

God works in mysterious ways – Religious belief as modulator in inconsistency compensation

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Abstract

Inconsistencies and lack of concluding information comes with a dose of uncertainty and distresses, which is inherent to everyone's life experience. Religious belief in a benevolent being with divine control could reduce the aversive arousal signal produced by the anterior cingulate cortex (ACC), when people are faced with inconsistencies and prediction errors. It has been shown that religious people experience more life satisfaction than non-religious people. Many theories on human cognition and decision making try to address this phenomena, while non seem to provide a conclusive answer. In this review paper, it will be argued that increased life satisfaction of religious people could arise due to religious belief acting as a modulator in inconsistency compensation. Religious belief seems to be strongly tied to the elimination of certain forms of uncertainty, by providing an omniscient external control mechanism based on all-knowing divinity. When primed with a positive God concept, believers will show reduced error related negativity (ERN) signals compared to non-believers. Interestingly, these results were not found with a negatively primed God concept. Although future experiments need to clarify the exact relationships, it seems that religious belief can reduce ERN magnitudes, aversive arousal, and acts as a compensatory strategy.

Keywords: uncertainty, religion, compensatory behaviour, error related negativity

“I trust in the ebb and flow of the universe. I trust that life’s bigger than what I can see. I trust that there is divine order beyond my control. And I trust that no matter what happens, I will be alright.

– Oprah Winfrey

Due to randomness and lack of information, life is full of unpleasant surprises and inconsistencies that evoke uncertainty-related anxiety (Hirsh et al., 2012). Surprises we try to overcome by making continuous predictions about the uncertain world that surrounds us and updating this, based on what knowledge we possess and feel at ease with. Predicting future outcomes may often lead to a satisfying result, but nevertheless leaves us puzzled when errors or outcomes occur that seem out of our direct control. When these random occurring events happen, humans employ a vast array of cognitive strategies to reduce either the undesirable outcome, or simply adjust their internal subjective judgment in order to cope with the elicited aversive arousal. Cognitive dissonance for example, is considered to feel very aversive as humans, as cognitive consistency is an epistemic cue for errors in somebodies system of beliefs (Gawronski, 2012). Not everybody employs the same strategies, which leaves those susceptible prone to increased feelings of aversive arousal than others.

Conversely, new research suggests that religious belief, could act as a positive buffer against the aversive arousal caused by these violated expectations (Inzlicht & Tullet, 2010). Past research suggests that religious belief reduces stress in life, and increases feelings of well-being and happiness (Green & Elliot, 2010). The underlying reason for this observation, if it might exist at all, has been heavily debated in the past but remains unclear. Although different religions share common grounds such as providing social support (Salsman et al., 2005) they also differ greatly on conceptual ideas about life and morality. It is therefore difficult to draw conclusions about what lies at the root of this life satisfaction and happiness. Some state that religion is a tool of providing meaning in life which in turn drives this happiness (Park, 2005). Although meaning is certainly important in life, this answer is not sufficiently satisfying in the current age, as Atheists can be equally happy, and find meaning in life through appreciating science and nature, instead of a divine being (Caldwell-Harris et al., 2011). Besides, the positive effects of religion are accompanied with possible negative effects, as religious doctrine is capable of inflicting harm upon people as well (Pargament, 2002). For example, a religiously born homosexual might experience elevated stress and negative life events compared to a non-religious homosexual, simply because religious doctrine does not acknowledge these feelings. It thus seems, that there exist numerous

theories and claims as to why religious people are supposed to experience more life satisfaction and happiness, while non provide conclusive evidence.

Current psychological theories consider religious beliefs and behaviour as complex neuropsychological-based phenomena (Loewenthal, 2000). These beliefs and behaviour might have co-emerged together with novel and demanding cognitive processes for social cognition, like future prediction, memory and error monitoring. Thus, the belief in supernatural overarching beings that exert divine control over many aspects of life, might have emerged as a defensive coping mechanism, capable of reducing anxiety when faced with increased complexity and uncertainty. To illustrate a modern example of this proposal, Bulman and Wortman (1977) asked a group of paralyzed people to explain their misfortunate situation. As a response to the question “Why me?”, the most common answer was that God must have had a reason.

In line with similar research that focussed on basic neurophysiological differences between religious and non-religious people (Hommel & Carzato, 2010)(Hommel et al., 2011), this review paper will focus on the novel idea that religious belief modulates inconsistency compensation. This could happen through providing an external control mechanism as a compensation strategy, which could lie at the root of religions yet elusive effect on well-being. Firstly, a short overview will be provided about what is known about uncertainty and how humans cope with this. Secondly, we look at what happens on a neurophysiological level when errors occur based on uncertainty. Lastly, differences in these errors and aversive arousal between religious and non-religious people are investigated. This will hopefully provide new insights into the emergence of religious belief systems and their capability of improving life satisfaction and reducing stress. The findings could also prove to be useful in the investigation of fundamentalist religious people and the cognition that leads to extreme worldviews. Possible other explanations will be addressed in the discussion section.

Control in an uncertain world

The world that we experience can be random and inconsistent. This implies a certain uncertainty, which leaves us with an unpredictable future that is unsettling to most (Tullet, Kay & Inzlicht, 2015). Re-establishing feelings of control after experiencing uncertainty due to inconsistencies has long been considered a fundamental motive for adaptive human behaviour. In order to do so, humans have many different compensation strategies, that are employed based on what sort of inconsistency has been detected. Proulx, Inzlicht & Harmon

Jones (2012) provide an overview of the different strategies. The compensation strategies are described as palliative responses to a biologically based pattern of aversive arousal that follows from any form of prediction error. Prediction errors are made more easily in random, uncertain and novel situations, where people feel they do not have sufficient information or knowledge to predict possible outcomes. These situations can elicit a subjective feeling that one is not in control of their environment, which could lead to helplessness, ineffective stress management, decreased self-control, and depression (Twenge, Zhang & Im, 2004)

Uncertainty-hypothesis of religious belief

The uncertainty-hypothesis of religious belief states that religion is a psychological coping mechanism for unpredictable situations regarding the self (Hogg et al., 2010). An assumption of the hypothesis is that greater control over the external environment due to, for example economic development and technological advances, causes religious belief to decline and vice versa. Barber (2011) provided evidence for this theory, as an increase in disbelief was linked to an increases in income and health security. Religious belief, could thus be one of the oldest control compensation strategies known to humans. The belief in supernatural sources of control, such as religious belief in divine beings or gods, may have evolved to defend against the distress and negative arousal associated with uncertainty and randomness. To investigate the relationship between uncertainty and belief in divine control, Kay, Moscovitch & Laurin (2010) primed participants with randomness-related words and found that they exhibited heightened beliefs in spiritual and divine control compared to control words. Interestingly, when participants were given the opportunity to attribute the cause of any felt aversive arousal to a pill that they ingested in the experiment, they re-established control, and heightened beliefs vanished. This suggests that in order to get rid of the aversive arousal, both the idea of divine control and the pill sufficed as explanation.

A clever study conducted by Legare and Souza (2014), tried to highlight a different aspect of the search for control for control. Their results showed that when people are primed with randomness, the attributed efficacy of rituals, used for problem-solving increased. Rituals are inherently linked to religious belief, and comparably provide a means for coping with the aversive feelings associated with randomness. This is thought to happen due to the perception of a connection between ritual action and a desired outcome, although this connection does not actually have to be there in order for the effect to occur. Both findings provide evidence that humans are actively searching for signs of external control to explain uncertain situations. The feeling of control, or the lack of it, thus seems to be an important

construct that modulates how we perceive random phenomena, and deal with its prediction errors. Whitson & Galinsky (2008) showed that a perceived lack of control causes people to perceive illusory patterns like images in noise, forming illusory correlations, perceiving conspiracies and developing superstitions. Although this review paper is not focused on addressing whether or not God exists, it is fair to say that believing in a supernatural divine being takes some form of superstitious belief.

In conclusion, uncertainty and randomness seem to lower the feeling of being in control with its associated negative effects. This feeling comes down to a general biological feeling of distress, and motivates people to engage in compensation strategies to reduce this. Religion and the notion of God could provide an omniscient external control mechanism that is always there for people in order to explain uncertainties. As is the case with rituals, actually being in control of the desired outcomes control does not matter as much as the reduction of uncertainty through whatever means possible. Although it is true that humans have a wide range of different compensation strategies for many different situations, the notion of a God with omniscient power and knowledge is bendable to quite an extent, and makes it possible to provide a cognitive coping mechanism harbouring explanations for a wide variety of uncertainties. As the ideas described above are merely behavioural observations, we will now look at the neurophysiological mechanisms that might underlie these phenomena.

Error..Error : On Detecting Inconsistencies

It is thought that different compensation strategies rely on the same aversive arousal , which arises when humans are confronted with any form of violated expectations. Research suggests that analogous compensation behaviour can follow from a variety of inconsistencies and violations that don't specifically share common content (Proulx et al., 2012). This suggests that compensatory responses are not aimed at actually restoring violations or resolving the source of inconsistencies, but rather act as palliative efforts to reduce the same aversive arousal that arises from any form of inconsistent experience. Although the entire neural mechanism behind aversive arousal is still unclear, it has been consistently linked to the anterior cingulate cortex (ACC), an area that is supposed to be responsible for error detection (Holroyd et al, 2004). The ACC interconnects highly with the prefrontal areas of the brain as well as the limbic system, with the regulation of bodily states and arousal as one of its primary functions (Luu & Pederson, 2004). Research suggests, that when people make an error or perceive inconsistencies, an error-related negativity signal is sent, indicating the

rest of the cortex that something conflicting is happening. This in turn steers motor action and guides new adaptive behaviour. Throughout the years, many models have been proposed for the specific functioning of ERNs. One of these models, in line with the view of this paper, suggest that ERNs are the product of anxious reactions to one's performance, acting as a neural distress signal (Bartholow et al., 2005). The amplitude of this ERN signal provides clues as to how distressed someone is, as it is considered to be a neural marker for the magnitude of the perceived error. If the theory described in the last paragraph is true, one would expect to see differences in ERN amplitudes between religious and non-religious people over varying conditions, which is indeed what we see (Inzlicht et al., 2009). If we continue the line of reasoning laid down by Proulx et al., (2012), although probably crude, it is clear that we should not worry about the type of inconsistency and error, as all of them, regardless of content, could make use of the same error detection system for signalling aversive arousal to steer compensatory behaviour.

Reflecting on God's mysterious ways

In order to test these differences, Inzlicht & Tullet (2010) conducted an experiment where they found that religious people, when consciously and unconsciously primed with religious concepts, showed a significant decrease in their ERN amplitudes after errors made during the STROOP Task. However, for non-believers they found an increase in ERN amplitude within the same experimental set-up. These results provide evidence for the ACC theory described earlier, as it suggests that the non-believers experienced an increase in aversive arousal through errors, as the concept of God is conflicting to them. As an extension of this study, Good, Inzlicht, Larson (2014) showed reduced ERN signals and worse performance on a go/no-go task for believers, in a condition where the love of God was primed. Reflecting on god's punishment however did not affect this performance, nor did it reduce ERNs. This striking finding suggests that the concept of a positive, loving God is necessary in order for the reduction of aversive arousal to occur. This could explain why, throughout most modern religions, Gods are predominately benevolent and forgiving (to the point where you still believe in them). Although it is thought that the reduced ERN signals are caused by religious belief (reflection upon God), it is not yet clear how this exactly works and how persistent this effect is. Since we see a difference in ERNs for believers in the loving and punishing conditions, it suggest that the effect is not automatic, but is capable of modulating basic neurophysiological processes through (un)consciously deliberating the concept of God. Religious rituals, artefacts and traditions could provide religious people with

reminders on the divinity and benevolence of God, which could then lower the ACC response to uncertainties and errors. This however, is highly speculative, and further research should be done in order to capture variations in ERNs in a variety of experimental set-ups, conditions, participants and religions.

Conversely, a study on ERN signals and the ACC conducted by Rigoni, Pourtois & Brass (2015), found a similar decrease in ERN signals on a STROOP task when participants were led to disbelieve the concept of free will in comparison to a neutral condition. Interestingly, there are conceptual similarities between the disbelief in free will and the belief in an omniscient divine being that ultimately controls the world and rids it of uncertainty. Both entertain a sense of determinism (the outcome is fixed anyway, so why bother) and show a reduced ERN signal after making errors. However, the authors state that the sense of determinism through the disbelief in free will might influence behaviour negatively, by promoting cursory and antisocial behaviour. Although the believers did perform worse on the go/no-go task when primed with the loving God, this conclusion is in stark contrast with attributes that are often ascribed to religious virtues, such as pro-social behaviour and conscientiousness (Pichon, Boccato, & Saroglou 2007). The possible difference in effect could arise due to the difference in locus of control, where free will implies that there is little to no control as life is governed by the strict laws of physics, whereas religion implies that divine benevolent control is in order. Although interesting, the current amount of research is not sufficient in order to draw broad conclusions on the similarities and disparities between the possible affective differences in deterministic views.

Conclusion

The scope of this paper was to investigate whether religious belief could modulate inconsistency compensation, could function as a compensation strategy that reduces aversive arousal elicited by the experience of errors and inconsistencies, and therefore the cause of life satisfaction. Through convergence of literature, it has become clear that religious belief is strongly tied to the elimination of uncertainty. It could do so by providing people with an external divine control mechanism, for which the term 'God works in mysterious ways', would perhaps be most fitting. Just like rituals provide an illusion of control over an outcome without the need of direct causation, it might only take a strong belief in God to reduce aversive arousal through experience. The idea that inconsistent or random phenomena might be out of your control, but are ultimately still controlled by an all-knowing divine being, might lie at the core of the stress reducing effects that are captured in lowered ESN signals

(as is captured by the Oprah Winfrey quote). However, this effect only occurs when this divine being is considered benevolent and loving, not punishing. Interestingly, another worldview, namely the disbelief of free will, seems to elicit the same lowered ESN signal. Although both world views imply a form of determinism, these results do not specifically have to mean that they use the same compensation strategy, as many different strategies are based on the same underlying ACC error detection system. Although it is suggested in the paper that religious belief is palliative, and could compensate for a wide variety of inconsistencies, it is not yet clear how it should do so and what its maximal flexibility is.

Discussion

As this paper is certainly no meta-analysis, and research on this novel topic is scarce, the findings should be taken with a grain of salt. This stems from the fact that many existing theories that focus on the mechanisms of religion are mere theories and correlational societal studies. New trends that, like this paper, focus on the cognitive neuroscience behind religious experience and its effect on human psychological functioning, luckily seem to be increasing. However, using recent findings that have not been replicated yet, also implies that a lot of assumptions were made. In this paper, a great deal of focus lies on the supposed ESN signal and its functionality in error detection. Although it is suggested that it is very likely that different compensation strategies all work with the same ESN from the ACC, a lot less is known about how the variety of follow-up compensation behaviours are selected and processed to meet the desired demands. Although the notion 'God works in mysterious ways' is applicable to a wide range of unexplainable uncertain phenomena in the world, it would be highly unlikely that this is the only used compensation strategy for religious people. Further research thus has to investigate whether the priming or reflecting on God proves useful for every form of inconsistency, whether perceptual, world view, morally or identity based.

On the other hand, it could easily also be the case that the decrease of ESN has nothing to do with religion in particular, but more with the sensation of a stable, understandable and predictable world, which is triggered by the reflection on the specific world view that one beholds and finds dear. Many varieties of ideologies and belief systems may serve the exact same palliative function, although religion and myth were probably the first to emerge in modern humans lives, as they are not specifically based on verifiable knowledge.

For future research, it would be interesting to investigate if differences exist between the use of religious belief as a compensatory strategy between religious individuals that vary

in intelligence, as religiosity has been found to negatively correlate with intelligence (Zuckermann et al., 2013). This could possibly imply that religious people use religious belief as a surrogate for a more analytical reasoning style associated with intelligence, simply because they lack the analytical reasoning style to cope with certain uncertain phenomena. Another interesting topic touches upon how differences in ESN amplitudes might arise over the entire range of religious conviction. We often stand baffled when we try to understand (religious) fundamentalist behaviour, choices and world view. It might be the case that the aversive arousal system is tuneable through experience, and that fundamentalists receive very selective ESN signals compared to moderate and non-religious individuals. Based on the findings, it seems that this system is modulated by world views and ideologies, and therefore prone to neurophysiological biases to ideas and stimuli that are utterly conflicting to most of us, but might not concern fundamentalists, as radical (religious beliefs) could serve as a justification for almost any experience and action.

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