

The Role of Superstition in the Placebo Effect on Memory Performance

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Abstract

Superstitions and the placebo effect have been found to influence human behavior. The present study aimed to determine whether there is a relationship between superstition and the placebo effect, and whether it affects human cognition and behavior. We hypothesized that more superstitious people would be more prone to the placebo effect and that it would improve their performance on cognitive tasks. We employed a fully between participants design, with placebo and control conditions and superstition as a constructive measure. The results showed that, in the placebo condition, more superstitious people memorized more words than less superstitious people. However, in the control condition, less superstitious people memorized more words than more superstitious people. Overall, the findings supported our hypothesis. The findings of the study are important, as they draw a link between the placebo effect and superstition, and further show that these two elements impact human performance in cognitive ability tasks.

Keywords: superstition, placebo effect, memory

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Superstition is defined as beliefs and practices that are not procured from scientific or religious ideas and concepts (Campbell, 1996). Superstitions appear frivolous, but are pervasive in our everyday lives (Damisch, Stoberock, & Mussweiler, 2010; An et al., 2019). While superstition accounts for an important part of our lives (An et al., 2019), there is little information about how superstition affects humans and their behaviors beyond the superstitious practice itself. Campbell (1996) suggested that superstition influences human thought and action, and thus is a powerful tool for the human belief system. While it is rooted in a psychological approach, it has been mostly applied in medical research (De la Fuente-Fernández et al., 2001). Moreover, it has been often referred to negatively, as it is the leading false positive phenomenon (Allan & Siegel, 2002). Recently, however, there has been an attempt to shed a different light on the topic. Placebos show how the human mind can be influenced (Colloca & Benedetti, 2005). We would like to better understand how they can intertwine with common beliefs and affect everyday life. The current research aimed to determine how our beliefs affect memory. While there have been many attempts to document the placebo effect on performance (Beedie & Foad, 2009; Damisch et al., 2010), to our knowledge, this is the first attempt to link the placebo effect with superstition in the context of cognitive ability.

Superstition in Everyday Life

Superstitions affect various personal as well as professional aspects of human life (Darke & Freedman, 1997). The degree to which superstition is held varies across several factors such as culture, age, religiosity, gender, education levels, intelligence, income groups, employment status, and marital status (An et al., 2019). For the emotional aspect, an individual might experience a temporary reversion to beliefs in magic and animism in order to help reduce

anxiety. Also, superstition can affect people coping with stressful events (Dudley, 1999). The element of coincidence plays an important role in superstition. While superstition phenomena are not casual, they are coincidental, whereby people have constructed a pre-existing association between the superstition belief and the incidents, and the occurrences influence human cognitions and behaviors immensely. Thus, belief in superstition is linked to associative learning, which is learning from observation of coincidental situations (Beck & Forstmeier, 2007).

Superstition can impact an individual's performance in the field of sports by improving self-efficacy of the players (Schippers & Van Lange, 2006). Moreover, it impacts an individual's belief system, which further determines their performance in both cognitive based tasks and physical tasks (Farley, 2015). Thus, it can be noted that superstition influences an individual's everyday life by impacting various aspects such as the decision-making process, the ability to handle stress, and performance in cognitive and physical tasks et al., as mentioned above. Further, some research shows that superstition can improve memory performance (Damisch et al., 2010). When people performed a memory task, the presence of a lucky charm affected people with stronger superstitious beliefs.

The Placebo Effect and its Relationship with Superstition

A placebo involves a belief effect; it results in physiological or psychological effects after the use of an inert or sham treatment (Macedo et al., 2003). Superstition has a psychological effect on human beings; superstition and placebos affect human health similarly. Specifically, both can improve patients' health. Also, when a patient takes any action that is against the superstition, it could result in distress, and their health could deteriorate (Hira et al., 1998). Further, there have been a few attempts to understand how superstitions work as placebo mechanisms in sports to change physiological responses (Beedie & Foad, 2009); the findings

showed that superstition is used as a mechanism for anxiety regulation and can help boost self-confidence, which further leads to improvement in performance and enhancement of expectations. The resulting improvement in performance could be due to involved placebo effect. Taken together, there are two possible accounts of superstitions and placebo effect. First, the placebo effect could be considered as an element separate from superstition, and that superstition results from reverse placebo effect. Second, the placebo effect may not be separate from superstition, and the placebo effect is seen as a superstitious response to inert drugs or other treatments (Shapiro, 1970). Hence, there exist different views as to how superstition and placebo effect are related.

The placebo effect is a cognitive as well as a behavioral phenomenon (Price et al., 2008). Often the beliefs one holds are so powerful that they affect how they think and behave. The placebo effect can impact one's performance in various activities such as cognition-based tasks, psycho-motor tasks and motor skill-based tasks (Beedie & Foad, 2009; Foroughi et al., 2016). The placebo effect improves performance because the belief in the performance enhancing ability of the inert drug modifies several psychological processes such as belief, pain, sensation, expectancy, and arousal in an individual. Further, modulation in each of these processes can impact the behavior and performance of an individual. The placebo effect is also found to modulate neurophysiological and neurochemical activity in brain regions that are involved in processes like perception or emotional processing, which further impact the performance in cognitive-based tasks, psycho-motor tasks and motor skill-based tasks (Beauregard, 2009).

The present study aimed to explore the role superstition plays in the placebo effect on memory performance. While there have been many studies of superstitions and placebos both separately and in conjunction, we investigated their relationship insofar as how they jointly affect

cognitive ability in the form of memory performance. We hypothesized an interaction whereby people who were more superstitious would recall more words than those who were less superstitious after a placebo induction of an inert drink that ostensibly improved memory performance.

Method

Design and Participants

A fully between participants design was employed, whereby each participant was randomly assigned to either the placebo or control condition. Superstition was measured as a continuous construct. In order to recruit participants, an email with sign-up sheet for participation in an experiment to test memory performance was sent out. An a priori power analysis revealed that 68 participants were necessary to detect a large effect size with 80% power for the rating task (Faul et al., 2011). In order to have the power to detect the interaction between condition and superstition, we aimed to recruit approximately double this amount. 122 Indian national participants were recruited (18 participants were excluded because they suspected the purpose of the study). A total of 104 (32 men and 72 women) with a mean age of 19.27 ($SD = 2.04$) were recruited and randomly assigned to the control condition (19 men and 44 women) or the experimental condition (13 men and 28 women). The study was approved by the local Institutional Review Board of Ashoka University. Participants gave informed consent prior to their participation, and could withdraw at any point. All participants were granted a small gift for their participation.

Procedure

After giving informed consent, participants provided demographic information and completed a superstition questionnaire of 18 items (Indian Superstition Scale: An et al., 2019).

Next, we randomly assigned participants into one of the two groups. The participants who were assigned to the experimental group drank coloured water (unflavoured), and were told that it was a drink that was being tested for its memory enhancing ability, which was approved by Food Safety and Standards Authority of India (FSSAI). Participants in the control group drank plain water with no explanation. Participants were then asked how they felt, and were given 30 words to memorize in 5 minutes. The dependent variable memory recall, which was operationally defined as the number of words they recalled in a 5-minute period following exposure. One participant was administered by one experimenter at a time, and all the experiments were conducted with a computer screen.

Results

The mean superstition score was 1.38 ($SD=1.36$); there was no difference between the placebo ($M=1.39$, $SD=1.34$) and control ($M=1.37$, $SD=1.39$) conditions, $F(1, 105)=.00$, $p=.948$. The mean number of words recalled was 11.38 ($SD=4.29$); those in the control condition ($M=12.14$, $SD=4.42$) recalled significantly more words compared to placebo condition ($M=10.20$, $SD=3.84$), $F(1, 105)=5.35$, $p=.023$.

To test whether the placebo and superstition predicted memory performance, a hierarchical linear regression was conducted. In step 1, the results of the regression revealed that the two predictors explained 8% of the variance, $R^2=.08$, $F(1, 103)=4.20$, $p=.018$. Placebo condition significantly predicted memory performance, $\beta=.22$, $p=.022$; however, superstition did not predict memory performance, $\beta=-.16$, $p=.089$. In step 2, adding the interaction resulted in an increase of 4% of the variance explained, $t(1, 103)=-2.07$, $\beta=-.71$, $p=.041$. See Figure 1.

[Insert Figure 1]

Lastly, there were no noteworthy sex differences.

Discussion

The results showed that when participants were more superstitious, they performed better in memorizing and recalling words in the placebo condition compared to when they were in the control condition. This supports the claim that people who are more superstitious are more influenced by the placebo effect. There have been many findings showing that superstition works as a placebo effect and how they both affect human behavior (Shapiro, 1970). We now have evidence suggesting that people who are more superstitious are prone to the placebo effect, and that it can even affect cognitive performance.

On the other hand, we originally did not expect any significant differences for participants who were less superstitious. The findings, however, showed that people who were less superstitious performed better in the control condition than the placebo condition. Given that there was no difference in superstition level between the placebo condition and the control condition, it is possible that people who are less superstitious may feel that such treatment affects their control and causes them to perform worse than they otherwise could have. While intelligence and rational thinking do not completely eliminate belief in superstition, it can moderate the extent to which superstition can impact one's life. Less intelligent people are comparatively more superstitious (Risen, 2016). The current findings are particularly important because they measured not only the placebo effect in people with different levels of superstition, but also the impact on cognitive ability. India has been a centre for medical, drug and food related research for several centuries (Differding, 2017), which is why we felt it particularly useful to conduct the study with an Indian population.

Limitations and Future Directions

Superstition is culture specific, and therefore we cannot be sure whether this study's results would be extrapolated cross-culturally. Also, the sample we tested was not particularly superstitious, with the mean score of 1.38 on the scale of 0 (not at all superstitious) to 6 (very much superstitious) with relatively high education and younger age. If anything, this could have worked against the manipulation in the current study due to low levels of superstition of the sample. Further, it would be interesting to conduct this with very superstitious people having different levels of education and more varied ages.

In closing, the current study is the first to investigate the role of superstition in the placebo effect on memory performance. The findings showed that people who are more superstitious are prone to the placebo effect and that it affected their performance on cognitive tasks. Understanding the effects of superstitions and placebos on how people think and behave is a step towards unfolding a mystery of human cognition and behavior. We hope that our findings contribute to a deeper understanding of humanity.

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Compliance with Ethical Standards: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Informed Consent: Informed consent was obtained from all individual adult participants included in the study.

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Figure 1. Regression model for the role of superstition in memory performance.

