrett & Weeks (2017)
Need to Evaluate Scale	Assess the tendency to "engage in evaluative	Jarvis & Petty (1996)

	responding” and judge objects as good or bad. Example item: “I form opinions about everything.”	
Preference for Intuition and Deliberation Scale	Assess “individual preferences to base decisions on gut feelings or affect and also assess preferences for thoughtful, reflective decisions.” Example item: “When I have a problem I first analyze the facts and details before I decide.”	Betsch (2004)
Resistance to Change	Assess the “tendency to resist or avoid making changes, to devalue change generally, and to find change aversive across diverse contexts and types of change.” Example item: “Once I have come to a conclusion, I am not likely to change my mind.”	Oreg (2003)
Self-Righteousness Scale	Assess the “conviction that one’s behaviors or beliefs are correct, especially in contrast to alternate behaviors or beliefs.” Example item: “To me, things don’t seem black and white, they are mostly shades of gray.”	Falbo & Belk (1985)

Note. Adapted from “The Comprehensive Thinking Styles Questionnaire: A novel measure of intuitive-analytic thinking styles,” by C. Newton, J. Feeney, & G. Pennycook, 2021.

The rationale of the current study

Misinformation such as common myths and conspiracy theories often lead individuals to form false belief and misjudgement. Holding false beliefs may cause people to reject scientific consensus and mainstream medicine which can result in negative consequences in society and even the world (Douglas et al., 2019). For example, the COVID pandemic causes a huge impact everywhere in the world. Lots of false COVID information are going around influencing people's life. Misinformation affects people's decisions on getting vaccinated, as well as behaving on different methods of prevention. Whether to wear a mask, sanitize our hands, or keep social distance from others. Therefore, preventing ourselves from falling into misinformation is crucial. Examining essential factors that lead to belief in misinformation and exploring the relationships between the important factor and beliefs in misinformation are essential.

Past research suggested that differences in thinking disposition and cognitive-perceptual factors have an influence on belief in urban legends as well as paranormal phenomena (Dagnall et al., 2017).

Dagnall et al. (2017) found that people who exhibited reality deficit and cognitive-perceptual factors of schizotypy believed in urban legends as well as paranormal phenomena more than people who did not. Reality deficit refers to individuals who have difficulties perceiving, processing or acting upon reality. Dagnall et al. (2017) investigated the relationship between belief in urban legends and paranormal phenomena as well as reality deficit and cognitive-perceptual personality factors using correlational design. There were 222 participants aged 16 to 63, including both genders but mostly females. The measures included the Urban Legends Questionnaires (ULQ), the Reality Testing subscale of the Inventory of Personality Organisation (IPO-RT), The Revised Paranormal Belief Scale (R-PBS), and the Schizotypal Personality Questionnaire Brief (SPQ-B). The ULQ contains seven urban legends, and each is followed by a narrative in a form of a story, or article. Several questions followed each narrative, such as the previous knowledge of the story, the belief of the story already heard by others, the possibility of retelling the story, and the truthfulness of the story. However, the

focus of the study was on the endorsement of the truthfulness of each item. Reality test is to test our ability to distinguish between internal and external sources of information accurately. IPO-RT is to assess if participants have a proneness to RT deficits. Also, IPO-RT emphasises an information processing style rather than psychotic symptoms. R-PBS contains 26 items to assess seven aspects of paranormal belief such as superstition, spiritualism, and traditional religious belief. SPQ-B contains 22 items to assess individuals' level of schizotypy. It is a shorter version of the 74-item SPQ from three subscales including cognitive-perceptual, interpersonal, and disorganized. The results showed that RT and the cognitive-perceptual factor of schizotypy predict belief in paranormal phenomena and the endorsement of urban legends. Furthermore, the interpersonal and disorganized facets of schizotypy showed only weak relationships with beliefs in anomalous beliefs. The deficits of RT were more related to beliefs in urban legends, and the cognitive-perceptual factor was more related to beliefs in paranormal phenomena.

Furthermore, researchers also found that individuals who tend to think analytically compared to intuitively are not likely to believe in conspiracy theories (Ståhl & van Prooijen, 2018; Swami et al., 2014). Aarnio and Lindeman (2005) stated that intuitive thinking was positively correlated with belief in paranormal belief. Swami et al. (2014) conducted four studies to investigate the effect of thinking disposition on beliefs in conspiracy theories. The first study they conducted was a correlation study that examined relationships between belief in conspiracy theories and a wide range of thinking dispositions which mainly appealed to analytic and intuitive systems/ thinking styles. There were 990 participants including males and females, aged 18 to 71, who resided in Britain. The measures included the Belief in Conspiracy Theories Inventory (BCTI) which contains 15 conspiracy theories rated on a 9-point scale to test participants' belief in conspiracy theories. Participants also have to complete the Rational/ Experiential Multimodal Inventory (RELM) which is a revision of the Rational Experiential Inventory. RELM consists of 12 items measuring individuals' analytic thinking styles. Also, RELM contains 30 items to measure people's experiential thinking styles. These 30 items consist of three subscales (with 10 items each) which are Intuition,

Emotionality, and Imagination Participants also need to be assessed their open-minded thinking by the Actively Open-Minded Thinking scale (AOT) as well as need for cognition by Need for Cognition scale (NCogS) and need for closure by Need for Closure Scale (NCloS). Also, demographic information, such as sex, age, and levels of education were assessed. The results of the first study showed that belief in conspiracy theories was negatively correlated with analytic thinking style and open-minded thinking. Furthermore, belief in conspiracy theories was positively correlated with intuitive thinking style and the need for closure. They also found that the need for cognition and the need for closure were not strong predictors of belief in conspiracy theories. Therefore, analytic thinking was the strongest predictor in terms of belief in conspiracy theories. Researchers then undertook other studies which demonstrated encouraging analytic thinking can reduce belief in conspiracy theories.

Both studies pointed out the crucial predictor of belief in misinformation which is analytic thinking. One focused on urban legends and belief in the paranormal, whereas the other investigated belief in conspiracy theories. Marques et al. (2021) did investigate many factors that drive people to believe in conspiracy theories. Whereas not many researchers conduct studies about common misconceptions, as well as finding relationships between different factors and common misconceptions. More specifically, the relationship between thinking styles and common misconceptions. What is more, thinking style is extensive. It affects us in many aspects in lives. If we understand the relationship between thinking styles and beliefs in misinformation. We could attempt to prevent or even stop the event of believing them. In addition, the main reason for the present study is to explore whether susceptibility to conspiracy theories is associated with susceptibility to common misconceptions. We would like to examine whether the relationship between analytic thinking and belief in common myths as well as conspiracy-related claims would differ or not by using CTQS which we consider a better measurement for assessing thinking style. If both relationships differ from each other, we could assume that there are factors other than thinking styles that drive people to believe in conspiracy theories or common misconceptions. For

example, we think that there are strongly political, cultural, or other 'drivers' of conspiracy belief that are probably not an important factor for determining common misconception belief. On the other hand, if both relationships are the same as each other, then we could provide evidence that thinking style is a strong predictor which drives individuals to believe both conspiracy-related claims and common misconceptions.

Overall aim and research questions

The aim of the present study is to explore the relationship between thinking style and beliefs in common myths and conspiracy-related claims among adult Australians and New Zealanders. This involves looking for connections between the existence of beliefs in common misconceptions and conspiracy-related claims and the dominant thinking styles the participants demonstrate using. The four research questions are:

Research Question 1: Is common misconception belief positively correlated with conspiracy belief?

Research Question 2: Are people who tend to think analytically or rationally less likely to believe in common misconceptions?

Research Question 3: Are people who tend to think analytically or rationally less likely to believe in conspiracy-related claims?

Research Question 4: Does the relationship between analytic thinking and belief in common misconceptions differ from the relationship between analytic thinking and belief in conspiracy-related claims?

Method

Participants and Procedure

Our participants are collected from Qualtrics and the Prolific crowdsourcing platform. Participants are informed that this project is to investigate how people think about common claims about the world (see Appendix B). They completed an online questionnaire which contains 60 questions in 2021. Participants must reside either in Australia or New Zealand, aged 18 or over. This study was approved by the Massey University Human Ethics Committee (see Appendix C)

Questionnaire

The questionnaire includes demographic information and main questions related to common misconceptions and conspiracy-related claims (see Appendix D).

The common misconception items include both items from Swami et al. (2012) and a few that we created ourselves. (The Swami items were examined by themselves but the same pattern of results was obtained. Therefore, there is no need to show those analyses.) Participants responded to how much they believe in misconception and claim items on a 5-point Likert scale ranging from 1 (definitely false) to 5 (definitely true).

The Comprehensive Thinking Style Questionnaire (CTQS) was included in the questionnaire to investigate participants' thinking styles on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The CTQS contains 4 subscales which are Actively Open-Minded Thinking (AOT), Close-Minded Thinking (CMT), Preference for Intuitive Thinking (PIT), and Preference for Effortful Thinking (PET). There are 6 questions for each subscale, and the total CTQS contains 24 questions.

Demographic information includes age, gender, annual income, education level, country and the area they live in.

The participants were measured on how much they believed in common misconceptions using some questionnaire items from Swami et al. (2012). They were also measured on how much they believed in conspiracy-related claims using a selection from John Kerr et al.'s survey. We also add a couple of contemporary items related to Covid. The ones we have chosen from Swami et al. (2012) and John Kerr et al. are more widely known or heard. We added some Covid-related questions to fit in a real-life situation and to see if they behave differently from older misconceptions and conspiracy-related claims.

Results

Analytic Plan

The analyses were carried out in two steps. First, we intended to find out whether belief in misconceptions is correlated with belief in conspiracies. We also assessed participants' thinking styles and demographic information, such as age and educational level, and whether those factors are correlated with belief in misconceptions and conspiracies. Second, we conducted a regression analysis to investigate stronger predictors which affected our dependent variable (belief in misconceptions and belief in conspiracies).

Data Preparation

Missing data and exclusions

Data from 13 participants were put into missing data because they did not complete questions related to belief in common misconceptions and belief in conspiracy-related claims. Moreover, even though some of the participants did not complete questions about demographic information, we did not exclude them from the data due to demographic information is not our variable in our analysis.

As hypothesized belief in common misconceptions was moderately positively correlated to belief in conspiracies scores, $r = .404$, $p < .001$ (see Table 2). Also, belief in common misconceptions and belief in conspiracy theories were weakly negatively correlated to Active Open-Minded Thinking, $r = -.321$, $p < .001$ and $r = -.324$, $p < .001$ respectively. Belief in common misconceptions was weakly positively correlated to Close-Minded Thinking, $r = .118$, $p = .067$; Belief in conspiracy theories was weakly positively correlated to Close-Minded Thinking, $r = .213$, $p < .001$. Belief in common misconceptions and belief in conspiracy theories were weakly positively correlated to Preference for Intuitive Thinking, $r = .329$, $p < .001$ and $r = .305$, $p < .001$ respectively. Belief in common misconceptions and belief in conspiracy theories were weakly negatively correlated to Preference for Effortful Thinking, $r = -.179$, $p = .005$ and $r = -.236$, $p < .001$ respectively. Age and belief in

misconceptions are slightly positively correlated, $r = .065$ but it is not significant, $p = .318$. However, age and belief in conspiracy theories are slightly negatively correlated, $r = -.065$, $p = .316$. Education and belief in misconceptions as well as belief in conspiracy theories are both negatively correlated, although both values are not significant, $r = -.077$, $p = .225$ and $r = -.140$, $p = .027$ respectively, see Table 2. As a result, people with Active Open-Minded Thinking tend not to believe in common misconceptions and conspiracies. People with Preference for Intuitive Thinking tend to believe in conspiracies.

This suggested that Conspiracy Theory Belief (CTB) and Misconception Belief (MB) correlate (small to moderate-sized correlations) with all of the thinking style subscales with one exception- although CTB is correlated with Close-Minded Thinking, MB is not. This is an interesting finding which suggests that a possible difference between the processes that lead us to believe in conspiracies compared to the processes that lead us to believe in misconceptions. Education has a small correlation with CTB. Lower education is associated with greater belief. However, MB does not show this pattern. Age is not correlated with either CTB or MB. It is interesting because many surveys show that younger people are more likely to believe in conspiracies than older people (Galliford & Furnham, 2017; Duplaga, 2020). This may be because we had a relatively young sample, therefore we did not detect this relationship. Moreover, age is only correlated with one thinking style- Preference for Effortful Thinking (PET). There is a small positive correlation indicating that older people have a slightly greater Preference for Effortful Thinking. On the other hand, education has small correlations with all of the thinking styles except for Close-Minded Thinking (CMT). The correlations suggest that people with more education engage in more Active-Minded Thinking (AOT) and Preference for Effortful Thinking (PET) while having less Preference for Intuitive Thinking (PIT). As a result, it is interesting to find out that the thinking style that seems to be related to CTB. However, MB does not show this pattern, and also the thinking style is not systematically related to education.

Descriptive statistics for Misonception Items

Descriptives

	Mean	SD
Myth_brain	2.20	1.207
Myth_eq	2.17	0.903
Myth_alive	2.83	1.226
Myth_soda	2.80	1.083
Myth_hairdark	2.55	1.293
Myth_gum	1.90	1.046
Myth_hairdeath	2.87	1.368
Myth_battery	2.45	0.866
Myth_mensex	1.99	1.102
Myth_coldwater	1.46	0.681
Myth_TVeye	3.40	1.205
Myths_ozoneGW	3.64	1.071
Myths_coolfans	2.86	1.373
Myths_vitaminDcovid	2.27	1.143

Descriptive statistics for Conspiracy Items

Descriptives

	Mean	SD
Consp_bigbusiness	3.72	1.131
Consp_minorities	2.77	1.218
Consp_NASA	1.85	1.069
Consp_aliens	2.34	1.205
Consp_911	2.51	1.152
Consp_HIVlab	1.80	0.938
Consp_WHOmask	2.19	1.176
Consp_Covidbioweapon	2.38	1.213

Table 2. Intercorrelations between Active Thinking, Close-Minded Thinking, Preference for Intuitive Thinking, Preference for Effortful Thinking, Age, Education, Mean of Misconception belief, Mean of Conspiracy theory belief.

Correlation Matrix		AOT	CMT	PIT	PET	Age	Educ	Misco ncepti on Belief	Conspir acy Theory Belief
AOT	Pearson's r	-							
	P-value	-							
CMT	Pearson's r	-0.151	-						
	P-value	0.017	-						
PIT	Pearson's r	-0.348	0.038	-					
	P-value	<.001	0.556	-					
PET	Pearson's r	0.304	-0.196	-0.149	-				
	P-value	<.001	0.002	0.019	-				
Age	Pearson's r	0.085	0.048	0.027	0.156	-			
	P-value	0.188	0.459	0.676	0.016	-			
Educ	Pearson's r	0.202	-0.020	-0.152	0.245	0.132	-		
	P-value	0.001	0.756	0.016	<.001	0.040	-		
Misconc eption Belief	Pearson's r	-0.321	0.118	0.329	-0.179	0.065	-	-	
	P-value	<.001	0.067	<.001	0.005	0.318	0.07 7 0.22 5	-	
Conspir acy Theory Belief	Pearson's r	-0.324	0.213	0.305	-0.236	-0.065	-	0.404	-
	P-value	<.001	<.001	<.001	<.001	0.316	0.14 0 0.02 7	<.001	-

We also did a hierarchical multiple regression, using the common misconception score and conspiracy score as the dependent variable. We attempted to explore how belief in misconception is associated with belief in conspiracies while controlling for the covariates of age and education. According to Table 3, it shows that 1.35% of the variation in belief in misconception can be explained by age and education. 20.9% of the variation in belief in misconception can be explained by thinking styles. Also, thinking styles compared to age and education, improved the explanation of the variance in data by 19.6%. In other words, thinking styles can better explain people's beliefs in misconceptions in comparison to age and education. Other descriptive statistic results show that 34.2% of the variation in belief in misconception can be explained by age, $p = .170$. 1% of the variation in belief in misconception can be explained by education, $p = .806$. 163.8% of the variation in belief in misconception can be explained by Active Open-Minded Thinking, $p = .003$. 28.1% of the variation in belief in misconception can be explained by Close-Minded Thinking, $p = .214$. 362.9% of the variation in belief in misconception can be explained by Preference for Intuitive Thinking, $p < .001$. 31.4% of the variation in belief in misconception can be explained by Preference for Effortful Thinking, $p = .189$. Moving on to Table 4, the results show that 2.72% of the variation in belief in conspiracies can be explained by age and education. 20.1% of the variation in belief in conspiracies can be explained by thinking styles. Thinking styles compared to age and education, improved the explanation of the variation in data by 17.4%. In other words, thinking styles can better explain people's belief in conspiracies in comparison to age and education. Other descriptive statistic results show that 19.6% of the variation in belief in conspiracies can be explained by age, $p = .523$. 33.8% of the variation in belief in conspiracies can be explained by education, $p = .402$. 317.5% of the variation in belief in conspiracies can be explained by Active Open-Minded Thinking, $p = .011$. 328.1% of the variation in belief in conspiracies can be explained by Close-Minded Thinking, $p = .009$. 621.7% of the variation in belief in conspiracies can be explained by Preference for Intuitive Thinking, $p < .001$. 128.7% of the variation in belief in conspiracies can be explained by Preference for Effortful Thinking, $p = .103$. These results from regression show that when we controlled for age and

education, Preference for Intuitive Thinking and Active Open-Minded Thinking are the only significant predictors of belief in common misconceptions. However, when we look at simple bivariate correlations, Preference for Effortful Thinking is also related to misconceptions, but we do not see that in the regression analysis. On the other hand, Close-Minded Thinking in the results from the regression for conspiracy beliefs shows it as a significant predictor. In fact, Close-Minded Thinking was found to be the strongest predictor for conspiracy beliefs. This suggests that Close-Minded Thinking might be the difference in the factor that drives conspiracy beliefs compared to misconception beliefs.

Table 3. Hierarchical Multiple Regression Predicting Australian and New Zealander Common Misconception Belief with Thinking Style by Each Subscale and Demographic Information.

Linear Regression Common Misconceptions

Model Fit Measures

Model	R	R ²	Adjusted R ²	AIC	Overall Model Test			
					F	df1	df2	p
1	1.116	0.0135	0.00481	312	1.55	2	227	0.214
2	0.458	0.2099	0.18859	269	9.87	6	223	<.001

Model Comparisons

Comparison		ΔR^2	F	df1	df2	p
Model	Model					
1	-2	0.196	13.9	4	223	<.001

Model Specific Results

Omnibus ANOVA Test

	Sum of Squares	df	Mean Square	F	p
Age	0.3429	1	0.3429	1.8932	0.170
Educ	0.0109	1	0.0109	0.0603	0.806
AOT	1.6381	1	1.6381	9.0433	0.003
CMT	0.2818	1	0.2818	1.5560	0.214
PIT	3.6299	1	3.6299	20.0396	<.001
PET	0.3141	1	0.3141	1.7340	0.189
Residuals	40.3937	223	0.1811		

Note. Type 3 sum of squares

Model Coefficients – Misconception Belief

Predictor	Estimate	SE	95% Confidence Interval		t	p	Stand. Estimate	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Intercept	2.37941	0.273990	1.83964	2.91917	8.687	<.001			
Age	0.00338	0.00246	-0.00146	0.00822	1.376	0.170	0.0841	-0.0364	0.2046
Educ	0.00464	0.01891	-0.03262	0.04191	0.246	0.806	0.0153	-0.1078	0.1385
AOT	-0.01927	0.00641	-0.03191	-0.00664	-3.007	0.003	-0.2012	-0.3331	-0.0694
CMT	0.00718	0.00576	0.00416	0.01852	1.247	0.214	0.0762	-0.0442	0.1966
PIT	0.02840	0.00635	0.01590	0.04091	4.477	<.001	0.2901	0.1624	0.4178
PET	-0.00828	0.00629	-0.02067	0.00411	-1.317	0.189	-0.0857	-0.2141	0.0426

Table 4. Hierarchical Multiple Regression Predicting Australian and New Zealander Conspiracy-related Belief with Thinking Style by Each Subscale and Demographic Information.

Linear Regression Conspiracies

Model Fit Measures

Model	R	R ²	Adjusted R ²	AIC	Overall Model Test			
					F	df1	df2	p
1	0.165	0.0272	0.00189	541	3.25	2	232	0.041
2	0.449	0.2014	0.1804	503	9.58	6	228	<.001

Model Comparisons

Comparison		ΔR^2	F	df1	df2	p
Model	Model					
1	-2	0.174	12.4	4	228	<.001

Model Specific Results

Omnibus ANOVA Test

	Sum of Squares	df	Mean Square	F	p
Age	0.196	1	0.196	0.409	0.523
Educ	0.338	1	0.338	0.706	0.402
AOT	3.175	1	3.175	6.631	0.011
CMT	3.281	1	3.281	6.852	0.009
PIT	6.217	1	6.217	12.983	<.001
PET	1.287	1	1.287	2.687	0.103
Residuals	109.171	228	0.479		

Note. Type 3 sum of squares

Model Coefficients – Conspiracy Belief

Predictor	Estimate	SE	95% Confidence Interval		t	p	Stand. Estimate	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Intercept	2.61895	0.43797	1.75596	3.48193	5.980	<.001			
Age	-0.00253	0.00395	-	0.00526	-	0.523	-0.0388	-	0.0808
			0.01032		0.640			0.1585	
Educ	-0.02545	0.03028	-	0.03422	-	0.402	-0.0522	-	0.0702
			0.08511		0.840			0.1746	
AOT	-0.02629	0.01021	-	-	-	0.011	-0.1718	-	-
			0.04641	0.00617	2.575			0.3032	0.0403
CMT	0.02428	0.00928	0.00600	0.04256	2.618	0.009	0.1593	0.0394	0.2791
PIT	0.03675	0.01020	0.01665	0.05684	3.603	<.001	0.2313	0.1048	0.3578
PET	-0.01656	0.01010	-	0.00334	-	0.103	-0.1066	-	0.0215
			0.03647		1.639			0.2347	

To answer our research question 2 and 3. As seen from the analyses of correlations and multiple regressions above, we conclude that people who tend to think intuitively are likely to believe in common misconceptions and conspiracy-related claims. Individuals with Active Open-Minded Thinking tend not to believe in common misconceptions and conspiracy-related claims. Moreover, Active Open-Minded Thinking and Preference for Intuitive Thinking are the stronger predictor of belief in misconceptions. On the other hand, Close-Minded Thinking is the strongest predictor of belief in conspiracy-related claims.

We also conducted reliability analysis to examine both common misconceptions and conspiracy-related claims' internal consistency, see Table 5 and 6. The data shows that mean of the common misconception scale is .636 (Cronbach's alpha) and .660 (McDonald's omega), and the mean of the conspiracy-related claim scale is .814 (Cronbach's alpha) and .819 (McDonald's omega).

Table 5. *Reliability analysis of beliefs in common misconceptions.*

Reliability Analysis Misconceptions				
Scale Reliability Statistics				
	mean	sd	Cronbach's α	McDonald's ω
scale	2.52	0.471	0.636	0.660
Item Reliability Statistics				
	mean	sd	If item dropped	
			Cronbach's α	McDonald's ω
Myth_brain	2.17	1.199	0.591	0.618
Myth_eq	2.16	0.905	0.638	0.665
Myth_alive	2.83	1.230	0.633	0.659
Myth_soda	2.80	1.088	0.616	0.644
Myth_hairdark	2.55	1.299	0.591	0.621
Myth_gum	1.89	1.042	0.592	0.612
Myth_hairdeath	2.87	1.371	0.620	0.644
Myth_battery	2.44	0.867	0.623	0.649
Myth_mensex	1.98	1.102	0.591	0.618
Myth_coldwater	1.45	0.647	0.615	0.631
Myth_TVeye	3.39	1.204	0.607	0.635
Myths_ozoneGW	3.64	1.081	0.629	0.657
Myths_coolfans	2.88	1.377	0.640	0.660
Myths_vitaminDcovid	2.27	1.152	0.661	0.679

Table 6. *Reliability analysis of beliefs in conspiracy-related claims.*

Reliability Analysis Conspiracies				
Scale Reliability Statistics				
	mean	sd	Cronbach's α	McDonald's ω
scale	2.44	0.752	0.814	0.819

Item Reliability Statistics				
	mean	sd	If item dropped	
			Cronbach's α	McDonald's ω
Consp_bigbusiness	3.72	1.131	0.810	0.818
Consp_minorities	2.77	1.218	0.802	0.809
Consp_NASA	1.85	1.069	0.788	0.792
Consp_aliens	2.34	1.205	0.788	0.794
Consp_911	2.51	1.152	0.788	0.797
Consp_HIVlab	1.80	0.938	0.785	0.787
Consp_WHOMask	2.19	1.176	0.797	0.804
Consp_Covidbioweapon	2.38	1.213	0.781	0.786

Table 7. *Exploratory factor analysis of beliefs in common misconceptions.*

Exploratory Factor Analysis

Factor Loadings

	Factor			Uniqueness
	1	2	3	
Myth_gum	0.659			0.534
Myth_coldwater	0.597			0.688
Myth_hairdark	0.499		0.143	0.699
Myths_TVeye	0.430			0.808
Myth_brain	0.369	0.352		0.631
Myth_mensex	0.332	0.203	0.199	0.710
Myths_vitaminDcovid	0.218	-0.190	-0.119	0.945
Myth_hairhealth		0.453		0.766
Myth_battery		0.426		0.815
Myth_soda		0.311	0.201	0.842
Myth_alive		0.262	0.184	0.903
Myths_ozoneGW			0.519	0.727
Myths_coolfans		-0.149	0.487	0.743
Myth_eq		0.172	0.180	0.942

Note. 'Principal axis factoring' extraction method was used in combination with a 'oblimin' rotation

Factor Statistics

Summary

Factor	SS Loadings	% of Variance	Cumulative %
1	1.625	11.60	11.6
2	0.894	6.39	18.0
3	0.730	5.22	23.2

Inter-Factor Correlations

	1	2	3
1	-	0.451	0.209
2		-	0.123
3			-

Model Fit

Model Fit Measures

RMSEA	RMSEA 90% CI		TLI	BIC	Model Test		
	Lower	Upper			χ^2	df	p
0.00	0.00	0.0407	1.000	-234	52.1	52	0.472

Assumption Checks

Bartlett's Test of Sphericity

χ^2	df	p
579	28	< .001

KMO Measure of Sampling Adequacy

	MSA
Overall	0.741
Myth_brain	0.763
Myth_eq	0.583
Myth_alive	0.624
Myth_soda	0.804
Myth_hairdark	0.771
Myth_gum	0.746
Myth_hairdeath	0.728
Myth_battery	0.669
Myth_mensex	0.817
Myth_coldwater	0.786
Myth_TVeye	0.817
Myths_ozonew	0.613
Myths_coolfans	0.592
Myths_vitaminDcovid	0.475

Table 8. Exploratory factor analysis of beliefs in conspiracy-related claims.

Exploratory Factor Analysis

Factor Loading

	Factor		Uniqueness
	1	2	
Consp_bigbusiness		0.722	0.520
Consp_minorities		0.611	0.565
Consp_NASA	0.628		0.558
Consp_aliens	0.571		0.593
Consp_911	0.339	0.394	0.602
Consp_HIVlab	0.822		0.384
Consp_WHOMask	0.443		0.700
Consp_Covidbioweapon	0.753		0.439

Note. 'Principal axis factoring' extraction method was used in combination with a 'oblimin' rotation

Factor Statistics

Summary

Factor	SS Loadings	% of Variance	Cumulative %
1	2.41	30.1	30.1
2	1.23	15.4	45.5

Inter-Factor Correlations

	1	2
1	-	0.477
2		-

Model Fit

Model Fit Measures

RMSEA	RMSEA 90% CI		TLI	BIC	Model Test		
	Lower	Upper			χ^2	df	p
0.0633	0.0265	0.0987	0.948	-45.7	26.2	13	0.016

Assumption Checks

Bartlett's Test of Sphericity

χ^2	df	p
579	28	< .001

KMO Measure of Sampling Adequacy

	MSA
Overall	0.833
Consp_bigbusiness	0.722
Consp_minorities	0.772
Consp_NASA	0.886
Consp_aliens	0.906
Consp_911	0.899
Consp_HIVlab	0.794
Consp_WHOMask	0.872
Consp_Covidbioweapon	0.801

Discussion

Our first aim was to examine whether belief in common misconceptions and conspiracy-related claims are correlated. The data shows that belief in common misconceptions and conspiracy-related claims are positively correlated which indicates that people who tend to believe in common misconceptions are likely to also believe in conspiracy-related claims. Lobato et al. (2014) also found that belief in one type of unwarranted belief tends to be associated with endorsement of other types (Lobato et al., 2014). In their study, they investigated three different types of unwarranted belief: paranormal belief; conspiracy belief; and pseudoscience. They suggested that belief types share fundamental characteristics which lead people to believe one another. Firstly, pseudoscience claims and conspiracy theory beliefs are often difficult to tease apart. Since pseudoscience and conspiracy claims are often erroneous and incomplete, they make use of each other to support their position and belief (e.g., climate change denial; see Lewandowsky, Gignac, et al., 2013 & Lewandowsky, Oberauer, et al., 2013). Secondly, the focus of each unwarranted belief may differ, but the rhetorical strategies (the mechanisms used by way of wording during communication that encourage action or convince others) supporters used to defend these unwarranted beliefs are almost identical. Lastly, they lack *epistemic warrants*. This concept, which comes from the philosophy of science literature, refers to “the totality of evidence and knowledge that is accessible to human knowledge seekers at the time in question” (Hansson, 2009, p.239) and it is often used to distinguish paranormal beliefs and conspiracy theories from empirically supported explanations. Both paranormal beliefs and conspiracy claims are often failed to evaluate the totality of evidence relevant to their specific claims (Lobato et al., 2014).

To compare these three fundamental characteristics with common misconceptions, we believe that common misconceptions and conspiracy theories have a lot in common. Firstly, misconceptions are nearly always required to believe a conspiracy theory. For example, the conspiracy theory that the government is spraying mind-changing chemicals from aircraft (‘chemtrail

conspiracy theory') relates to the misconception that plane vapour trails contain mind-changing chemicals (also a misconception) as well as the belief that the government is doing it in private to manipulate the population (a malevolent conspiracy type of the belief). Therefore, people who are prone to believe misconceptions, are already prone to believe an element of a conspiracy theory. Secondly, the 'rhetorical strategies' idea from Lobato et al. (2014) is similar to our ideas about thinking styles. They fundamentally both boil down to the idea that people who believe conspiracy theories or misconceptions are mostly likely to think or argue in a particular way. In this thesis, we provided evidence in favour of the idea that belief in misconceptions and belief in conspiracy theories are related to similar kinds of thinking styles. Although we cannot make a causal claim from our data, our data are consistent with conspiracy beliefs and misconception beliefs being, at least partly, caused by a particular type of thinking style. The final shared characteristic is strongly related to the previous one – the finding that conspiracy and misconception believers are less systematic or analytic with their use of evidence. This is reflected in our findings of participants' Preference for Effortful Thinking and Active Open-Minded Thinking.

Specifically, we wanted to find out if people who think analytically are less likely to believe in common misconceptions and whether individuals who think more intuitively are more likely to believe in common misconceptions. The results also indicated that people who scored higher on Close-Minded Thinking and Preference for Intuitive Thinking are more likely to believe in misconceptions and conspiracy-related claims. Furthermore, people who scored higher on Preference for Intuitive Thinking believe in common misconceptions and conspiracy theories more than people who were high score on Close-Minded Thinking. A similar finding was found by Swami et al. (2014). They suggested that analytic thinking is associated with lower belief in conspiracy theories. They conducted a correlational study to examine the association between belief in conspiracy theories and a range of thinking dispositions. Thinking dispositions included experiential and analytic thinking styles, open-minded thinking, the need for cognition, and the need for closure.

The results showed that belief in conspiracy theories was negatively correlated with analytic thinking style and open-minded thinking. Also, belief in conspiracy theories was positively correlated with intuitive thinking and the need for closure.

Barron et al. (2018) and van Prooijen (2018) believe that analytic thinking decreased beliefs in conspiracies. Individuals who tend to think analytically compared to intuitively are less likely to believe in conspiracy theories. This is similar to our finding that people who scored higher on Preference for Intuitive Thinking are more likely to believe in misinformation. Barron et al. (2018) conducted a path analysis study, providing evidence that analytic thinking mediated the relationship between odd beliefs and conspiracy beliefs. Moreover, studies found that conspiracy beliefs are strongly related to a belief in simple solutions for complex societal situations (van Prooijen et al., 2015). Van Prooijen (2017) conducted a hierarchical regression analysis and found several indirect effects of the level of education on belief in conspiracy theories. They suggested that education decreased belief in simple solutions due to an increased capacity for analytic thinking (van Prooijen, 2017). Uscinski and Parent (2014) also suggest that people who hold higher levels of conspiracy beliefs are less educated. However, in our study, education is not a significant predictor to examine the extent to which people believe in misinformation or not. Beliefs in misconceptions and conspiracy-related claims can be explained better by thinking styles than levels of education.

Regarding the research question that the relationship between analytic thinking and belief in common misconceptions was the same or different from the relationship between analytic thinking and belief in conspiracy-related claims. We consider that the relationships between thinking styles and common misconceptions and conspiracy-related claims are mostly similar to each other. In terms of correlation, both beliefs in common misconceptions and conspiracy theories were negatively correlated with Active Open-Minded Thinking as well as Preference for Effortful Thinking and education. This result is similar to Swami et al. (2014) finding that belief in conspiracy theories was negatively correlated with analytic thinking styles and open-minded thinking. On the other

hand, both beliefs in common misconceptions and conspiracy theories were positively correlated with Close-Minded Thinking and Preference for Intuitive Thinking. Also, this is similar to Swami et al. (2014) finding that belief in conspiracy theories was positively correlated with intuitive thinking style.

However, an interesting finding was the difference between common misconceptions and conspiracy-related claims' internal consistency. We did the reliability analysis to examine both common misconceptions and conspiracy-related claims' internal consistency. The data suggests that the common misconceptions are a more varied collection of items than conspiracy-related claims. Our data suggested that the internal consistency of common misconceptions was questionable (.636/ .660), and the internal consistency of conspiracy-related claims was good (.814 / .819). This suggests that, for the sets of misconceptions and conspiracies we used, there are more factors that drive individuals' belief in common misconceptions than conspiracy-related claims. One possible reason that people treat different questions of common misconceptions differently, or more in various ways, more than questions of conspiracy-related claims is because they are less familiar with them. In relation to this, Sachsenweger (2007) found that people do show low belief in myths that they have not heard of before, and interestingly, they also show it for true facts they have not heard before. However, Swami et al. (2012) found that their myth scale had adequate internal consistency. It is difficult to understand why this difference exists. The reason why the difference may be due to the specific sets of items we chose for misconceptions and conspiracy-related claims. It is also possible due to our participants differing from theirs, their samples may be more familiar with myths or had different knowledge of the facts related to some of the myths. Also, Swami's participants were not from New Zealand and Australia. Therefore, there may be some myths that are more commonly known in the UK, or wherever his participants were from.

Reflecting on our data, the subscales of AOT, CMT, and PIT fit the regression model of thinking styles and conspiracy-related claims. Whereas, in the regression model of thinking styles

and common misconceptions, AOT and PIT fit well. This may indicate that Active Open-Minded Thinking and Preference for Intuitive Thinking are significant factors which affect people's belief in common misconceptions and conspiracy-related claims. It is worth thinking about why it might be. The results implied that people who scored lower on Active Open-Minded Thinking tend to believe in these claims and misconceptions. Also, people who do not prefer thinking intuitively are less likely to believe in these claims and misconceptions. To believe in those claims is usually based on a feeling which is more regarding an intuitive move, rather than an evidence-based act. The reason why people who scored higher on AOT are less likely to believe in misinformation may be because they tend to think of the relationship between their thoughts or feelings in relation to the evidence shown associated with the information is close or not (Pennycook et al., 2020; Stanovich & West, 2007). They often hold critical thinking when they judge whether the information is reliable or not, so that they may not fall into false beliefs effortlessly. In terms of PIT, the possible reason why people who scored higher in PIT tend to believe in misinformation may be because they are more likely to believe their intuitive thoughts without considering whether there is a piece of evidence behind the information or claims. Furthermore, why people who scored higher on CMT are likely to believe in conspiracy-related claims may be because they tend not to be aware of how others think, and only care about how or what they think is right. Because they often do not care if their thoughts are different from others, therefore they often hold biases (Kruglanski, 2013; Runciman, 2019). Once they believe in one thing (whether they are evident or not), it would be difficult for them to change their mind. Moreover, it is also interesting to note that PET is the only factor that was not statistically significant for conspiracies. This is another point worth exploring. We suggest that people enjoy thinking does not necessarily imply that they think in a rational or intuitive way. Spending time to think does not mean they engage in a critical way of thinking; it could be only thinking in a direction of non-logical or less evidence-based thinking. Hence, Preference for Effortful Thinking may not be a significant predictor.

People who scored higher on PIT often rely on instinctive understanding and feeling. They also do not need a lot of information or conscious reasoning to come to a conclusion (Dane & Pratt, 2007). This is corresponded to our System 1 Thinking which happens intuitively, automatically, and with not much effort (Chaiken & Trope, 1999). The use of familiarity and fluency in thinking is a System 1 (intuitive) type of thinking strategy. Hence, we infer that people who are more likely to engage in intuitive thinking styles are more likely to be vulnerable to familiarity or fluency influences. Swire et al. (2017) investigated how familiarity contributes to false beliefs. They suggested that familiar information tends to be accepted as true. When we attempt to correct the misinformation, we repeat the misinformation, at the same time making the misinformation more familiar. Therefore, corrections may be ineffective to retract the misinformation. Moreover, they suggested that there are three elements which make familiarity influence people's belief in misinformation. The first one is the illusory truth effect. It occurs when familiarity increases, and it gives the illusion that the information is correct and accidentally increases people's beliefs (Begg et al., 1992; Dechene et al., 2010; Wang et al., 2016). For instance, DiFonzo et al. (2016) showed participants with rumours about campus life; a professor giving a student a good grade to stop them from spreading information about the professor's plagiarism. They found that belief in the statement was logarithmically associated with the number of repetitions. The more it repeated, the more the participants believed them. The illusory truth effect can be problematic when we try to correct misinformation, while a correction often repeats the original statement. This increase in familiarity may reduce the effectiveness of a correction and result in the continued influence effect of misinformation (Swire et al., 2017). The second one is strategic and automatic memory processes. When we attempt to correct the misinformation, we face familiarity-related difficulties appearing at the same time. This phenomenon can explain from a dual-processing perspective. In the dual-process theory, our memory contains a dichotomy between automatic memory processes, which include familiarity, and strategic memory processes (i.e., recollection or output monitoring) (Brown & Warburton, 2006; Diana et al., 2007; Yonelinas & Jacoby, 2012). Familiarity is a rapid, context-free

automatic activity that allows for the quick recognition of previously encountered information (Swire et al., 2017). On the other hand, recollection is a slower process which allows for the retrieval of contextual details (i.e., the origin of the information or veracity of the information) (Swire et al., 2017). An action of correction of a statement requires strategic memory processes for veracity to be retrieved successfully. Otherwise, when we try to negate the false statement (the misinformation), automatic processes may identify this negation as familiar (Gilbert et al., 1990; Herron & Rugg., 2003). However, the strategic memory processes often fail. Therefore, people often keep relying on invalid information, and this misinformation is automatically retrieved in their judgement and decision-making (Ecker et al., 2011; Ecker et al., 2010; Roediger et al., 2001). The last effect which makes familiarity affect people's belief in misinformation is the familiarity backfire effect. It is a cognitive bias that makes people remember misinformation better, as remembering it as being true. Although showing people the corrective information afterwards that should debunk the misinformation, the exposure of the misinformation increased, at the same time it makes them believe it more (Swire et al., 2017). However, recent research suggests that this may not exist (Swire-Thompson et al., 2020; Wood & Porter, 2019). Swire-Thompson et al. (2020) suggested that improving the study's design and measurement, for example, using more reliable measures (implementing multi-item measures), and powerful designs (experimental designs) can better examine the familiarity backfire effect.

There are interesting relationships between common misconceptions and conspiracy-related claims. Our correlations between misconceptions and conspiracy-related claims suggested that there is a general tendency for the level of belief in one to be associated with the level of belief in the other. This is consistent with Goertzel's monological belief system idea. It is a system where beliefs contain an expanding network of thinking that mutually reinforce each other (Goertzel, 1994). People who believe in one conspiracy theory are likely to believe other conspiracy claims (Goertzel, 1994). We found that not only belief in conspiracy theories that correspond with each other but

beliefs in 'unsupported beliefs' more generally. It is worth exploring whether any of the misconceptions are also part of one or more conspiracy theories. For instance, our misconception item on vitamin D supplementation can protect against COVID-19 was clearly something that COVID conspiracists talked a lot about. Therefore, it is unsurprising that it is significantly correlated with most conspiracies. This makes us think about how unsupported conspiracies often contain misconceptions or myths. Perhaps one reason we see misconceptions correlating with conspiracies is that misconceptions are in fact a component of conspiracies. In other words, to believe a conspiracy, people need to be open to believing one or more misconceptions (myths). However, it would be sensible action for people to believe many misconceptions without thinking they are related to a conspiracy.

Strengths and Limitations

Our study is one of the first studies to ask the same group of people and evaluate their beliefs in both common misconceptions and conspiracy-related claims. As a result, the strength of our study is that we are people who try to investigate common misconceptions or myths and the relationship between conspiracy-related claims, as well as their connection with thinking styles. Providing the evidence that believing common misconceptions or myths have an association with believing in conspiracy theories. Not only do previous studies suggest that thinking styles affect our conspiracy beliefs but also our study proves that thinking styles play some roles in our beliefs in misconceptions. By knowing the association between these two, we may be more aware of evaluating new information when we receive them.

The first limitation is the choice of our type of study design. We conducted an observational study, which is difficult to demonstrate causality (Hess & Abd-Elseyed, 2019; Wang et al., 2015). For example, we are providing correlation and a possible association between thinking styles and beliefs in both misconceptions and conspiracies, but we cannot provide firm causality that people who are

in low Active Open-Minded Thinking will believe in misconceptions and conspiracies. Another limitation may be that we did not measure familiarity, which may have confounded comparisons of conspiracy beliefs and misconception beliefs. The internal consistency measure suggests that our set of myths was more varied than our set of conspiracies. It would be good for future research to examine whether this is an overall difference or whether it was only a result of specific items we included for misconceptions and conspiracy-related claims. Furthermore, since our study cannot make causal claims, future studies can use other designs of studies to investigate possible causal statements. There also might be caused by a third variable, or factors that should be controlled for, such as familiarity. Using an experimental design and creating a controlled group in the samples to establish causality between variables. In our case, participants who score lower in AOT, compared to participants who score higher are likely to believe statements related to misconceptions and conspiracies. Participants who score higher PIT, compared to people who score lower are likely to believe in claims related to misconceptions and conspiracies.

In conclusion, we found that believing in common misconceptions is correlated with believing in conspiracy-related claims. This indicated that people who are likely to believe in common misconceptions tend to believe in conspiracy-related claims as well. Moreover, people who scored higher on Close-Minded Thinking and Preference for Intuitive Thinking are more likely to believe in both common misconceptions and conspiracy-related claims, compared to people who scored higher on Active Open-Minded Thinking and Preference for Effortful Thinking. The relationships between thinking style and common misconceptions and conspiracy-related claims are similar to each other in terms of correlation. Both beliefs in common misconceptions and conspiracy theories were negatively correlated with Active Open-Minded Thinking as well as Preference for Effortful Thinking and education. Both belief in common misconception and conspiracy theory were positively correlated with Close-Minded Thinking and Preference for Intuitive Thinking. On the other hand, the difference between belief in common misconception and conspiracy theory is their

internal consistency. The data suggest that common misconceptions are a more varied collection of items than conspiracy-related claims. This indicates that there are more factors that drive peoples' belief in common misconceptions than conspiracies. We suggest that future studies can examine other factors, such as familiarity, to understand the reasons behind individuals' beliefs in false beliefs.

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Appendix A

Pre-registration

We forgot to make the pre-registration public, but no changes were made after the data collection began.

Appendix B

Participant Information Sheet

Information Page

Thinking about Common Claims

Information Sheet

Researcher introduction

My name is Cassie Chueh; I am a postgraduate student in the School of Psychology at Massey University in New Zealand. My supervisor on this project is Dr Stephen Hill.

Project description

This study is designed to investigate how people think about common claims about the natural or social world. To be eligible to participate in this study you need to be at least 18 years old, and be living in New Zealand or Australia. Completing this survey is very unlikely to cause any discomfort or harm.

Project procedures

If you choose to participate, you will be asked to indicate the extent to which you agree with several statements. The survey will include 63 questions in total, and takes around 10 minutes to complete. If you complete the survey, you will receive GBP1.50 (approx. AUD or NZD\$3) via Prolific.

Data management

After I have completed data analysis, the data from this study will be made publicly available on the Open Science Framework and stored indefinitely. This means that other researchers and members of the public will be able to access the data. Before sharing the data, I will remove any information that might indicate who you are (e.g., your Prolific ID).

Participant rights

You are under no obligation to accept my invitation to take part in this research. If you decide to participate, you have the right to decline to answer any particular question, or to stop answering questions at any time.

Contact information

If you have any questions or queries regarding this project, please don't hesitate to contact the following:

Researcher

Cassie Chueh
School of Psychology
Massey University
Palmerston North
New Zealand
Email: Cassie.Chueh.1@uni.massey.ac.nz

Supervisor

Dr Stephen Hill
School of Psychology

Massey University
Palmerston North
New Zealand
+64 6 3569-099 ext 85083
S.R.Hill@massey.ac.nz

Massey University School of Psychology – Te Kura Hinengaro Tangata
Palmerston North, New Zealand
T +64 6 3569-099 ext 85071 : W psychology.massey.ac.nz

This research project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director (Research Ethics), email humanethics@massey.ac.nz. (Ethics notification number: 4000024659).

Appendix C

Ethic Approval



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Ethics Application

Application ID :	4000024659
Application Title :	Exploring the relationship between thinking style and belief in common myths and conspiracy-related claims.
Date of Submission :	04/08/2021
Primary Investigator :	Cassie Chueh (Applicant)
Other Personnel :	Dr Stephen Hill (Applicant)

1. Risk Assessment

Project Detail

Human Ethics Application Risk Assessment Form

Does your research fall within the scope of the Code? The scope includes:

- All research involving either the participation of human or where the research impacts on individuals, groups or communities. This includes consultancies, contract research, staff research and supervised student research.
 - Any teaching which involves the participation of students for the demonstration of procedures or phenomena that have a potential for harm.
 - Any evaluation of university services, organisational practices or teaching programmes where information of a personal nature may be collected, where participants may be identified, or where the performance of staff may be commented on. This does not include routine organisational quality improvement activities, e.g. academic programme evaluations or service delivery projects but does include activities which have a research component and may lead to publications.
- NB: Where research involves a Massey staff researcher using their own students as participants please refer to the [Decision Chart](#) in Section 2 of the Code.**

Applicant Information- PEER REVIEW

Prior to submitting your application for approval, there is an option for you to have your application peer reviewed. (This could be a supervisor if you are a student, or a colleague in the case of academic research). The process is as follows:

- Click on the Action Tab
- Click on the 'Send for peer review' action
- Follow the instructions given.

Note: This process will send an email to your peer reviewer which contains a pdf of the application. The peer reviewer comments by email outside of the RIMS process.

This **IS NOT** part of the approval process.

Following comment (if any) from your peer reviewer, you must **STILL** submit the final application through the action tab.

1 Project Title

Please limit this to a maximum of 25 words*

Exploring the relationship between thinking style and belief in common myths and conspiracy-related claims.

2 Recruitment / Data collection start date.

This date must be in the future.

Data collection /recruitment cannot begin until notification of submission has been received.*

05/08/2021

3 Projected end of project date.*

28/02/2022

4 Project Type *

- Academic Staff Research
- General Staff Research
- Postgraduate Student Research
- Undergraduate Student Research
- Evaluation
- Teaching
- Other

5 Project Summary

Please outline in no more than 2000 characters in lay language*

The aim of the study is to find out whether there is a relationship between thinking style and beliefs in debatable or contentious claims. We predict that people who think analytically will be less likely to believe these claims which include common 'urban' myths and conspiracy-related claims.

Common misconceptions (myths and conspiracy-related claims) and analytic ability will be measured in the study. We will measure how much they believe in misconception using questionnaire items from Swami et al. (2012). We will also add on some recent conspiracies related to COVID-19. Data will be collected via an anonymous online Qualtrics survey distributed via the Prolific crowdsourcing platform (prolific.co). The survey will include a thinking style measure () and.

The survey will take about ___ minutes to complete. Participants will be adults (18+) from Australia and New Zealand. We will also investigate their demographics such as age, gender, income, political views, and trust in institutions items.

After the results are produced and shared, the anonymous data from this study will be shared using the Open Science Framework repository (osf.io), where it will be openly accessible and stored indefinitely.

6 Describe the peer review process that has been used to discuss and analyse the ethical issues present in this project. (maximum of 4000 characters)*

The ethics of the project have been discussed in detail with my supervisor Stephen Hill. In terms of its data collection procedure and ethical issues, this study is very similar to previous notifications I have completed which underwent independent peer review, including:
 -4000023746 "Why are beliefs in different conspiracy theories positively correlated across individuals? Testing monological network vs. unidimensional factor model explanations" Independently peer reviewed by Dr Darryl Forsyth (member of MUHEC Northern)
 -4000022980 : "Are beliefs in conspiracies correlated with perceived stress?" Independently peer reviewed by Dr Michael Philipp and Dr Pita King (MU School of Psychology)
 Both of these low risk notifications were for anonymous online surveys relating to beliefs in conspiracies conducted using the Prolific platform. The latter of the two, like this one, included a longitudinal element. The peer reviews of those very similar projects has informed the design of this study. In addition, this planned study has been reviewed by the research team.

7 **List the ethical issues considered and explain how each has been addressed**
 (maximum of 2000 characters)*

Avoidance of harm: Participants will only be asked to complete, anonymous survey with fixed choice items. We consider it unlikely that completing the survey would cause any meaningful discomfort, embarrassment, or harm. One possibility is that answering questions about misconception might cause some participants to increase belief in those myth and conspiracy-related claims. Therefore, we will debrief participants at the end of the study (via the Prolific messaging system), and indicate that most of the claims we asked about are not supported by empirical evidence.

Autonomy: Following an information sheet, participants will be asked for their consent; the remainder of the survey will only open if participants click "yes". Participants who complete a survey at one time point are not obligated to complete subsequent surveys, and participants can choose not to respond to any question.

Privacy and confidentiality: The survey is designed to avoid collecting any identifiable data. Participants will be informed that their anonymised data will be stored indefinitely and shared openly online. Participants' responses at different survey waves will be linked using their Prolific ID numbers (which do not indicate their personal identities, and will not be shared in the open dataset).

Te Tiriti: This study does not focus specifically on Te Ao Maori, and is likely to have only a small number of Maori participants. The study may nevertheless be of interest to Maori. Some of the conspiracy-related claims relate to issues of particular concern to the Maori community, such as COVID-19 and human health.

8 **With whom did you peer review your research?**
 (maximum of 2000 characters)*

The research ethics was reviewed by my supervisor Stephen Hill.

Applicant

1 Applicant Department*

School of Psychology

2 Ethics Category Hidden*

Human

Campus of Chief Applicant

(or Campus of Supervisor for Student)*

- Manawatu
 Wellington
 Albany

3 Personnel

You can add any additional team members here. Click on 'More criteria' below to access the advanced search function.

1	Surname	Chueh
	Given Name	Zi-Yan
	Full Name	Cassie Chueh
	Position	Applicant
	Primary?	Yes
	Work Number	+ 886 227962658
	Email Address	Cassie.Chueh.1@uni.massey.ac.nz
	Department	
	College	
2	Surname	Hill
	Given Name	Stephen
	Full Name	Dr Stephen Hill
	Position	Applicant
	Primary?	No
	Work Number	
	Email Address	S.R.Hill@massey.ac.nz
	Department	School of Psychology
	College	College of Humanities & Social Sciences

Please add name of co researchers if unable to locate above

This question is not answered.

Risk Assessment

1 **Is Health and Disability Ethics Committee review required for this study?***

- No
 Yes

[Link to Standard Operating Procedures for HDECs](#)
[Link to HDEC scope of review form](#)

2 **Does your research include:**

a **Situations where the researcher may be at risk of harm***

- No
 Yes

b **Use of a questionnaire or interview, whether or not it is anonymous, which might reasonably be expected to cause discomfort, embarrassment or psychological or spiritual harm to the participants. ***

- No
 Yes

c **Processes that are potentially disadvantageous to a person or group, such as the collection of information which may expose a person / group to discrimination.***

- No
 Yes

d **Collection of information of illegal behavior(s) gained during the research which could place the participants at risk of criminal or civil liability or be damaging to their financial standing, employability, professional or personal relationships.***

- No
 Yes

e **Collection of blood, body fluid, tissue samples or other samples.***

- No
 Yes

f **Any form of exercise regime, or deprivation. (e.g. sleep or dietary)***

- No
 Yes
- g **Any form of physical examination (e.g. physical, radiation, ultrasound).***
 No
 Yes
- h **The administration of any form of drug, medicine (other than in the course of standard medical procedure), or placebo. ***
 No
 Yes
- i **Physical pain, beyond mild discomfort.***
 No
 Yes
- j **Any Massey University teaching which involves the participation of Massey University students for a demonstration of procedures or phenomena which have potential for harm.***
 No
 Yes
- k **Participants whose identities are known to the researcher giving oral consent rather than written consent, other than for cultural reasons .***
 No
 Yes
- l **Participants who are unable to give informed consent.***
 No
 Yes
- m **Research on your own students / pupils. For Massey Staff - refer to the Decision Chart in section 2 of the Code. [Code of Ethical Conduct - Decision Chart](#)***
 No
 Yes
- n **The participation of children (seven (7) years old or younger).***
 No
 Yes
- o **The participation of children under sixteen (16) years old where active parental consent is not being sought.***
 No
 Yes
- p **Participants who are in a dependant situation, such as nursing home or prison, or patients highly dependent on medical care.***
 No
 Yes
- q **Participants who are vulnerable.***
 No
 Yes
- r **The use of previously collected identifiable personal information or research data for which there was no explicit consent for this research.***
 No
 Yes
- s **The use of previously collected biological samples for which there was no explicit consent for this research.***
 No
 Yes
- t **Any evaluation of organisational services or practices where information of a personal nature may be collected and where participants or the organisation may be identified.***
 No
 Yes
- u **Deception of the participants, including concealment or covert observations.***
 No
 Yes

v **Conflict of interest situation for the researcher.**

[Code of Ethical Conduct- Special Relationships](#)

*e.g. Is the project funded or supported in any way that might result in a conflict of interest, do any of the researchers have a financial interest in the outcome, or is there a professional or other relationship between the researcher and the participants? **

- No
 Yes

w **Payments or other financial inducements (other than reasonable reimbursement of travel expenses or time) to participants.***

- No
 Yes

x **A requirement by an outside organisation (e.g. a funding organisation or a journal in which you wish to publish) for Massey University Human Ethics Committee approval.***

- No
 Yes

y **I wish to submit a full application for Training / Education purposes***

- No
 Yes

2. Sign off

Applicant Sign Off

To submit this application please select the check box below, then using the Actions Tab click on the Submit action.

As Chief Applicant;

- I have read the Code of Ethical Conduct for Research, Teaching and Evaluation involving Human Participants.
- I understand my obligations and the rights of the participants.
- My Head of Unit knows that I am undertaking this research. (for academic staff research)
- I understand that Low Risk Notifications are audited by the Ethics Office and that breaches in complying with Low Risk conditions will be followed up.
- I agree to undertake the research as set out in the Code.

Are there any co-researchers?*

- No
 Yes

- I have confirmed that all co-researchers have read the Code and I have obtained their approval for the content of this application.

- The information in this application is to the very best of my knowledge accurate and not misleading.

*

- I have read and understood the above statements

Appendix D

Participant Questionnaire

Start of Block: Consent

Consent_hdr Respondent Consent

Consent_inf Thank you for participating in this questionnaire. Your participation implies consent. You have the right to decline to answer any particular question.

Consent I have read and understood the information sheet for this study and consent to collection of my responses.

(Please click on the 'Yes' choice if you wish to proceed.)

Yes (1)

No (2)

End of Block: Consent

Start of Block: Does not consent

DNC As you do not wish to participate in this study, please **return** your submission on Prolific by selecting the 'Stop without completing' button.

End of Block: Does not consent

Start of Block: Record Prolific ID

Prolific_ID Please enter your Prolific ID:

End of Block: Record Prolific ID

Start of Block: Screening (Scr)

Resident I am currently resident in:

- New Zealand (1)
- Australia (2)
- Another country (3)

Age How old are you?

▼ Less than 18 (17) ... 100 (100)

End of Block: Screening (Scr)

Start of Block: Myths

Myths_a Here are some claims you might have read about or heard. Please indicate on the scale below how true you think each one is:

	Definitely false (1)	Probably false (2)	Unsure (3)	Probably true (4)	Definitely true (5)
We only use 10% of our brains. (Myths_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthquakes are most likely to occur when the weather is hot and dry. (Myths_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The number of people alive today is greater than the number of people who ever lived. (Myths_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tapping the top of a soda can will prevent its contents from foaming over when opened. (Myths_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hair grows back darker and thicker after it has been shaved. (Myths_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chewing-gum takes seven years to pass through the human digestive system. (Myths_6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hair and fingernails continue to grow after a person's death.
(Myths_7)

Storing batteries in a refrigerator or freezer will improve their performance.
(Myths_8)

Men think about sex every seven seconds.
(Myths_9)

Myths_b Here are some claims you might have read about or heard. Please indicate on the scale below how true you think each one is:

	Definitely false (1)	Probably false (2)	Unsure (3)	Probably true (4)	Definitely true (5)
Drinking cold water after meals can lead to cancer. (Myths_10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you sit too close to the TV it will damage your eyes. (Myths_11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The hole in the ozone layer is partly responsible for global warming. (Myths_12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fans can cool the air in a warm room. (Myths_13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vitamin D supplementation can protect against COVID-19. (Myths_14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Society is constantly being manipulated by Big Business. (Myths_15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a deliberate political conspiracy to suppress the rights of minorities. (Myths_16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NASA faked
some (or all) of
the moon
landings for
publicity.
(Myths_17)

World
governments
are hiding
evidence that
the earth has
been visited by
aliens.
(Myths_18)

Myths_c Here are some claims you might have read about or heard. Please indicate on the scale below how true you think each one is:

	Definitely false (1)	Probably false (2)	Unsure (3)	Probably true (4)	Definitely true (5)
The American government was either involved in, or knew about, the September 11 attacks before they happened. (Myths_19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The HIV virus was deliberately created in a government laboratory. (Myths_20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that events which superficially seem to lack a connection are often the result of secret activities. (Myths_21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that many very important things happen in the world, which the public is never informed about. (Myths_22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I think that government agencies closely monitor all citizens.
(Myths_23)

The World Health Organisation was suppressing evidence that wearing a mask can prevent COVID-19 spread due to the shortage of mask.
(Myths_24)

COVID-19 was produced under laboratory conditions as a biological weapon.
(Myths_25)

End of Block: Myths

Start of Block: Thinking Styles (TS)

TS_a Please indicate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
Even if there is concrete evidence against what you believe to be true, it is OK to maintain cherished beliefs. (TS_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regardless of the topic, what you believe to be true is more important than evidence against your beliefs. (TS_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There may be evidence that goes against what you believe but that does not mean you have to change them. (TS_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to be loyal to your beliefs even when evidence is brought to bear against them. (TS_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Whether something feels true is more important than evidence. (TS_5)

Just because evidence conflicts with my current beliefs does not mean my beliefs are wrong. (TS_6)

Either something is true or it is false- there is nothing in-between. (TS_7)

There is no middle ground between what is true and what is false. (TS_8)

TS_b Please indicate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
In my experience, the truth is often black and white. (TS_9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think there are many wrong ways, but only one right way, to almost anything. (TS_10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The truth does not change. (TS_11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Truth is never relative. (TS_12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to rely on my intuitive impressions. (TS_13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe in trusting my hunches. (TS_14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I make decisions, I tend to rely on my intuition. (TS_15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Using my
“gut-feelings”
usually works
well for me in
figuring out
problems in
my life.
(TS_16)

TS_c Please indicate the extent to which you agree or disagree with the following statement.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
Intuition is the best guide in making decisions. (TS_17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often go by my instincts when deciding on a course of action. (TS_18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not that good at figuring out complicated problems. (TS_19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thinking is not my idea of an enjoyable activity. (TS_20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to avoid situations that require thinking in depth about something. (TS_21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not a very analytical thinker. (TS_22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reasoning things out carefully is not one of my strong points. (TS_23)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking hard
and for a long
time about
something
gives me little
satisfaction.
(TS_24)

End of Block: Thinking Styles (TS)

Start of Block: Trust items (TI)

TI Trust in others

Please indicate the extent to which you trust the following groups from 1=Not at all to 5=Very much

	Not at all (1)	Sometimes (2)	Often (3)	Much (4)	Very much (5)
Your Neighbours (TI_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Police (TI_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Justice System (TI_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Trust items (TI)

Start of Block: Political View Items (PV)

PV Please rate how politically conservative/progressive you see yourself:

- Extremely Conservative (1)
- Somewhat Conservative (2)
- Neither Conservative nor Progressive (3)
- Somewhat Progressive (4)
- Very Progressive (5)

End of Block: Political View Items (PV)

Start of Block: Demographics

Dem_hdr Demographics

Gender What is your gender?

- Male (1)
 - Female (2)
 - Gender diverse (3) _____
-

Aus_loc What Australian State or Territory do you live in?

▼ Australian Capital Territory (ACT) (1) ... Western Australia (9)

NZ_loc What region of New Zealand do you reside in?

▼ Northland (1) ... Southland (16)

Loc_type Which of the following best describe the area you live in?

- Metropolitan/ Urban (1)
 - Rural (2)
 - Remote (3)
-

Educ What is the highest level of education you have achieved to date?

- High school not completed (1)
 - High school graduate, or the equivalent (2)
 - Advanced Diploma (3)
 - Bachelors degree, Graduate Diploma and Certificate (4)
 - Postgraduate Diploma and Certificate, Bachelor Honours Degree (5)
 - Masters degree (6)
 - Doctorate degree (7)
 - Other (8) _____
-

Income What is your average annual income?
(In your local Australian or New Zealand currency)

- \$0-\$9,999 (1)
- \$10,000-\$19,999 (2)
- \$20,000-\$29,999 (3)
- \$30,000-\$39,999 (4)
- \$40,000-\$49,999 (5)
- \$50,000-\$59,999 (6)
- \$60,000-\$69,999 (7)
- \$70,000-\$79,999 (8)
- \$80,000-\$89,999 (9)
- \$90,000-\$99,999 (10)
- \$100,000-\$149,999 (11)
- More than \$150,000 (12)
- Rather not to say (13)

End of Block: Demographics
