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Self-construal, mood, nationality, and openness to evidence against the afterlife

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SELF-CONSTRUAL, MOOD, NATIONALITY, AND OPENNESS TO EVIDENCE AGAINST THE AFTERLIFE

by

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Abstract

There is considerable evidence that people process information in a manner that favours prior beliefs, and that they are resistant to evidence against those beliefs. People who believed in an afterlife were recruited, and they all indicated their level of confidence. This study analyzed the effect of self-construal, mood, and nationality on openness to belief-contradicting evidence. Our study used a 2 (self-construal: rational vs fallible) X 2 (mood: positive vs negative) X 2 (nationality: Western vs non-Western) factorial design. Self-construal was manipulated through the use of questionnaires, while mood was manipulated with videos. All participants were exposed to arguments that contradicted their beliefs, and they indicated how convincing the arguments were. Their ratings of the arguments were our measure of openness to belief-contradicting evidence. There was a strong negative correlation between initial belief confidence and ratings of the arguments. Participants who were more confident in their beliefs tended to find the arguments unconvincing, but participants with less confidence tended to find the arguments convincing. Self-construal did not produce significant differences in ratings of the arguments, and neither did the mood manipulation. There was also no significant difference in average ratings between Westerners and non-Westerners. However, there was an unexpected interaction between nationality and self-construal. A fallible self-construal led to significantly lower ratings of the arguments for Westerners, while it led to higher ratings of the arguments for non-Westerners. Possible explanations of this finding are discussed, including identity threat and differences in self-serving bias.

Keywords: confirmation bias, mood, rationality, fallibility, afterlife, nationality

Introduction

The empiricist philosopher David Hume remarked that "a wise man... proportions his belief to the evidence" (Hume, 1748/1998, p. 108). According to Hume, someone should only believe claims when there is sufficient confirming evidence. It is a consistent finding of cognitive psychology that most people do not do this. People are often unwilling to revise their cherished beliefs, even when they are unambiguously disconfirmed. The tendency to seek and interpret evidence in light of prior beliefs is known as confirmation bias, and it has been called the most well-established error of human reasoning (Evans 1989). As Jonathan Haidt (2012) has said, when encountering an argument favourable to one's prior conceptions, the question is "can I believe it." On the other hand, when evaluating a disconfirming argument, the question is "must I believe it" (p. 98). Put another way, humans reason more like lawyers than like scientists (Haidt, 2001). Their goal is not to subject our beliefs to rigorous tests, but rather to defend them (Mercier & Sperber, 2011).

One early study found that two groups of people would interpret the exact same evidence in diametrically opposing ways based on their prior beliefs (Lord et al., 1979). Participants were remarkably good at finding reasons to discount the studies they happened to disagree with but failed to do so for studies they happened to agree with. Many in both groups reported more confidence in their prior beliefs at the end of the study. A more recent study used gun control and affirmative action as the relevant controversies. It was found that participants were more likely to say that belief-confirming evidence was relevant and compelling (Taber & Lodge, 2006). As before, the participants accepted the prima facie implications of the arguments in support of their views and found ways to explain away belief-disconfirming evidence. They also took longer to read belief-disconfirming evidence, which may indicate that they were actively involved in

discounting it. Similar results have been found for processing information about climate change (Unsworth & Fielding, 2014), homosexuality (Boysen & Vogel, 2007), abortion (Baron, 1995), daycare (Bastardi, Uhlmann, & Ross, 2011), religious topics (Klaczynski & Gordon, 1996), and the question of whether video games make children more violent (Greitemeyer, 2014). Confirmation bias has also been shown to facilitate the selective search for information online (Garrett, 2009), closed-minded processing of evidence against a criminal suspect (Ask & Granhag, 2005) and the denial of scientific findings (Munro, 2010). Nickerson (1998) has speculated that it might play a role in obsession with coincidences involving numbers, faulty medical diagnoses based on initial hunches, and the resistance of scientific paradigms against new data.

It is important to make a distinction between normative claims about how we ought to reason (if accurate descriptions of the world are the goal) and empirical claims about how humans typically reason. The former issue falls under the domain of analytic philosophy and will not receive serious treatment here. This paper will be focusing almost entirely on the psychological question of how humans engage in reasoning. Haidt (2001) made a similar distinction with respect to reasoning about morality. His view was that moral judgement is typically emotion-based, but he made clear that this does not make emotion ideally suited for arriving at ethically sound judgements. I will also make a distinction between two definitions of confirmation bias. Nickerson (1998) defined confirmation bias as the tendency to look for and process information in a manner which is irrationally favourable to prior beliefs. There is a controversy about this definition. It is worth noting that people display a tendency to seek confirming evidence even for hypotheses they have not encountered before (Evans 1989). People appear to be biased towards confirming evidence in general. According to Arkes (1991), the term

"confirmation bias" should only be used to refer to this tendency. For clarity's sake, this paper will be assuming the definition of confirmation bias given by Nickerson (1998). Stanovich et al. (2013) and others use the term myside bias, which they define as a subset of confirmation bias related to the processing of information in light of prior beliefs. This paper will treat the terms more or less synonymously.

Some other terms from the literature are relevant. One is "attitude polarization", which denotes the tendency to acquire more extreme views after being presented with both sides of an issue (Lord et al., 1979). This occurs because the belief-contradictory evidence is rejected, whereas the belief-confirming evidence is readily accepted. It is especially likely to happen to people who know more about an issue, perhaps because they can more readily think of counter-arguments for the belief-contradictory evidence (Taber & Lodge, 2006). Biased assimilation is another closely related concept. It is a theoretical mechanism postulated to be underlying confirmation bias. Biased assimilation occurs when people readily process (assimilate), remember and accept evidence which supports their beliefs, while scrutinizing belief-contradicting evidence (Lord et al., 1979). Another term is "belief perseverance", which refers to maintaining a belief even after is has been demonstrated to be false (Lilienfeld, Ammirati, & Landfield, 2009). Confirmation bias is likely related to this tendency (Nickerson, 1998). Our tendency to always find a reason to doubt belief-disconfirming evidence ensures that our current beliefs remain insulated.

Differences in Susceptibility

There is fascinating research into individual differences in tendency toward biases in information processing. An influential distinction has been made between so-called system 1 thinking and system 2 thinking (Stanovich & West, 2000). System 1 is fast, intuitive, and based

on heuristics. System 2 is algorithmic, slow, methodical, and more effortful. These do not necessarily correspond to specific brain regions, but the distinction has been widely used. Stanovich has also extensively studied individual difference in the tendency towards cognitive biases. Remarkably, there is no statistically significant relationship between the tendency to interpret evidence in light of prior beliefs and IQ (Stanovich, West, & Toplak, 2013). Possessing an above average IQ does not appear to significantly reduce one's susceptibility to confirmation bias. Due to this and other findings, Stanovich (2016) has been developing an assessment of rational thought that purports to be psychometrically independent of IQ. It is the culmination of considerable research, but his assessment has not yet been formally developed or been tested for psychometric validation. Studying individual differences in rational thought is an exciting new area of research. In addition to cognitive factors, there are personality variables which predict resistance to debiasing. These include low openness to experience, high dogmatism, need for closure and low integrative complexity (Lilienfeld et al., p. 394). Political conservatives are also more likely to show confirmation bias (Fischer, Greitemeyer, & Frey, 2008).

There is no research investigating cross-cultural differences in confirmation bias, but there are differences in toleration for contradictions. Peng and Nisbett (1999) summarized one of the most consistent finding in cultural psychology, namely that East Asians tend to think in a holistic, dialectical manner, whereas Western Europeans and North Americans tend to think in an analytic manner. The latter approach does not allow for contradictions, whereas the former is quite comfortable with paradox and ambiguity. One of the experiments conducted in the aforementioned study found that when presented contradicting pairs of statements, Chinese participants were more likely to conclude that both were (in some sense) true. This would lead one to expect less of a polarizing tendency among East Asians. It should also be noted that non-

Westerners have far less (if any) motivation for self-enhancement or tendency toward self-serving bias (Cross, Hardin, & Gercek-Swing, 2011). As will be argued later, self-enhancing motivations likely play a causal role in these biases. This would be another reason for expecting a greater tendency for confirmation bias among Western participants.

Explanations

The fact that people (at least in Western samples) show a consistent tendency to explain away disconfirming evidence (while taking confirming evidence at face value) is not in dispute. A more controversial research question concerns the best explanation for confirmation bias. Explanations for psychological tendencies can be divided between proximate causes and ultimate causes (Scott-Phillips, Dickins, & West, 2011). When analyzing human behavior, these are two complementary levels of analysis. Proximate causes include immediate environmental factors, internal physiology, prenatal environment, early childhood experiences, and sociocultural conditioning. Ultimate causes concern the evolutionary pressures that gave rise to the possibility of such behaviors. For example, when a man finds himself attracted to a particular woman, proximate explanations would relate to his visual processing, his hormones, local beauty standards, and even his fetal development. An ultimate explanation would be given in terms of selective advantage of the tendency to be sexually attracted to women. Being sexually attracted to women has rather obvious Darwinian benefits. Ultimate and proximate explanations have both been advanced in the case of cognitive biases.

Nickerson (1998) briefly reviewed some evolutionary accounts of confirmation bias. His argument was related to the fact that natural selection favours genes which predispose organisms toward behaviors that increase the likelihood of survival and reproduction. Because of this, human cognitive faculties are not necessarily optimal for discovering the truth and may be more

pragmatic in nature. Mercier and Sperber (2011) put forward a more specific evolutionary explanation of human reasoning that purports to explain various failure of human thought (including confirmation bias). They argued that the function of rational thought is to defend beliefs to other human beings. This is not a normative claim about how reason should operate, but an empirical claim about why evolution produced human beings capable of reasoning. The function (or selective advantage) of system 2 thinking is largely to defend and rationalize the intuitions of system 1 thinking. On this view, system 2 does not exist to correct system 1.

In his book, Haidt (2012) argued along similar lines. He contended that the emotional/motivational aspects of the human mind dominate, and the rational element merely serves to justify what the intuitive mind would have concluded anyways. To use one of his analogies, instinctual human intuition is like a dog, and rational reflection is like its tail (Haidt, 2001). In the words of Benjamin Franklin (as cited in Pinker, 2018, p. 359), "so convenient a thing it is to be a rational creature, since it enables us to find or make a reason for everything one has a mind to". This captures Mercier and Sperber's model. This particular evolutionary account of these biases remains controversial, as indicated by their inclusion of a series of critiques from various cognitive psychologists and philosophers. Given that there is not adequate cross-cultural research, it is not even clear if this tendency is a human universal. Fortunately, the researchers laid out a number of specific predictions, so its accuracy will ultimately be an empirical question.

Proximate explanations of confirmation bias are another area of controversy. One account offered by Evans (1989) is that confirmation bias simply emerges out of a generalized tendency to readily look for confirming reasons. He explained that this occurs regardless of whether people are motivated to accept the hypothesis or not. He made no comment about the origin of this tendency, but merely noted that it exists and speculated that it is the immediate cause of

confirmation bias. It is indeed the case that this tendency exists. One particularly famous experiment bears this out. Wason (1960) showed that when given a statement (which may or may not be true), participants look for support. Nickerson (1998) summarized this finding and contrasted it with the Popperian scientific approach of conjecture and refutation. Popper (1963) argued that science should involve holding up testable hypotheses to be falsified, and only keeping hypotheses which survive serious attempts at falsification. Studies reveal that people do the opposite. Once they have a proposition in hand, they seek support for it. Evans' view is that the relevant data can be explained fully without resort to motivations or affect. According to him, confirmation bias simply stems from a cognitive error.

There are other researchers who have argued that motivated reasoning (Kunda, 1990) plays a role. Nickerson (1998) discussed this view, pointing out that there is a correlation between how desirable people find propositions and how likely they are to believe them to be true. Later studies have done controlled analyses, revealing that affect and the importance of an issue both mediate the effects of biased interpretation. According to Munro et al. (2002), self-reported attitudes were predictive of degree of belief change following the presentation of new arguments. They also found that this negative correlation between strength of prior attitudes and belief change was mediated by the participants' reported emotional states, such as anger or irritation. Similarly, Zuwerink and Devine (2000) analyzed the relationship between attitude importance (as well as affective factors) and subsequent biased assimilation of controversial information. They found a strong negative correlation between strength of prior attitudes and amount of belief change. These studies constitute strong support for the motivated reasoning explanation. Defenders of this view have not claimed that motivation and affect are the sole cause of biased assimilation. Nickerson (1998) argued that cognitive and motivational factors are

both involved.

Kunda's (1990) summary of past studies discussed different kinds of motivated reasoning. She summarized data showing that introducing a motivation to be accurate reduces bias, though not confirmation bias specifically. This motivation was introduced by raising the stakes of being wrong or making the participants aware that they would need to argue for the position they take. Additionally, this manipulation (introducing an accuracy motivation) only worked if it was done before they read the relevant information. If it was given in between the time that they encoded the information and when had to evaluate it, it produced no effect. This suggests that the effect reflects a desire to be accurate rather than a desire to present oneself positively. Munro (2010) discussed the research concerning the motivation underlying biased assimilation, a process closely related to confirmation bias. He argued that the research indicates that information which contradicts one's prior beliefs leads to a negative state and that it threatens one's sense of being intelligent. According to Munro et al. (2002), this is an interpretation consistent with the well-established phenomenon of cognitive dissonance. Cognitive dissonance is the apprehension felt as a result of conflict between beliefs and/or behaviors (Festinger, 1957). This is a more theoretically specific version of a motivated reasoning explanation.

Neurological Data

The connection between belief and emotion is supported by neuroscientific studies. For example, the relevant brain regions (primarily in the ventromedial prefrontal cortex) underlying belief have been implicated in hedonic processes and the recognition of beauty (Harris, Seth, & Cohen, 2008). Conversely, judging a proposition to be false activates the insular cortex, a region involved in disgust. There have also been neurological studies directly investigating brain

activity while contemplating belief-disconfirming evidence. There have only been two neurological studies of biased assimilation and confirmation bias, but both indicate that emotional factors are relevant. Westen et al. (2006) correctly predicted that brain regions associated with emotion, reward and affect would be activated during the processing of belief confirming or disconfirming data. In particular, when evaluating a series of contradictory statements made by their preferred political candidate, the ventromedial prefrontal cortex and the ventral anterior cingulate gyrus were more active. In addition, contrasts revealed increased activity in the orbitofrontal cortex and the left insula. These are regions with known roles in emotional processing (Nicolle & Goel, 2013).

Consistent with Taber and Lodge's (2006) finding that participants take longer to process belief-disconfirming data (plausibly because they are trying to find evidence to counter it), the hippocampus (a brain region implicated in memory retrieval) also showed more activity. Westen et al. (2006) correctly predicted that brain regions associated with cold (i.e. unmotivated, independent of emotion) reasoning would not show more activation. Significantly, the dorsolateral prefrontal cortex (a region involved in conscious emotion regulation and more deliberative processes) was not more activated. They argued that implicit (unconscious) emotion regulation was underlying biased processing. If true, this would mean that human processing is influenced by unconscious tendencies to maximize positive affect. A more recent neuroimaging study replicated a role for the insula cortex, and also indicated a role for the default mode network (Kaplan et al., 2016). This is relevant given the default mode network's relevance for identity and self-construal, which will be discussed later.

Debiasing

There is a considerable amount of research into the occurrence of confirmation bias and

related failures of human reasoning. There is relatively less research into ways to reduce this bias, as reported by the review done by Lilienfeld et al. (2009). According to them, most of the research has centered on the existence of confirmation bias, not how to solve it. They summarize some other strategies known to mitigate confirmation bias, including perspective taking and a delay prior to decision making. The evidence supporting the efficacy of informing people about confirmation bias (psychoeducation) is mixed. Many studies only found only small insignificant effects for such teaching, with Arkes (1981) arguing that it is because people are unaware of the influences on their thinking (as cited in Lilienfeld et al., 2009). Often the methods that turn out to be effective in reducing confirmation bias work outside of conscious awareness. For example, one study found that text with disfluent (i.e. difficult to read) font made participants less susceptible to confirmation bias, and that this was separable from cognitive load (Hernandez & Preston, 2013). This manipulation is almost certainly having its effect outside of conscious awareness.

One very successful debiasing strategy is considering how compelling a belief-confirming study would be if it had the opposite result. Lord et al. (1984) gave participants a study which supported their prior beliefs, and then asked them to consider whether the study would be convincing if the same methodology was used but it turned out to support the opposite conclusion. This resulted in dramatically less bias in processing belief-confirming evidence. This was because confirmation bias often results from people failing to apply skepticism to belief-confirming evidence. Their skepticism of belief-disconfirming evidence is often warranted, it should just be extended to all studies they encounter. This is what was found by Klaczynski & Gordon (1996). With respect to belief-inconsistent evidence, participants were the most good at distinguishing good studies from bad ones. Their scrutiny was well calibrated, but they did not

apply the same scrutiny to belief-confirming evidence. Thus, the strategy of considering the opposite when evidence is belief-confirming (Lord et al., 1984) triggers a more optimal level of criticism.

Importantly, Evans (1989) reported that an admonition to be open-minded about the evidence (which is frequently included in these studies) does not have a significant effect on the degree of bias. Encouragingly, while intelligence does not predict the degree of myside bias (Stanovich et al., 2013), amount of post-secondary education does, even when intelligence and age are statistically controlled (Toplak & Stanovich, 2003). One might expect that increased knowledge about a topic might reduce bias when evaluating evidence about that topic. In fact, the opposite is true (Taber & Lodge, 2006). One proposed explanation is that people with expert knowledge are more readily able to think of counterarguments against evidence they do not like (Ross, 2012). According to Haidt (2012), people's snap judgments did not track the validity of an argument. They evaluated good and bad arguments equally poorly if they were against their prior beliefs. However, allowing people two minutes to reflect upon the value of an argument minimized this irrational bias. Time seems to be on the side of rationality. Similarly, Zuwerink and Devine (1996) found that the strength of counterattitudinal messages does produce an effect. Strong arguments do impact people's beliefs more than weak arguments. People are not totally blind to the difference between a good argument against their views and a bad one.

Mood

There is one study indicating a protective effect of positive mood against confirmation bias. Jonas et al. (2006) showed that increased mood lowers the preference for belief-confirming information and decreased mood has the opposite effect. They informed the participants that they could go on a trip and made them choose a location. They then manipulated mood by showing

different clips, one happy and one sad. They confirmed that the clips made a difference to reported mood with a manipulation check. The dependent variable was the extent to which they chose supporting information. They made 16 studies available, half supporting the destination they had chosen, and half supporting other destinations. The negative mood condition showed more confirmation bias, and mood mediated the effect. Jonas et al. (2006) also reported the results of two successful replication experiments. This design is somewhat distinct from traditional studies measuring confirmation bias in two ways. First, it only concerns the search for information, not the interpretation of information. Second, it is about beliefs concerning a trip that one has chosen to take, and thus may plausibly be more directly related to mood than political or social beliefs. They argued that the behavioral outputs associated with dissonance are motivated by a desire to reduce the unpleasant emotions involved. They cited some evidence that the biased search for information may have a similar underlying cause. In line with these theoretical arguments, the study seems to suggest that increasing someone's mood makes them more willing to explore disagreeable arguments.

Despite the above evidence, the literature is equivocal about the relationship between mood and rationality. One experiment found that people are more likely to rely on heuristics (like stereotyping) when positive mood is primed, whereas they are more deliberative and accurate when negative mood is primed (Park & Banaji, 2000). The authors, arguing from past research, explained this by saying that positive mood is a signal to our information processing systems that there is no danger. As a result, relying on heuristics is an adaptive strategy during times of positive mood. This functionalist approach treats mood as data being given to the mind. The experimental context, however, concerned racial stereotypes. The study conducted by Jonas et al. (2006) may have differed because the information (about vacation destinations) being

processed was more directly related to mood. This might explain why negative mood made participants more biased in favour of supportive information. In other conditions, it might be that negative mood improves accuracy and facilitates more careful thinking.

Identity Salience

The research into identity priming and its relationship with biased assimilation is perhaps the most promising. Making someone's political identity salient can affect the degree to which they exhibit bias. In one experiment, conservative participants who were made to identify themselves politically showed more polarized interpretations of climate change (Unsworth & Fielding, 2014). Munro (2010) discussed the research concerning the motivation underlying biased assimilation (i.e. a partial processing of information, a process closely related to confirmation bias). He argued that the research indicates that information which contradicts one's prior beliefs leads to a negative affective state and that it threatens one's sense of being intelligent. According to Munro et al. (2002), this is an interpretation consistent with the well-established phenomenon of cognitive dissonance. Cognitive dissonance is the apprehension felt as a result of conflict between beliefs and/or behaviors (Festinger, 1957). This is a more theoretically specific version of the motivated reasoning explanation.

One study is particularly relevant to our design. Cohen et al. (2007) gave some participants a chance to affirm their identity by writing an essay about their most valued virtues. As long as they were made aware of their convictions in advance, these participants showed considerably less bias when interpreting belief-contradicting evidence. By contrast, participants who had to write about a time they had failed to live up to their values showed more bias afterwards. The natural theoretical interpretation is that people whose identities are more secure perceive belief-contradicting evidence as less threatening. To be specific, the condition which

resulted in the greatest openness was the one in which conviction was salient and there was an opportunity for self-affirmation. Additionally, the study used measures to test for other variables. Having an opportunity to self-affirm did not lead to a decrease in the importance attached to the issue. While past research found that positive mood decreases bias, whereas negative mood increases bias (Jonas et al., 2006), the effect of self-affirmation found by Cohen et al. (2007) was not related to mood. Thus, identity maintenance appears to play an independently important role in the processing of belief-contradicting evidence. The neurological evidence suggests that when people's beliefs are challenged, in addition to areas related to emotion, there is increased activity in areas correlated with self-concept processing (Kaplan et al., 2016).

Cohen et al. (2007) also manipulated the salience of rationality as opposed to the salience of conviction. To be specific, some participants were made to answer questions about the importance of rationality, whereas participants in another condition were asked about the importance of defending one's views. Surprisingly, rationality salience did not decrease bias. The authors' explanation was that people are likely to believe that their previous beliefs were rationally arrived at, so reminding them of their rationality would increase their confidence in prior beliefs. Our study sought to test this explanation by manipulating whether a rational self-construal or a fallible self-construal was made salient. If their explanation was correct, then fallibility salience should increase openness.

Predictions

We measured openness to belief-contradicting evidence with a novel topic, the afterlife. All of our participants believed in an afterlife, and they all read arguments against this belief. Our measure for openness was the ratings that participants gave to the arguments. We manipulated self-construal by giving participants different questionnaires, one about rationality

and one about fallibility. We also sought to replicate the finding that positive mood protects against confirmation bias, whereas negative mood increases confirmation bias (Jonas et al. 2006). Like the previous research, we used videos to manipulate mood. In addition to a debiasing effect for positive mood, we predicted an interaction between mood and self-construal. We predicted that a fallible self-construal would produce higher ratings of the arguments for participants shown the happy video than for participants shown the sad video. This is because a fallible self-construal might plausibly lead to negative emotion. A separate positive mood manipulation might counterbalance this and allow for fallibility to have a larger debiasing effect. In addition to these manipulated variables, we also looked for a difference in openness between participants born in Western countries and participants born in non-Western countries. Based on the fact that Westerners are less tolerant of contradictions (Peng & Nisbett, 1999) and show more self-serving bias (Cross et al., 2010), we predicted that Westerners would give lower ratings of the arguments than non-Westerners.

There might be some concern that death is a qualitatively different topic to make participants review. Terror management theory concerns the human tendency to respond to information differently when mortality is made salient (Greenberg & Arndt, 2011). The theoretical explanation is that death makes people uneasy, and they become motivated to believe in the superiority of themselves, their beliefs and their group. There might be some concern that terror management (differential responding to information due to the fear of death) would confound the results. However, all of our conditions received the same arguments against the existence of an afterlife. Their response to mortality-related readings is the dependent variable. Conversely, in studies related to terror management a mortality prime is generally the independent variable (it is given only to the experimental group). A related concern is that

religious beliefs might be different than other beliefs. While there surely are differences, neuroimaging evidence suggests that the difference between belief and disbelief in propositions involves the same brain regions regardless of whether they are religious propositions or not (Harris et al., 2009). Furthermore, activating deeper processing by giving people disfluent text or rationality primes can decrease confidence in religious beliefs (Gervais & Norenzayan, 2012). There is no empirical reason for expecting religious propositions to be a special class of beliefs that are in principle not amenable to persuasion.

Method

Participants

Our sample included 264 Canadian undergraduate students. Our study was approved by the institutional ethics board. Participants who failed to complete the entire study were not considered in the analysis. Participants who took less than 4 minutes (given that the videos were around 3 minutes) or more than 45 minutes were also not considered. Most participants took less than 25 minutes, and there were no participants who took between 25 and 45 minutes, so it was a natural place to make a cut off. One participant reported that both of the arguments were unconvincing, but that they convinced him to no longer believe in an afterlife. This person was discarded from the data set, as their answers seemed to indicate random clicking. These exclusion criteria left us with 181 eligible participants. There were 131 Westerners and 50 non-Westerners.

Procedure

The students participated through an online system called Qualtrics. When entering the experiment, participants were first asked whether or not they believed in an afterlife and then had to rank their confidence on a scale of one (*very unsure*) to seven (*very confident*). As they were

warned in advance, only people who believed in an afterlife were allowed to participate. They were then asked whether or not they were born in a Western country (Canada, the US, Australia, New Zealand, or a European country).

Mood was manipulated with either a clip with a family friendly comedian (*positive*) or a video describing a drunk-driving car accident which left the victim disfigured (*negative*). Both clips were between approximately three and a half minutes long. All participants were asked to rate their mood on a scale of one *(negative)* to five *(positive)* after viewing the respective scenes. This was a manipulation check to ensure that the clips had causally influenced the average mood of the respective conditions.

The second manipulation concerned self-construal. It involved whether a rational self-construal or fallible self-construal was made salient. We primed a rationality self-construal with a questionnaire which asked them about the extent to which they are open to changing their minds based on new evidence. They were instructed to indicate their level of agreement with items such as “I am a rational person at least sometimes” and “it is important to be willing to change your mind”. We primed a fallible self-construal by asking the participants to complete a questionnaire which included items like “sometimes I get into heated arguments and become overly emotional” and “I am sometimes resistant to changing my mind”. Both questionnaires included scales for each question from one *(incorrect)* to four *(correct)*. We formed the questionnaires ourselves, but the one for a rational self-construal was inspired by Cohen et al. (2007). Both contained four items, and are available in Appendix A. They were designed to be general enough that almost anyone could agree.

Participants in all conditions then read two arguments against the existence of an afterlife. One was based on the character of dreamless sleep, the other was from brain damage research.

Both are available in Appendix B. After each argument, they were asked to rate how convincing each of the arguments were on a scale of one *(very unconvincing)* to seven *(very convincing)*. Higher ratings of the arguments were taken to be suggestive of more openness to belief-contradicting evidence. After finishing this, the participants were asked if they still believed in an afterlife, and how confident they were on a scale of one *(very unsure)* to seven *(very confident)*.

Design

Our experiment used a 2 (self-construal: rational vs fallible) X 2 (mood: positive vs negative) X 2 (nationality: Western vs non-Western) factorial design. We used stratified randomization to ensure an approximately proportional number of Western (n=131) and non-Western (n=50) participants across the two levels of each manipulated variable. This is shown in Table 1 and Table 2.

Table *1*

Assignment of Western subjects into levels of the self-construal variable, split by the mood variable.

	Fallible Self-Construal	Rational Self-Construal
Negative Mood	n=32	n=28
Positive Mood	n=33	n=38

Table 2

Assignment of non-Western subjects into levels of the self-construal variable, split by the mood variable.

	Fallible Self-Construal	Rational Self-Construal
Negative Mood	n=12	n=13
Positive Mood	n=14	n=11

Results

We conducted a manipulation check for our mood manipulation. As described earlier,

subjects reported their mood on a scale of one (*negative*) to five (*positive*) after viewing the respective videos. An independent samples t-test revealed that the average mood of people in the positive mood condition (M=3.53, SD=.92) was significantly higher than that of people in the negative mood condition (M=2.14, SD=1.02); t(179)=-9.57, p<.0001. This is shown in Figure 1.

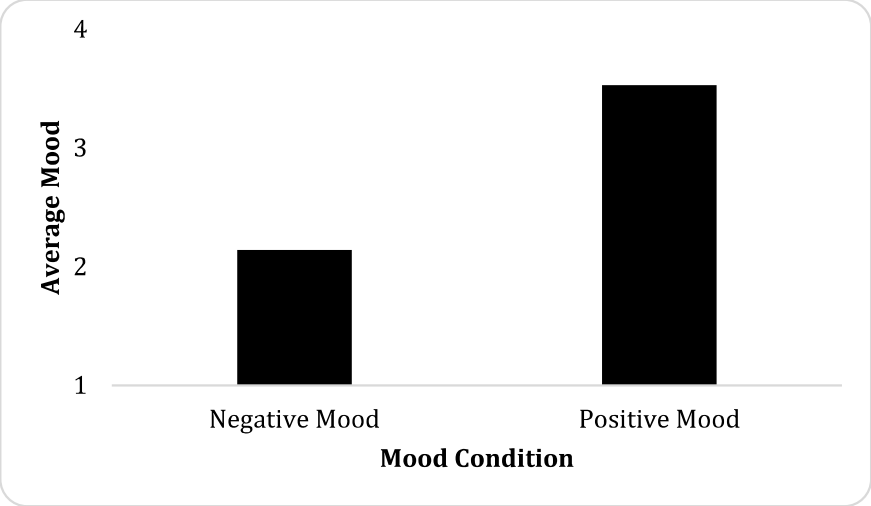

Figure 1. Mean reported mood for the two mood conditions. Scale is from 1-5.

This is strong evidence that the videos had produced a difference in the subjects' mood. We also wanted to see if participants' agreement with the questionnaire was affected by the type of questionnaire. Both questionnaires contained four items, which they were to indicate agreement with on a scale of one (*incorrect*) to four (*correct)*. An independent samples t-test demonstrated that participants agreed more with the rationality questionnaire (M=3.46, SD=.59) than the fallibility questionnaire (M=2.81, SD=.35); t(179)=-9.06, p<.0001. This is shown in Figure 2.

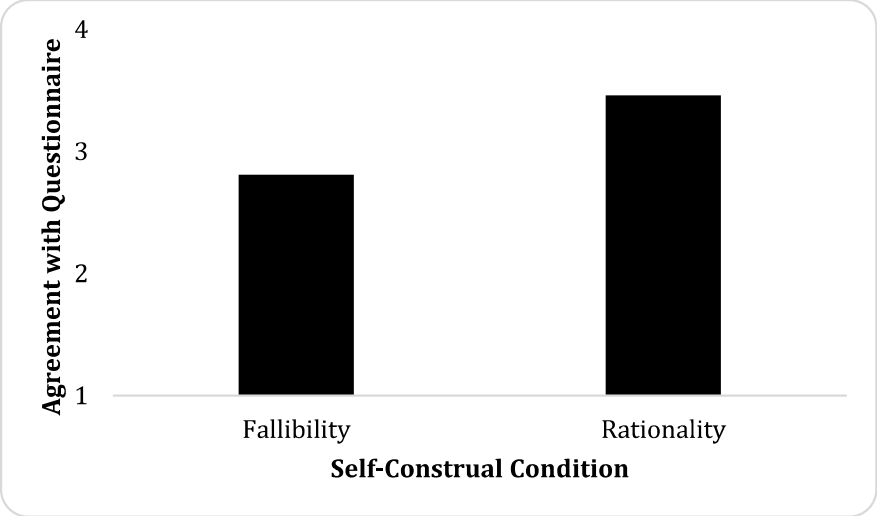

Figure 2. Average agreement with item in the questionnaire for each self-construal condition. Scale is from 1-4.

As stated earlier, initial confidence was reported on a scale of one (*very unsure*) to seven (*very confident*). People tended to report moderately high confidence in their belief in the existence of an afterlife (M=5.10, SD=1.76). The initial confidence was approximately the same for both Westerners (M=5.11, SD=1.75) and non-Westerners (M=5.08, SD=1.74). The argument from dreamless sleep tended to be viewed neutrally (M=3.90, SD=1.84), as did the argument from brain damage (M=3.83, SD=1.92). These arguments were also rated on a scale of one (*very unconvincing*) to seven (*very convincing*). After being exposed to the arguments, 103 participants, a large majority, reported no change in their confidence. Forty-four reported that their confidence had decreased, and an additional 11 reported that they no longer believed in an afterlife. Twenty-three participants reported that their confidence had increased.

We analyzed the relationship between initial confidence and how convincing people found the argument to be. Participants who were more confident in their belief tended to give lower ratings of belief-contradicting arguments; whereas participants who were less confident in their belief tended to give those arguments higher ratings. For example, the average rating of the

arguments given by people who said that they were *very unsure* was (M=5.82, SD=1.35), whereas the average rating of the arguments given by people who said they were *very confident* was (M=2.56, SD=1.58). The average rating given for people at each level of confidence is shown in Figure 3. There was a Pearson correlation of r(179)=-.45 between participants' initial confidence and average ratings of the arguments ($p<.0001$). Given that this produces a coefficient of determination with a value of $R^2 = .20$, this means that initial confidence explains 20% of the variance in argument ratings.

Figure 3. Mean rating of the arguments for participants at each level of confidence. Arguments rated on a scale of 1-7.

With respect to our research hypotheses, none of them were confirmed. We conducted an analysis of variance for the effects of self-construal, mood, and nationality on average ratings of the arguments. When testing for a main effect of self-construal, we found no statistically significant effect [F(1,173)=.11, p=.74]. For mood, there was also no statistically significant effect [F(1,173)=.27, p=.61]. Our prediction that there would be an interaction between mood and self-construal was not confirmed [F(1,173)=.46, p=.50]. The average rating for each of the

four different conditions is shown in Figure 4. The mean differences are all relatively small.

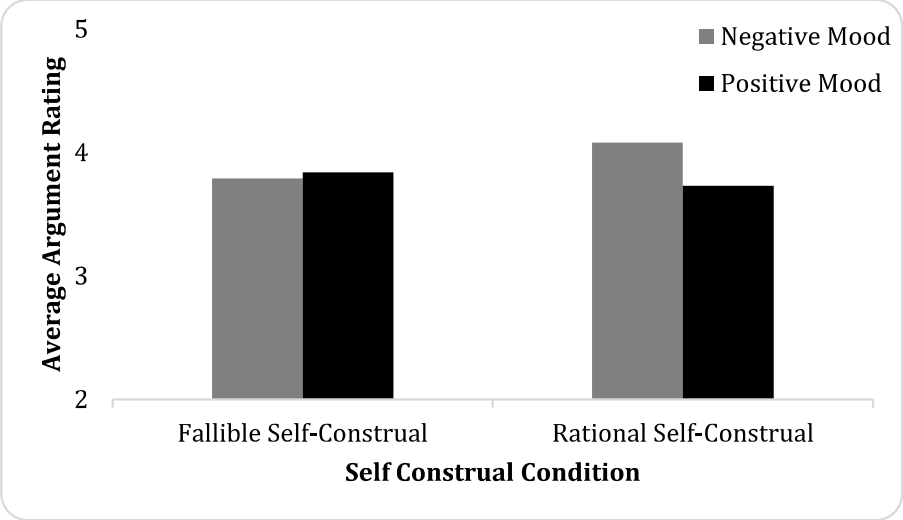

Figure 4. Mean rating of the arguments for each mood condition, split by self-construal condition. Arguments rated on a scale of 1-7.

With respect to nationality, participants gave similar ratings of the arguments regardless of whether or not they were born in a Western country. Our ANOVA gave a very high p-value for the effect of nationality on ratings of the arguments [$F(1,173)=.001$, $p=.97$]. When collapsed across conditions, the mean rating for Westerners ($M=3.86$, $SD=1.78$) was very close to the mean rating for non-Westerners ($M=3.88$, $SD=1.59$). The correlation between initial confidence and average argument rating was strongly negative for both Westerners ($r=-.480$, $p<.0001$) and non-Westerners ($r=-.368$, $p=.009$). Furthermore, an independent samples t-test revealed that agreement with the rationality questionnaire was very similar for Westerners ($M=3.46$, $SD=.35$) and non-Westerners ($M=3.47$, $SD=.34$). For the fallibility questionnaire, mean agreement for Westerners ($M=2.83$, $SD=.55$) was also very close to the mean agreement for non-Westerners ($M=2.75$, $SD=.68$).

However, unexpectedly, there was an interaction between self-construal and nationality

[F(1,173)=5.68, p=.018]. Among Westerners, a fallible self-construal *decreased* ratings of the arguments, but among non-Westerners a fallible self-construal *increased* ratings of the arguments. For Westerners, participants primed with a fallible self-construal rated the arguments as less convincing (M=3.47, SD=1.69) than participants primed with a rational self-construal (M=4.24, SD=1.79). For non-Westerners, a fallible self-construal led to higher average ratings (M=4.16, SD=1.37) than a rational self-construal did (M=3.58, SD=1.79). This is shown in Figure 5. The interaction between mood and nationality did not reach significance [F(1,173)=3.13, p=.079] and thus was not considered further. Given that there was a significant

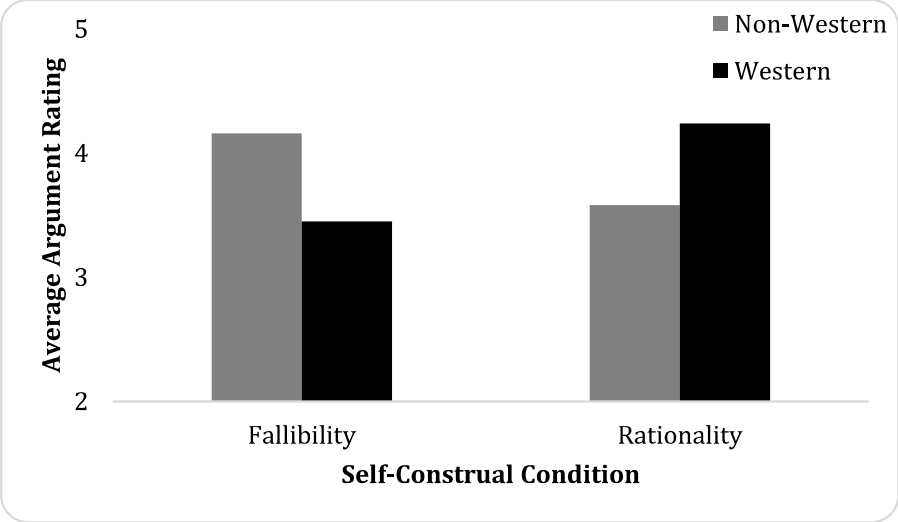

Figure 5. Mean rating of the arguments for each self-construal condition, split by nationality. Arguments rated on a scale of 1-7.

interaction between self-construal and nationality, we decided to analyze the effect of self-construal among Westerners and non-Westerners separately. An ANOVA for the effect of self-construal on argument ratings (for non-Westerner participants) failed to yield a significant result [F(1,48)=1.40, p=.24]. When the same analysis was done for Western participants, the difference was significant [F(1,129)=6.32, p=.013]. This difference in p-values was largely a function of

sample size. The effect sizes for self-construal were relatively similar for Westerners (d=-.44) and non-Westerners (d=.36). We tested for differences in initial confidence as a possible explanation for the respective effects. Given that confidence is correlated with argument ratings, mean differences in confidence could explain between condition differences in ratings. For non-Westerners, participants in the fallible self-construal condition started out as less confident (M=4.77, SD=1.68) than participants in the rational self-construal condition (M=5.77, SD=1.89); t(48)=-1.28, p=.21. While this was not significant, it has a moderate effect size (d=.36). For Westerners, there was little difference between participants in the fallible self-construal condition (M=5.08, SD=1.85) and participants in the rational self-construal condition (M=5.13, SD=1.66); t(129)=.50, p=.62.

Discussion

There was a strong negative correlation between initial confidence and ratings of the arguments. Participants who were more confident in their belief were less likely to find belief-contradicting evidence convincing, whereas participants who were more likely to find the evidence convincing. However, our study was not designed to address why this occurred. There are a number of possibilities that can be tested. Taber and Lodge (2006) found that more knowledgeable participants became more polarized when exposed to argument against their beliefs. This implies that they were also less convinced by the arguments. They also found that participants tended to spend more time reading belief-contradicting evidence than belief confirming evidence and speculated that they were thinking of counter-arguments. This would be consistent with the fact that the hippocampus (a region crucial for memory retrieval) is more activated when someone is faced with belief-contradicting evidence (Westen et al., 2006). It could be that people who are more confident also have more knowledge about the topic and are

thus more able to produce counter-arguments. This charitable interpretation would be consistent with the above research. One way to test this explanation would be to ask participants why they found the arguments convincing or unconvincing. If participants with higher confidence are more likely to state knowledge of a counter-argument as a reason why they were not persuaded, this would support the explanation. It is worth noting that when people are able to discredit evidence against their beliefs, they become more confident. This is called attitude polarization (Lord et al., 1979). Twenty-three participants reported that their confidence had *increased* after being exposed to the arguments, which might indicate that they were constructing counterarguments. This is consistent with the phenomenon of attitude polarization.

There could also be affective explanations of why confidence correlates with argument ratings. People who are more confident in their belief might be more motivated to not be convinced by the counterevidence. They might be more threatened by the evidence and feel a stronger desire to find problems with it. Zuwerink and Devine (1996) found that beliefs that were more personally important were more resistant to counter-arguments. They also found that negative affect mediated the relationship between belief importance and resistance to the arguments. That is, the negative affect that participants reported when they read counterattitudinal arguments partially explained the relationship between belief importance and resistance to the arguments. The same could be true of the correlation between belief confidence and resistance to the arguments. Future studies should look into what factors mediate the relationship between confidence and resistance to belief-contradicting evidence. If reported negative affect turns out to be a mediator, that would support a motivational explanation of why confident participants found the arguments less convincing. Personal importance and confidence are conceptually distinct, but future research could also determine whether or not they are

strongly correlated.

There is also the possibility of third variables being at work. There might be a particular personality trait, for example, that underlies both the tendency to be more confident and the tendency to not find belief-contradicting evidence convincing. Political conservatism (Fischer et al., 2008), less openness, less integrative complexity, more dogmatism and need for closure are all associated with greater confirmation bias (Lilienfeld et al., 2009). These are all possible third variables that could also be associated with having high confidence to begin with. IQ scores are unlikely to explain the relationship, given that they show no relationship with confirmation bias (Stanovich et al., 2013). However, Stanovich (2016) has been developing a new test which purportedly measures rationality, as opposed to intelligence. His "Comprehensive Assessment of Rational Thinking" (CART) has not yet been psychometrically tested. It would be interesting to see if people who score more highly are more open to belief-contradicting evidence, and if people who score low are more closed to belief-contradicting evidence. This would be a good way to test the discriminant validity of CART. If people who score low also tend to be more confident in their beliefs to begin with, then CART scores could be a third variable underlying the correlation between confidence and argument ratings.

To our knowledge, only one other study manipulated mood to measure its impact on confirmation bias (Jonas et al., 2006). The researchers study found that positive mood had a debiasing effect. They also performed two successful replication experiments and reported the results in the same paper. Our mood manipulation used videos, just as the above study did. They produced a difference in mood, but they did not produce a significant effect on openness to the arguments. This may be the experimental contexts were quite different. Nickerson (1998) made the distinction between confirmation bias related to information seeking and confirmation bias

manifesting itself in information interpretation. The aforementioned study was about information *seeking*, whereas our study concerned information *interpretation*. They found that positive mood increased the likelihood of participants looking for undesirable evidence, whereas we found that positive mood made no difference for how convincing participants found undesirable evidence to be. It is possible that positive mood does not influence information processing, but only information search. Furthermore, the topics were also different. Our study had participants evaluate evidence related to the afterlife, whereas the other study was related to vacation destinations. It is possible that the debiasing effect of mood disappears when the topic is religious. Another possibility is that the debiasing effect of positive mood only exists for topics directly related to personal life. These possibilities could be tested experimentally.

With respect to self-construal, completing the questionnaire about one's rationality did not produce a significant effect on openness. This is consistent with a previous study (Cohen et al., 2007), which used a similar manipulation and found that it did not increase openness to belief-contradicting evidence. Their explanation was that rationality salience led people to believe that their past beliefs were rational, and thus made them less open. However, this would naturally lead to the prediction that priming people's sense that they are fallible would result in the opposite effect. In other words, if a rational self-construal leads to less openness *because* it increases confidence in one's past accuracy, then a fallible self-construal should lead to less confidence in one's past accuracy and thus more openness. Our study failed to support this prediction. Completing the fallibility questionnaire also did not increase openness to the arguments.

However, it must also be noted that the effect of self-construal differed depending on nationality. A fallible self-construal led to lower ratings of belief-contradicting evidence for

Westerners, but let to higher ratings for non-Westerners (though the effect on the latter was not significant). It must be pointed out that for non-Westerners, participants in the fallible self-construal condition started out with less confidence in their belief. It is thus possible that, for non-Westerners, the nonsignificant difference between the rational and fallible self-construal conditions was due to a failure of random assignment. As far as why the difference exists for Westerners, there is at least one theoretical possibility. Cohen et al. (2007) found that identity threat had a biasing effect. Giving participants a chance to reflect on a time when they failed to live up to their values made them less open to belief-contradicting evidence. A fallible self-construal might similarly constitute an identity threat and make participants feel insecure. This could make them more motivated to maintain their current beliefs to preserve their sense of identity.

Munro (2010) argued along consistent lines, contending that resistance to belief-contradicting evidence is motivated by the fact that such evidence threatens one's self-esteem. A fallible self-construal might also threaten self-esteem, and strengthen the mechanism underlying confirmation bias. It is also worth noting that participants were less likely to agree with the fallibility questionnaire. This is despite the fact that the questions were designed so that almost anyone could agree with them (see Appendix A). This is consistent with the hypothesis that admitting fallibility is an identity threat. There is also a plausible explanation for why non-Westerners did not have their openness reduced when a fallible self-construal was primed. Past research has shown that people from non-Western societies tend to show less motivation for self-enhancement (Cross et al., 2010). Thus, a fallible self-construal might not be as problematic for non-Western participants. If they are less motivated to maintain a sense of self-esteem, then there is less reason to expect a threat to increase their desire to hold onto their beliefs.

At the same time, there was approximately the same level of agreement with the questionnaires for Western and non-Western participants. If a lack of self-serving bias (and less susceptibility to identity threat) is the reason why non-Westerners were not biased by the fallibility questionnaire, then we would expect them to agree more with the fallibility questionnaire. However, both Westerners and non-Westerners were less likely to agree with the fallibility questionnaire. In fact, Westerners agreed with the fallibility questionnaire slightly more. This makes our explanation less likely, though it does not constitute disconfirmation. Future studies should seek to replicate the finding that the questionnaires differently affect Westerners. If it is confirmed that Westerners are more resistant to belief-contradicting evidence when they are reminded of their fallibility, this could inform educational attempts to reduce confirmation bias. Reminding people that they are error-prone might lead to identity threat, which in turn increases bias.

It is a well-known problem in psychology that subjects in experiments are disproportionately Western (Henrich, Heine, & Norenzayan, 2010). No study to our knowledge has looked for group differences in confirmation bias. Despite the difference in the effect of self-construal, Westerners and non-Westerners gave almost exactly the same ratings of the arguments on average. There was a strong negative correlation between initial confidence and argument ratings for both nationality groups. Future studies should replicate this with a broader array of cultures. Unlike our study, they could also try to include participants currently living in non-Western societies and consider the specific country the participants were from. It might turn out to be a human universal that belief-contradicting evidence is unconvincing if one is more confident to begin with.

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Appendix A

Rationality questionnaire (inspired by Cohen et al., 2007)

1: incorrect – 2: somewhat incorrect – 3: somewhat correct – 4: correct
I am a rational person at least sometimes: 1 2 3 4
I am generally open to following the evidence where it leads: 1 2 3 4
Sometimes I get into heated arguments but remain rational: 1 2 3 4
At least some of my beliefs are based on an evaluation of the evidence: 1 2 3 4

Fallibility questionnaire

1: incorrect – 2: somewhat incorrect – 3: somewhat correct – 4: correct
Sometimes I am not a rational person: 1 2 3 4
I am sometimes resistant to changing my mind: 1 2 3 4
Sometimes I get into heated arguments and become overly emotional: 1 2 3 4
I have some beliefs about things I haven't studied very much: 1 2 3 4

Appendix B

Argument from dreamless sleep (written by David Simpson)

During dreamless sleep, it does not feel like anything to be you. You have no awareness, no sensations, and no conscious experience. Dreamless sleep is caused by a specific pattern of brain activity wherein certain functions are inhibited, and there is a loss of integrated processing. If reducing the brain's level of function causes you to lose all of conscious experience, it is very likely that destroying the brain would also do this. Thus, it is unlikely that you will have any conscious experience after death.

Argument from brain damage (written by David Simpson)

Brain damage can destroy every part of who you are. It can make you lose your language abilities, your memories, the ability to recognize faces, and your love for those close to you. There are many cases of people's personalities becoming dramatically different after brain damage. One famous example is Phineas Gage, a man whose left frontal lobe was damaged in an accident. Prior to the accident, he was responsible, kind, and hard-working. Following the accident, he was irritable, aggressive and could not keep a job. Everything about you can be ended by damaging a specific brain region or multiple brain regions. The most reasonable conclusion from this is that when the whole brain dies, you will lose the ability to have any conscious experiences. The death of the brain likely removes any possibility for an afterlife.