

Replication Study: Using Subtle Priming to Influence Card Choices in a Magic Trick

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Abstract

Replication is crucial for increasing confidence in scientific findings. We replicated a priming study by Pailhes and Kuhn (2020) who found that participants who viewed a magic performance with subtle priming cues (gestures and words) were more likely to choose a target card (3 of diamonds) than those who did not view them. We replicated this effect using the original study's recorded performances on a sample of adults (primarily IIT students) as part of an assignment in our Behavioral Science Research Methods class. We will look for differences in selection of the target card in the priming vs. neutral condition. We will test an additional hypothesis that states that psychology students will be more aware of the priming and more likely to suspect it because they might have learned about priming in their studies and could be more prone to look out for such signs. The priming effect is an important concept because it has serious implications for consumers who are exposed to influential advertisements, powerful leaders who can be manipulated to make big decisions “on their own”, and more.

Introduction:

Researchers Alice Pailhès and Gustav Kuhn published a research paper titled “Influencing Choices with Conversational Primes: How a Magic Trick Unconsciously Influences Card Choices” in 2020. This experiment exposed participants to either a magic card performance with subtle priming gestures (toward a specific target card) or a magic card performance without any gestures to see if there was any impact on the card participants chose at the end of the performance. Also at the end of the performance, participants were asked to rate their sense of control and freedom and to explain whether or not they knew why they chose their card. In the experimental group, the performer tried to subtly prime the participants to choose the three of diamonds

using the following techniques: describing the color of the card as bright and vivid, making a diamond shape with their hands, drawing small threes in the air, pointing to three points in the air, and repeating a word three times. In the control group, none of these techniques were used. The researchers hypothesized that due to the mental priming force, more participants in the experimental group would choose the three of diamonds than participants in the control group. The experiment was further divided into either a video or live performance to see if this affected the rate of choosing the three of diamonds. The researchers hypothesized that the mental priming force would be more effective in a live performance than on video. Statistical analysis showed that participants who viewed the video with priming chose the

three of diamonds significantly more often than those who viewed the video without priming. However, participants did not choose the three of diamonds significantly more often during the live performance than the video performance. Also, there was no significant difference in the participants' feelings of control/freedom or awareness of the priming whether they chose the three of diamonds or not. This research shows that naturally embedding subtle priming gestures and sounds can successfully and unconsciously influence people's decisions. Also, it highlights that people often do not know the real reason behind their choices and are therefore susceptible to this manipulation of mental processes.

The Pailhès and Kuhn (2020) research paper was published in the Proceedings of the National Academy of Sciences, a prestigious multidisciplinary scientific journal. It has been cited 17 times according to Google Scholar, and has also been referenced by a science and technology news website called Ars Technica (Ouellette, 2020). No exact replications have been done, but similar research on priming by magicians has led to similar results (e.g., Olson, Amlani, Raz, & Rensink, 2015; Pailhès, Rensink, & Kuhn, 2020; Kuhn, Pailhès, & Lan, 2020). Some controversy has been raised by University of Essex Professor Dr. Geoff Cole (Cole, 2020). His view is that studies like this over-exaggerate how much of forcing by magic trick performers actually involves manipulating participants' decisions. He also believes that the forcing phenomenon does not contribute much to the psychological study of influence. However, Pailhès and Kuhn maintain that scientifically studying

magicians' techniques provides valuable insights into the human mind (Pailhès & Kuhn, 2021). In this paper, we seek to replicate the findings of the video experiment from Pailhès & Kuhn (2020). Replication is crucial for solidifying confidence in scientific results and ensuring that published results are actually true.

We also tested an additional hypothesis stating that participants who have taken a psychology course will be more aware of priming and influencing because they probably have learned about the priming effect and have been taught to look out for signs of influence. This is important because it can show if educating people about priming and manipulation can make them more aware of it in the real world.

Methods

Participants

A total of 33 participants (19 women) between 18 and 25 years old ($M = 19.82$, $SD = 1.98$) were recruited. Only volunteers above the age of 18 were recruited as participants.

Procedure

Ethics approval was obtained from the Illinois Tech IRB before recruitment began. Participants were recruited online through social media and professor recommendations, and they were offered 0.5 SONA credits as compensation. Unlike the original research, this study only replicated the video version of the experiment and not the in-person version due to the COVID-19 pandemic. Participants were invited to take the survey online using Qualtrics (www.qualtrics.com). First, participants were asked to read and agree to a consent

form that detailed the basic procedure and purpose, risks and benefits, compensation, voluntary participation, and confidentiality. Then, participants were randomly assigned to either view the video with or without priming techniques. They were instructed to imagine/visualize a card during the video. After viewing the video, participants were asked what the suit and value for their chosen card was. Then, they were asked several questions regarding their locus of control, decision-making awareness, private self consciousness, and awareness of influence. Participants were also asked their age and gender for the purpose of demographics. For full instructions and details of tasks, see the Appendix.

Measures

The primary outcome measure was the chosen card. The secondary outcome measures were locus of control, decision-making awareness, awareness of influence, private self consciousness, and psychology class.

Chosen Card

Chosen Card is a measure of the suit and value of the participant's visualized card. The suit can be spades, hearts, diamonds, or clubs. The rank can be ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, jack, queen, or king. This measure was created by the original authors of the Magic Primes study. It includes two multiple choice items. Some example items are "Select the card (rank) that came to your mind" and "Select the card (suit) that came to your mind"

Locus of Control

Locus of Control is a measure of how free and in control participants felt about their card choice. This measure was created by the original authors of the Magic Primes study. It includes 2 slider scale items with response choices from 0-100 (0= no control/freedom at all, 100= complete control/freedom). Some example items are "How free did you feel to choose this card?" and "How much control did you feel you had over your thought of card?"

Decision-making Awareness

Decision-making Awareness is a measure of the participant's awareness of their own decision making process. This measure was created by the original authors of the Magic Primes study. It includes one yes or no item and one open ended item. Some example items are "Do you know why you chose the card you chose?" and "If yes, please explain why."

Awareness of Influence

Awareness of Influence is a measure of the participant's suspicion and notice of influencing by the performer. This measure was created by the leaders of the replication project, but it was not used by the original authors of the Magic Primes study. It includes 2 Likert scale items with response choices from 1-9 (1 = no, 5 = not sure, 9 = yes). Some example items are "Did the magician's gestures or words influence your choice of card in any way?" and "Did you suspect the magician's gestures or words were influencing you in some way?" The reliability of these items was .70.

Private Self Consciousness

The Private Self Consciousness scale (Fenigstein, Scheier, & Buss, 1975) is a measure of the participant’s tendency to think about private beliefs, aspirations, values, and feelings. It is a 10 item Likert scale. Participants were asked to choose a value from 0-3 (0 = not at all like me, 1 = a little like me, 2 = somewhat like me, and 3 = a lot like me) in response to a statement . Some example items are “I’m alert to changes in my mood.” and “I reflect about myself a lot.” We removed one of the items (“Generally, I’m not very aware of myself”) from the composite mean score because a reliability analysis showed that it was negatively correlated with the other items. The reliability of the remaining 9 items was .76.

Psychology Class

Psychology Class is a measure of the participant’s educational experience in the field of psychology. This measure was created by the leaders of the replication project, but it was not used by the original authors of the Magic Primes study. It includes one yes or no item. An example item is “Have you ever taken a course in psychology?”

Please refer to the Appendix for the full set of items for all measures.

Results

Main Hypothesis

The present study aimed to test the hypothesis that participants who are primed are more likely to choose the 3 of diamonds than those who are not primed. Participants were all adults ($N = 33$) with an average age of 19.82 ($SD = 1.98$), and 42% of the sample

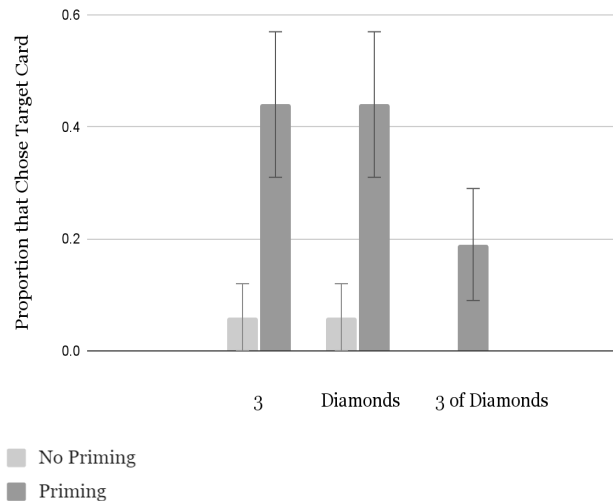
self-identified as male. The data was analyzed using three independent samples t -tests. The results indicated that primed participants chose the 3 of diamonds significantly more than non-primed participants, $t(30) = 1.86, p = .036$. Additionally, primed participants chose a card value of 3 significantly more than non-primed participants, $t(31) = 2.74, p = .005$, and primed participants chose a card suit of diamonds significantly more than non-primed participants, $t(30) = 2.63, p = .007$. These tests successfully replicated the original study’s results found by Pailhès and Kuhn in 2020.

Table 1

Participant Demographics

Variables			
Gender		<i>n</i>	Percent
	Female	19	58%
	Male	14	42%
Psychology Class			
	Yes	29	88%
	No	4	12%
Age		<i>M</i>	<i>SD</i>
		19.82	1.98

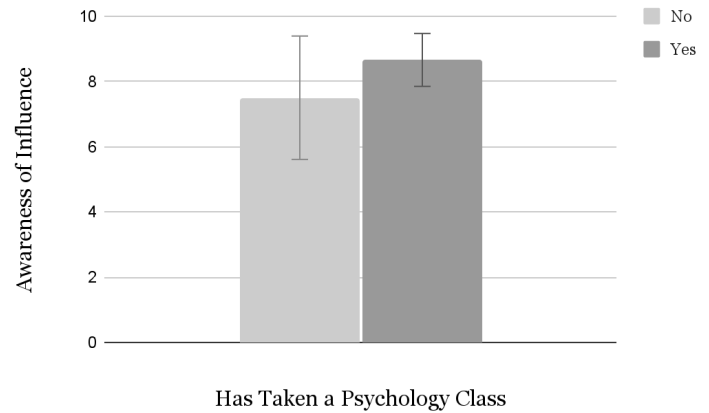
Figure 1
Proportion that Chose Target Card with and without Priming



Additional Hypothesis

This additional hypothesis was tested using an independent samples *t*-test. The results indicated that participants who took a psychology class were not significantly more aware of the influence, $t(31) = .50, p = .309$. This shows that simply learning about psychology does not make people automatically more prone to look out for priming in non-classroom situations.

Figure 2
Awareness of Influence by Psychology Class Experience



Discussion

Our results successfully supported the hypothesis that primed participants choose the target card (3 of diamonds) more than non-primed participants. This is because the subtle gestures and words (diamond shape, three fingers, “boom, boom, boom”) unconsciously influenced participants to think about the number 3 and diamonds. Therefore, when asked to randomly select any card, their brain automatically selected the choice that was relevant to what was in their subconscious thought. This effect is called the mental priming force, and this was the main subject of study in the original Magic Primes research (Pailhès & Kuhn, 2020). Our experiment successfully replicated the results of the original study. However, the effect was not as strong in our replication. In the original experiment, 16 (36%) out of the 45 primed participants chose the 3 of diamonds, while in our experiment, only 1 (6%) out of the 16 primed participants chose the 3 of diamonds. However, in both experiments, none of the non-primed

participants chose the 3 of diamonds. This weaker priming effect could be due to our smaller sample size. The original study used 90 participants, but we only used 33. If the replication was continued on more volunteers, then perhaps we would see a similar strength in the priming effect. Also, our replication results showed a significant difference in percentage of participants selecting diamonds with and without priming, while the original study did not. This can be attributed to the small sample size and random differences in participants.

This study has practical implications for people who are vulnerable to manipulation. The results suggest that it is in fact possible to change someone's decisions without them even being aware of it. This should make people more careful about the reasoning behind their decisions and encourage them to reflect on what outside influences could affect their thinking. It is still necessary to keep in mind the limitations of these results as many psychologists doubt the large claims made by priming researchers (Meyen et al., 2022). Our experiment used convenience sampling with mostly IIT students and a high percentage of psychology majors, so our sample was not very representative of all adults. Also, most important decisions are not as simple and "mindless" as picking a card. The participants in this study were therefore much more vulnerable to priming than someone in the real world. Similarly, the nature of magic tricks is that participants are extremely focused on the words and gestures of the performer, so it was easier to incorporate priming without being too obvious. Other studies (Naccache, Blandin, & Dehaene,

2002) have shown that the participants' uninterrupted attention is crucial for priming, so it's possible that this effect would be weaker in a different setting. Nonetheless, the mental priming effect is a real force that can unconsciously manipulate people's choices on politics, shopping, relationships, etc. Further research should be done to learn about the effect in other forms and settings. For future experiments on priming, we would use a larger and more diverse sample size to get a more representative picture. It would also be interesting to test the efficacy of priming in other contexts such as teachers priming students, advertisements priming customers, etc.

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Appendix

Below are the exact instructions and questions viewed by participants in the survey.

You are about to see a video in which a woman will ask you to follow some instructions and visualize and imagine some things. The video is very short and quick, it is important that you are ready before launching it. You will be allowed to watch it once only. It is important that you follow the instructions as best you can and genuinely imagine what the woman will ask during the video. Please put on your headphones/ earphones and turn on the sound.

(participants are randomly assigned to view either the priming or no priming video at this point)

Chosen Card

Select the card (rank) that came to your mind:

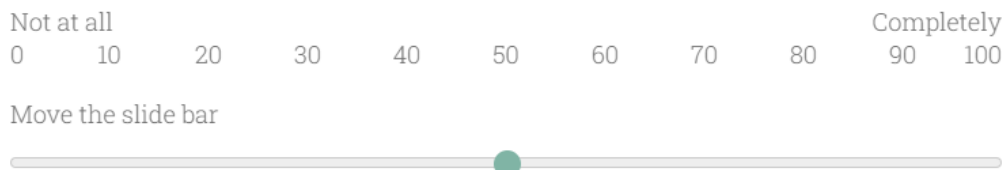
Ace 2 3 4 5 6 7 8 9 10 Jack Queen King

Select the card (suit) that came to your mind:

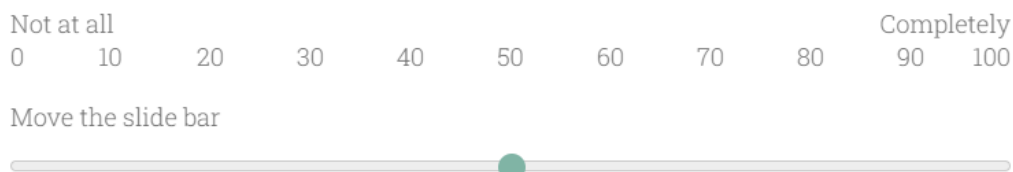
Hearts Diamonds Spade Clubs

Locus of Control

How free did you feel to choose this card?



How much control did you feel you had over your thought of card?



Decision-making Awareness

Do you know why you chose the card you chose?

- Yes
- No

If yes, please explain why:

Awareness of Influence

Did the magician’s gestures or words influence your choice of card in any way?

1	2	3	4	5	6	7	8	9
NO				Not Sure				YES

Did you suspect the magician's gestures or words were influencing you in some way?

1	2	3	4	5	6	7	8	9
NO				Not Sure				YES

Private Self Consciousness

To what extent is each of the following statements characteristic of you?

- “I’m always trying to figure myself out.”
- “I reflect about myself a lot.”
- “I’m often the subject of my own fantasies.”
- “I never scrutinize myself.”
- “I’m generally attentive to my inner feelings.”
- “I’m constantly examining my motives.”
- “I sometimes have the feeling that I’m off somewhere watching myself.”
- “I’m alert to changes in my mood.”
- “I’m aware of the way my mind works when I work through a problem.”

