

Article

The Effect of Supernatural Priming on Cheating Behaviour

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Abstract: Research has shown that the mental activation of concepts related to supernatural agents (e.g., God, ghost) is capable of altering one's moral behaviours. Based on the supernatural monitoring hypothesis, two experiments were conducted to investigate the impact of priming on cheating behaviour using undergraduate participants from Singapore. The results of the first experiment showed that participants who were primed with the concepts of God and ghost via a word-scramble task cheated less in a mathematical task than participants exposed to neutral primes. The second experiment showed that the activation of God and ghost concepts via a supraliminal priming method reduced the participants' cheating in a riddle game, even when the participants were informed that they would be rewarded monetarily for correctly answering the riddles. The results suggested that the mental activation of supernatural agents could reduce cheating behaviour regardless of the presence or absence of explicit belief in supernatural agents.

Keywords: explicit supernatural belief; religious priming; cheating behaviour; religiosity

1. The Effect of Supernatural Priming on Cheating Behaviour

People form concepts of supernatural agents (e.g., God, ghost, spirits) from personal experiences, media exposure, anecdotal accounts, and folklores (Bering 2006; Granqvist et al. 2010), and the idea of supernatural agents is often associated with religious beliefs (Beck 2006; Kapogiannis et al. 2009). Most research has investigated how the mental activation of the concept of God influences affective, cognitive, and behavioural states (Batson et al. 1993). More research is necessary to explore whether other types of supernatural agents would influence people in the same way as the *God* concept does. Here, we investigated if the activation of the *ghost* concept (another supernatural agent) would have a similar impact as the *God* concept has on overt behaviour. In particular, we predicted that the mental activation of *God* and *ghost* concepts would reduce individuals' cheating behaviours as compared to participants not exposed to those concepts.

The concept of God has traditionally been activated via priming techniques (e.g., Bargh and Chartrand 2000). Priming refers to a stimulus facilitating a particular response. The priming technique involves the exposure to one stimulus that is expected to influence a response to another stimulus, automatically, without conscious intention. With the assumption that people have the knowledge of God stored in the unconscious, researchers could access, recall, and activate the concept of God and examine the linkage between God and other psychological phenomena through the priming paradigm (Granqvist and Larsson 2006). The overall findings using the priming paradigm suggest that the mental activation of the God concept could lead to a wide range of psychological changes. On one hand, studies have shown that priming individuals with the concept of God has resulted in beneficial psychological consequences such as increased levels of gratitude (e.g., McCullough et al. 2002), well-being (e.g., Ramsay et al. 2019), and self-awareness (Gervais and Norenzayan 2012), as well as number of prosocial

behaviours (e.g., [Ahmed and Salas 2011](#); [Lin et al. 2016](#)) as compared to individuals primed with neutral stimuli. On the other hand, research has shown that priming people with the concept of God could induce prejudice (e.g., [Johnson et al. 2010](#); [Ramsay et al. 2014](#)), bias towards the out-group ([Johnson et al. 2015](#)), aggression ([Bushman et al. 2007](#)), and support for terrorism ([Ginges et al. 2009](#)). Further, research has shown that the activation of the *God* concept could curb pleasure-seeking tendencies. For example, [Laurin et al. \(2012\)](#) found that individuals primed with the concept of God tended to put a halt on their pursuit of personal goals. Similarly, other researchers have shown that the reminder of God caused believers to delay their self-fulfilment ([Geyer and Baumeister 2005](#)), self-gratification, and self-accessibility ([Lin et al., forthcoming](#)).

Regarding the effects of supernatural priming on cheating behaviour, both nonreligious and religious primes have been used to activate the concept of supernatural agents. For instance, [Piazza et al. \(2011\)](#) found that children who were primed with information about the presence of a watchful invisible fairy Princess Alice cheated less in a challenging task compared to those children who were not primed. Similarly, [Bering et al. \(2005\)](#) demonstrated that participants were less likely to cheat on a spatial intelligence test when primed with a story about the laboratory room being haunted by a ghost. In addition, [Kinnier et al. \(2000\)](#) showed that when primed with religious beliefs (the Golden Rule in the Bible), participants became more honest. We could understand that honesty would lead to less cheating behaviour.

With the understanding that supernatural priming could curb cheating behaviour, another interesting research question is whether the belief in supernatural agents moderates the relationship between supernatural priming and cheating behaviour. Previous research has yielded contradictory findings. [Aveyard \(2014\)](#) found there was no difference between God and non-God believers regarding honesty at solving a math test after the participants were primed with the concept of God. Similarly, [Randolph-Seng and Nielsen \(2007\)](#) found that when participants were primed with God concepts, they were less inclined to cheat regardless of their levels of intrinsic religiosity (i.e., high vs. low). No moderation effects of the belief in supernatural agents have been found in other behaviours (rather than cheating) such as submissive behaviour ([Saroglou et al. 2009](#)), punishment, ([McKay et al. 2010](#)), and spatial-attention performance ([Chasteen et al. 2010](#)). In contrast, other research has found a significant moderating effect of supernatural agent belief in prosocial behaviours ([Lin et al. 2016](#)), self-judgment ([Baldwin et al. 1990](#)), moral dilemmas ([Carpenter and Marshall 2009](#)), personal agency ([Dijksterhuis et al. 2008](#)), neurophysiological responses ([Inzlicht and Tullett 2010](#)), and creation of humour ([Saroglou and Jaspard 2001](#)).

One possible reason for such inconsistent findings could be explained by the lack of consensus on the operationalisation of supernatural agent belief ([McKay and Dennett 2009](#)). For instance, some researchers treated supernatural agent belief in terms of intrinsic/extrinsic religiosity ([Gervais and Norenzayan 2012](#)), others viewed belief of supernatural agents as spiritual awareness ([Pichon et al. 2007](#)). Further, another group of researchers measured supernatural agent belief in terms of observed religion participation ([Shariff and Norenzayan 2007](#)), or perceived importance of religion ([Saroglou et al. 2009](#)). [Galen \(2012\)](#) has suggested that these techniques (e.g., high religiosity versus low religiosity; high spiritual awareness versus low spiritual awareness) could potentially conflate uncommitted supernatural agent believers with the nonbelievers or believers of supernatural agents. Hence, it is unclear which form of supernatural agent belief conceptualisation would moderate the effects of supernatural priming. To avoid the situation wherein uncommitted supernatural agent believers (i.e., participants answer “moderately believe in supernatural agents”) could be considered either true nonbelievers or believers, we decided to use the method used by [Aveyard \(2014\)](#) and [Lin et al. \(2016\)](#) and simply ask the participants whether they believed in the existence of God and ghosts (i.e., yes or no).

The supernatural monitoring hypothesis explains that individuals who believe in the existence of supernatural agents might be influenced by believing that they are being observed. Thus, believers’ cheating behaviour may be deterred because of the belief that invisible supernatural agents (e.g., God,

ghosts) could be surveying on them and punish them if they do not obey to moral behaviour (see [Gervais and Norenzayan 2012](#); [Johnson and Krüger 2004](#); [Shariff and Norenzayan 2007](#), for more detail). The hypothesis implies that being primed with a supernatural entity would reduce cheating behaviour (i.e., supernatural priming would induce the idea of being observed and possibly punished for immoral behaviour). The hypothesis would also predict no priming effects of the God and ghost concepts on cheating behaviours for nonbelievers in supernatural agents. However, we predicted that nonbelievers would be affected by supernatural priming in a society like Singapore. Singapore is a multi-religious society, rich in folklore stories and superstition about the existence of ghosts and spirits, and wherein popular traditions are well-known by the population and overtly celebrated by many (e.g., the Hungry Ghost festival, in which believers would offer paper-money and other gifts to the spirits). As such, the concepts of God and ghost may prime individuals regardless of their reported belief in the existence of God or ghosts.

2. The Current Research

Two experiments were conducted to examine if the activation of the God and ghost concepts could lead to a decrement of cheating behaviours. We also hoped to obtain more consistent and replicable evidence concerning the moderating effect of belief in supernatural agents on cheating behaviour. We hypothesised that priming participants with God and ghost concepts would lead to a decrement of cheating behaviours regardless of the participants' belief in supernatural agents.

3. Experiment 1

The first experiment tested the effects of supernatural priming on cheating behaviour using a mathematical task. Priming was induced by instructing participants to assemble words into meaningful sentences in which the primes (God, ghost, or neutral words) were presented. The participants' belief in supernatural agents was also registered. Participants were unaware of the real purpose of the study.

4. Method

4.1. Participants

A total of 90 undergraduate students (36 males and 54 females, $M_{\text{age}} = 23.23$, $SD_{\text{age}} = 3.32$) from a university in Singapore participated for course credits. To operationalise supernatural agent belief, we asked participants if they believed the existence of God and ghosts (e.g., [Aveyard 2014](#)); hence, only participants who believed in the existence of God and ghosts would be considered as supernatural-agent believers. Out of the 90 participants, there were 51 believers of supernatural agents and 39 nonbelievers of supernatural agents¹. All participants were randomly assigned to one of the three prime conditions: God ($n = 30$), ghost ($n = 30$), or neutral ($n = 30$).

4.2. Materials and Procedure

Participants were told that the aim of the study was to examine their English and mathematical abilities. On the day of experiment, they were first invited to complete a word-scramble task (similar to other studies, as in [Shariff and Norenzayan 2007](#); [Toburen and Meier 2010](#)). In this task, they had to rearrange the words in a correct order by removing one word to form a correct sentence. For instance, participants in the God prime condition were given the words "he God the felt lives" to rearrange to "he felt the God"; in the ghost prime condition, "ghosts the him to spoke" to rearrange to "ghost spoke to him"; in neutral prime condition, "more paper it once do" to "do it once more". All participants

¹ Participants' religious affiliations were registered; however, the information was not used in the analysis. There were Buddhists (11.1%), Christians/Catholics (44.4%), Hindus (15.6%), Muslims (4.4%), Taoists (1.1%), and the rest professed not being affiliated to a particular religion or being atheists (23.3%).

completed five sentences. After completion of the word-scramble task, participants were asked to perform a mental mathematic task (von Hippel et al. 2005), in which 20 mathematical operations were presented one by one on a computer screen for the participants to solve (e.g., $1 + 1 + 1 + 12 - 9 + 7 + 1 - 2 + 8 - 4 = ?$). The experimenter also informed the participants that the correct answer to each operation would pop-up on the screen due to a programming glitch, but they could press the spacebar to stop the answers to appear. The experimenter continued to say that it would be impossible to know whether they had really pressed the spacebar or not, so it would really be up to them if they wanted to cheat or not. Actually, the experiment had been programmed not only to display the answers, but also to record the number of times the spacebar had been pressed. Cheating behaviour was operationalised as the number of times that the participant did *not* press the spacebar out of the 20 mathematical operations in the math task. The higher the number, the more the participants allowed the answers to appear before responding, therefore, cheating.

5. Results and Discussion

The results of a 3 (prime: God, ghost, neutral) \times 2 (supernatural agent believer: believers, nonbelievers) between-subjects analysis of variance (ANOVA) showed significant differences between the three priming conditions on cheating behaviour, $F(2, 84) = 10.23$, $p < 0.001$, $\eta_p^2 = 0.20$. Post-hoc analyses revealed that participants in the God prime condition ($M = 5.23$, $SD = 4.95$) and ghost prime condition ($M = 4.07$, $SD = 4.81$) cheated similarly ($p = 0.66$) and significantly less than the participants in the neutral prime condition ($M = 9.90$, $SD = 5.74$), $ps < 0.005$. No differences on cheating were found between believers ($M = 6.00$, $SD = 5.80$) and non-believers ($M = 6.92$, $SD = 5.63$), $F(1, 84) = 0.92$, $p = 0.34$, $\eta_p^2 = 0.01$. There was no significant interaction effect between the priming conditions and the belief status, $F(2, 84) = 0.57$, $p = 0.57$, $\eta_p^2 = 0.01$.

In Experiment 1, we used a word-scramble task to activate the concepts of God and ghost and found that the reminder of supernatural agents could curb cheating. We also found that belief in supernatural agents did not moderate the relationship between supernatural priming on cheating behaviour. However, we noticed some design and methodological concerns that required improvement. In Experiment 1, the students might have not been motivated to answer the mathematical task as they would receive course credit points regardless of their cheating outcome. Therefore, in Experiment 2, we motivated the participants to cheat by incorporating a monetary incentive (i.e., if they could answer all the questions correctly, they could be rewarded with money). Another issue was the unequalled sample size between the participant with and without supernatural agent belief. There were only 39 (out of 90) who declared that they did not believe in supernatural agents. To confirm that supernatural-agent belief would not moderate the impact of supernatural priming on cheating behaviour, we tried to recruit an equal number of supernatural agent believers and non-believers in Experiment 2.

6. Experiment 2

The second experiment employed a poster to prime participants with supernatural agents and a riddle-card game to explore cheating behaviour. This experiment also included a monetary incentive with the intention of promoting cheating behaviour and recruited a similar number of believers and nonbelievers. The aim of the study was concealed to the participants.

7. Method

Participants, Materials, and Procedure

A total of 120 participants were recruited in Experiment 2. Six participants were excluded from the analysis for not following the instructions. The final number of participants ($N = 114$) were randomly assigned to one of the three prime conditions (God: $n = 37$; Ghost: $n = 39$; neutral: $n = 38$). The participants were undergraduate students (64 females, 50 males; $M_{\text{age}} = 22.41$; $SD_{\text{age}} = 3.86$) from a university in Singapore and participated for course credits. We followed the same procedure

as Experiment 1 and recorded the participants' belief in the existence of God and ghosts². The total number of participants with supernatural agent belief (believers) was 58, and without supernatural agent belief (nonbelievers) was 56.

Participants reported to the experimental room one at a time. The room was equipped with a one-way mirror. Participants were instructed to be seated at one side of the one-way mirror and randomly assigned to a condition wherein there was poster on the wall with either the word "GOD", "GHOST", or "GHEDS" (i.e., a nonsense word for the neutral prime condition). Exposure to the poster was considered a supraliminal priming method (as in [Lin et al., forthcoming](#)). In all conditions, the word was presented in a black ink, font size 150 Calibri with a white background. Once seated, they were told to wait for 3 min while the experimenter prepared a riddle-solving game. The 3-min waiting time was intended to activate the God (or ghost) concepts.

The participants were then given 30 riddle-solving game in flashcards (e.g., "during which month do people sleep the least?", "A man pushes his car, stops in front of a hotel and immediately goes bankrupt. What is he doing?"). They were instructed to answer 30 riddles on an answer sheet form within 15 min and told that the winner with the most correct answers would win \$100 SGD.³ The incentive was to promote cheating (e.g., [Bering et al. 2005](#); [Randolph-Seng and Nielsen 2007](#)). The participants were told that the answers of each riddle were located at the back of the cards and they should try to answer the riddles honestly and to the best of their ability. Their cheating behaviours (i.e., flipping the card to look at the answer) were observed from a one-way mirror (i.e., the experimenter could see the participant, but the participant could not).

8. Results and Discussion

Cheating behaviour was operationalised as the number of times the participants turned over the riddle-card in order to check for the correct answer. The results of a 3 (prime: God, ghost, neutral) \times 2 (supernatural agent believer: believers, nonbelievers) showed significant differences between the three priming conditions on cheating behaviour, $F(2, 108) = 4.54, p = 0.013, \eta_p^2 = 0.08$. Post-hoc analyses revealed that the number of cheating behaviours of the participants in the God prime condition ($M = 1.86; SD = 5.25$) and ghost prime condition ($M = 2.21; SD = 5.85$) were not significantly different, $p = 0.98$. However, participants in the neutral prime condition ($M = 6.46; SD = 10.20$) cheated significantly more in comparison to participants in the God and ghost prime conditions, $ps < 0.005$. Similar to Experiment 1, there were no differences between believers and nonbelievers on cheating behaviour, $F(1, 108) = 0.58, p = 0.45, \eta_p^2 = 0.01$. The believers' number of cheating behaviours ($M = 3.99, SD = 8.41$) were not different from the nonbelievers ($M = 3.03, SD = 6.85$). There was no significant interaction effects between prime and belief status on cheating behaviour, $F(2, 108) = 0.19, p = 0.83, \eta_p^2 = 0.003$.

The results of Experiment 2 replicated the findings of Experiment 1 and showed that the participants in God and ghost conditions demonstrated significantly lower cheating rates than the participants in the control condition, even with the promise of high monetary reward (\$100 SGD). As in Experiment 1, the participant's belief in supernatural agents had no moderating impact on cheating behaviour.

9. General Discussion

The two experiments yielded three findings. First, the mental activation of supernatural agents decreased individuals' cheating behaviours. Second, the mental activation of supernatural agents

² Among the participants ($N = 114$), there were 15.8% Buddhists, 25.4% Christians/Catholics, 15.8% Hindus, 6.1% Muslims, 33.3% no religion (i.e., atheists), and 3.5% others (e.g., Taoists, Shintoists). Similar to Experiment 1, this information was not used in the analysis.

³ One hundred Singapore Dollars (\$100 SGD) is equivalent to approximately \$72 USD. It is considered relatively high monetary reward for most of the university students in Singapore. Most Singaporean university students receive around \$60 SGD per week from their parents ([Today Online News 2017](#)).

decreased cheating behaviour regardless of monetary reward. Hence, the present research suggests that the mental activation of God or ghost concepts could refrain individuals from cheating, even under the pressure of monetary temptation. Last, supernatural-agent belief did not moderate the impact of supernatural priming on cheating behaviour.

Our results on the effects of supernatural priming on cheating behaviour were consistent with previous studies (e.g., [Bering et al. 2005](#); [Randolph-Seng and Nielsen 2007](#); [Piazza et al. 2011](#)). While other studies have shown that the concept of supernatural agents could be activated by a variety of words (e.g., church, faith, prayer, and spirits; e.g., [Pichon et al. 2007](#); [Saroglou et al. 2009](#); [Shariff and Norenzayan 2007](#)), we found similar effects using the words God and ghost. We employed two types of supraliminal priming methods: a word-scramble task and a poster (both are considered explicit methods). The outcomes from our experiments suggested that the method of supraliminal priming did not affect cheating behaviour.

We found no moderating effects of supernatural agent belief on the impact of supernatural priming on cheating. One possible reason for the lack of moderating effects of supernatural agent belief could be explained by the dual process model of religious cognition (e.g., [Jong et al. 2012](#); [Pirutinsky et al. 2015](#)). According to the dual process model, nonbelievers of supernatural agents can demonstrate their endorsement towards the concept of existence of supernatural agents ([Uhlmann et al. 2008](#)). For example, [Bering \(2002\)](#) found that participants who explicitly indicated that they did not believe in afterlife implicitly agreed with the statements of afterlife. In the present study, therefore, it is possible that when the nonbelievers of supernatural agents claimed to be “not believing the existence of God/ghost” explicitly, they might believe (and agree with) the notion of God/ghost implicitly ([Jong et al. 2017](#); [Pirutinsky et al. 2015](#)). The fact that our results showed that the nonbelievers decreased their cheating behaviours (just like the believers) indicates that they could implicitly believe in supernatural agents and thus be fearful of their punishment ([Gervais and Norenzayan 2012](#)). However, since there was no test for implicit supernatural agent belief in this study, this contemplation could only be examined in the future.

The ambivalence of the moderation effect of supernatural agent belief could also be due to the location where the supernatural priming research takes place. For example, in one study conducted in a laboratory, [Shariff and Norenzayan \(2007\)](#) found that God believers donated more money than nonbelievers when primed with God concepts, but in another study conducted in a more naturalistic setting, the moderating effect was absent. Hence, it seems that the moderation effect of supernatural agent belief in supernatural priming studies is complicated and deserves more exploration.

With regard to the supernatural monitoring hypothesis ([Gervais and Norenzayan 2012](#); [Johnson and Krüger 2004](#)), believers may have behaved in accordance to a religious doctrine in which supernatural agents can watch and punish immoral behaviour. We found, however, that nonbelievers were similarly influenced by the God and ghost primes. In Singapore (and many other Southeast Asian countries), the concepts of God and ghost are intertwined with folk religion, and superstitious practices and beliefs are popular knowledge among the locals. For instance, it is believed by many that it is not auspicious to walk alone in the night during the 7th Lunar month, when the doors of hell are opened and ghosts roam on earth. Therefore, when participants (both believers and nonbelievers of supernatural agents) were primed with the concepts of God and ghost, certain embedded values, knowledge, and experiences of those practices were also activated (e.g., [Jong et al. 2012, 2017](#)). Hence, it is possible that the implicit motivation to fear, obey, or respect were reasons for the decrement of cheating behaviours due to values, knowledge, and experiences, and regardless of the participants’ explicit belief in the existence of supernatural beings ([Bering 2002](#); [McKay et al. 2010](#); [Pirutinsky et al. 2015](#)). Besides religiosity (implicit and explicit), future researchers should explore how knowledge, culture, and folklore may explain the effects of supernatural priming on cheating behaviour.

10. Limitations

One limitation of the current study is the use of supraliminal primes. All the participants were supraliminally exposed to the concepts of God and ghost. It is yet to explore if subliminal exposure to such concepts would yield similar results. Another limitation is the assumption of the existence of a *mental activation* of God and ghosts after the participants were exposed to those primes, which could not objectively be observed. Moreover, the supernatural monitoring hypothesis was proposed as explanatory framework for the current results. However, we could not ascertain objectively changes in the feeling of “being observed” or changes in morality. Last, by asking participants whether they did or did not believe in God and ghosts, we could not ascertain whether nonbelievers did not completely believe in supernatural agents (e.g., it could be that a person reports not believing in supernatural agents, but he or she performs superstitious behaviours to avoid punishment or bad luck, suggesting lack of awareness in supernatural belief).

The concept of God and ghosts are learnt early in age and have complex and emotional components that may automatically produce changes in people’s covert and overt responses regardless of their levels of belief and religiosity (Granqvist et al. 2010). We propose that future research could use implicit measures of supernatural belief rather than questions about it.

11. Conclusions

Different priming methods were used to examine different cheating behaviours in two experiments and both experiments offered good evidence that supernatural agent concepts (i.e., God, ghost) were capable of curbing cheating behaviours. However, we did not find a moderating effect of supernatural agent belief on the impact of supernatural priming on cheating behaviours. With the moderating factor of belief unresolved, the current research serves as a cornerstone for more exploration in supernatural priming research.

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