Effects of Subliminal Priming on Consumer Choices

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Abstract: *Subliminal messages can influence the choices and behavior of humans. Priming affects the decisions but mostly for a short duration. It can also change thoughts and practice for a short period. The present study aimed to test whether priming could influence choices in our day to day to decisions. The sample consisted of 66 students of IIT Kharagpur. Group 1 and 2(treatment groups) comprised 25 and 20 respondents, respectively, whereas, the control group comprised 21 respondents. Kruskal-Wallis H test and Mann-Whitney U test were used to evaluate the differences in choice problems responses among groups. Chi-Square was used to investigate the priming effect on the word completion task. It was found that only 22.2 percent of the participants had any impact on their decisions due to the scenarios presented to them. The choices of the nature-related group were eco-friendlier and cheap, whereas the preferences of the technology-related group were more convenient and technology-oriented.*

Keywords: Subliminal, priming, consciousness

1. Introduction

The idea that the specific type of messages outside the purview of our consciousness can have subtle influences on our behavior has been a widely debated issue in behavioral sciences. This idea emerged from the early school of psychoanalysis, where it was proposed most of our minds consisted of unconscious urges and motivation. Though most of these ideas were considered unscientific because of their unfalsifiable nature, there is still a strong consensus among researchers that most of our behaviors and cognitive processes cannot be explained consciously.

One such popular notion is that subliminal messages can have an influence on choices and behavior. This idea was popularized by a classic study later dubbed a hoax. Its intriguing implication garnered itself a lot of attention both among general masses and researchers. There are early researches that have shown people do in some level register information they were not conscious of earlier, but the amount of influence that information might have on our daily behavior is still controversial. It has been shown that subliminal messages do not work in advertisements, but again, numerous countries have laws that bar companies from indulging in subliminal messages in their advertisements.

But there is some evidence that some stimulus, like priming, does influence the decisions but mostly for a short duration. Priming has been used in numerous studies to change the thinking and behaviors for a short duration. Thefundamental aim of the current researchis to test whether priming, a subconscious process, can influence choices in our day to day to decisions.

1.1 What is subliminal perception?

Subliminal perception means those stimuli that lie below the absolute threshold level of our sensation. Generally, most of these stimuli go undetected, because our brain never registers it in the first place. But some stimuli, if strong enough, still can be detected like 50% of the time correctly. These stimuli come in the purview of subliminal perception. The theory is that these stimuli somehow has the ability to influence our thoughts and behavior.

Given that most of our minds still linger in the unconscious (believed by the Psychoanalysts). Though understanding a person's sensory thresholds dates back to the early works done in psychophysics but using subliminal messages to influence behavior was a very recent view popularized after a classic study done by James Vicary (1957), later admitted to being a hoax. Since then, this idea has garnered a lot of attention, especially in the field of advertising, though the general consensus among scientists is that this doesn't work for advertising, it still captures a lot of unneeded attention, to the extent that subliminal advertising is banned in many western countries.

1.2 The controversy

Subliminal Messaging is understandably very fascinating, because of the influence it might have on a person's behavior without their conscious knowledge can cause a moral panic. But research doesn't agree that it can influence behavior at an unconscious level. Being that, Subliminal perception is a different matter and has been shown to exist in laboratory experiments. Lazarus and McLeary (1951) did studies using a tachistoscope (an instrument used for exposing objects to the eye for a very brief measured period of time), they could tell subjects were able to give discriminatory responses as measured by their galvanic skin response (GSR). Subjects were presented five letters non-sense syllable (e.g., YILIM, ZIFIL), and later when flashed through a tachistoscope, they could tell which syllables they were presented and which weren't through GSR, even though they couldn't tell being conscious about it.

Some previous studies like this 2002 study (Strahan, Spencer, &Zanna) show priming of behavioral concepts (like drinking water) can drive consumers unconsciously to drink more water, but only if the prime matches a 'current

need' (consumer should be thirsty). So given an effective use of priming technique, we can under specific conditions use subliminal persuasion to influence some positive behavior possibly. Some later studies like Veltkamp, Custers, &Aarts (2011) also suggest that we can even create a need by subliminal conditioning, but that would be quite infeasible at our current state.

1.3 Subliminal vs. subtle messaging

Subtle messaging, in contrast, works on a more conscious level, also known as the supraliminal level, meaning it is not blind to our senses, but we tend to ignore it. American Psychologist Association defines it as "the processing of above-threshold information that is ignored by the perceiver. Examples include the hum of conversation in a crowded room or visual information displayed very briefly during experiments on perception."

Many instances in marketing are found, like smart product placements, a hero in a movie driving a Mercedes, or drinking a Pepsi, but not making any indication that he is doing or using it deliberately.

2. Methods

2.1 Sampling and data collection

Data used in the study were collected via google forms. There were three different forms for three differing conditions distributed separately among the participants. Participants consisted of the students of IIT Kharagpur. No personal information was taken from any students; therefore, ensuring complete anonymity. The respondents were informed that the participation was voluntary, and their responses and identity would be kept confidential. The data would be used in an aggregate manner for research purposes only. A total of 93 samples were recorded, out of which 66 were usable. Group 1 and group 2 formed the treatment groups, which consisted of 25 and 20 respondents, respectively, whereas the control group consisted of 21 respondents.

2.2 Data analysis

The analysis was undertaken using IBM Statistical Package for the Social Sciences (SPSS). For evaluating differences in responses among groups in choice problems Kruskal-Wallis H test and Mann Whitney U test was used because of less sample size; equal variance cannot be assumed. Chi-Square was also used to investigate if there was any effect of prime on the word completion task by comparing it with the responses given by the control group.

2.3 Measures

2.3.1 Scenarios
No standardized test was used, instead of a 3-group experimental design (between-group design). Two scenarios (Nature oriented and technology-oriented) were given to two groups, respectively, and the third group was a control group. These scenarios were intended to prime our participants to think in a certain orientation. Here is the following scenario for group 1 and 2, respectively.

Prime 1 - Intended to induce eco-friendly choices
"My trek to Gorkhe village last month was wonderful, the forests were covered with pine trees, the air was clean, the water was pristine and clear, one could see the little fishes swimming in it. Due to the lack of a motorway, the village is only accessible to hikers. The homestay over there serves you local homegrown food. People still rely on wood for fuel to cook their meals. It tasted better than our regular gas cooked meal. Theirs is no pollution of any sort. People are so fit and healthy, and you can view the majestic Mt. Kanchenjunga if you go up to the grass-laden hills nearby. My friends and I didn't feel like returning to our hectic city life."

Prime 2 - Intended to induce technology/ convenience-oriented choice
"Modern technology is a blessing. Traveling is easier and faster; our lifestyles have become more pleasurable. I am happy to be alive now than 30 years earlier. Last week I purchased a tablet for myself, and I am telling you this was a great decision. Now I don't need to carry my heavy notebooks around here and there. Taking notes is more convenient, thousands of books in the palm of my hand. Cycling made walking unnecessary and scooty made cycling obsolete. We have good electricity, easy communication, and internet banking. We are so used to all this wonderful development, that we take this miracle for granted. We need to remind ourselves sometimes that we are lucky to have modern technology. I hope this development continues…"

2.3.2 Mundane tasks
After presenting the scenarios, the authors offered some mundane task to distract them for 2-3 minutes to ensure there was no role of short term memory in the latter task. By providing these tasks, the authors distracted them from memorizing the scenario consciously. Mundane tasks traditionally involve giving tasks like coloring a square or putting items in a box. Still, instead, the authors offered them tasks like simple additions or multiplication, which they can do mentally.

2.3.3 Word completion task
To check whether students retained any information from the scenario earlier, the authors gave them a word fragment completion task (WFC) task (Greenwald, McGhee, & Schwartz, 1998). This task was to check if priming worked. Students were given word fragments that they needed to complete.

Word Completion Test for Group 1
*Vil___ (here we could expect them to answer **village**, as referred in the scenario, and not villa, vile or villain)*
*For__ (**forest** not forecast, forever, etc.)*
*Mou___ (**mountain**, not mouth, mourn,*
*Pol___ (**Pollution** not police, Poland)*
*Hea___ (**health**, not heaven, heal)*
*Tre__ (**Trees** not trade or treat)*

Word completion task for Group 2
Mod__ (modern not model or modal)

Tra_ (travel not tragedy)
Dev__ (development not devil, etc.)
Com__ (communication, not computer, compass)
Int__ (internet)
Con__ (convenience)

Since the control group would have no scenarios presented to them, their response in this task would let the authors know whether the prime worked since the authors accepted more different and divergent responses from them.

2.3.4 Choice Problems

The authors presented them with preference-based decision problems; the authors hypothesized that the responses of participants to be influenced by the priming effect. Group 1 would provide more nature/eco-friendly responses, whereas Group 2 would offer more technology or convenience-based response. The authors did not expect any pattern in the control group. Choice problems presented to the students are listed below

a) What would be important to you if you had to buy a bag for your upcoming semester **(they need to rank all these options 1 to 5)**
   - Cheap
   - Longevity
   - Trusted Brand
   - Eco-friendly materials
   - Not second-hand
b) What are the advantages of having a cycle over scooty/motorcycle on your college campus?
   - Zero cost for fuel
   - Health
   - Eco-friendly
   - Easy maintenance
   - Less chance of accidents
c) Essential items in your hall/hostel if you could choose
   - Provide AC/heater in the room
   - Good ventilation for air passage
   - Food facility for stray dogs
   - Washing machine provided
   - Dustbins for wet & dry waste
d) What types of clothes would you go for when you intend to go shopping next time?
   - Handloom/ handcrafted
   - Readymade/ Machine made
   - Branded
   - Expensive
   - Budget-friendly/ Discounted Clothes
e) Advantages of biometric attendance over traditional?
   - Saves quality teaching times
   - Saves paper which in turn saves nature
   - Reduces the chances of proxy
   - Authentic and Reliable
   - Easy to calculate the attendance

3. Results

3.1 Priming effect

The chi-square results of the word completion task showed little evidence of whether participants who received the scenario remembered anything from the scenario without any prior instruction. The mundane task between the scenario presentation and word completion task was to ensure participants didn't consciously remember the scenario.

Participants who received the nature-related prime answered more 'forest' for 'for_' ($\chi^2(1, N=46) = 4.39$, p=.038) than the control group but the authors found an opposite observation than expected where the control group answered 'health' more for 'hea_' ($\chi^2(1, N=46) = 5.38$, p=.022) compared to the treatment group. The rest of the words did not show any such pattern.

Similarly, in a technology-related prime scenario, more participants answered 'modern' for 'mod_' ($\chi^2(1, N=41) = 7.424$, p=.008) than the control group.

Table 1: Total Mean Rank Scores of 3 Groups on Choice Problems

	Group	N	Mean Rank
What would be important to you if you had to buy a bag for your upcoming semester?	Nature Prime	25	39.92
	Technology Prime	20	27.63
	Control	21	31.45
What are the advantages of having a cycle over scooty/motorcycle on your college campus?	Nature Prime	24	31.58
	Technology Prime	19	32.68
	Control	21	33.38
Essential items in your hall/hostel if you could choose?	Nature Prime	25	36.6
	Technology Prime	20	29.15
	Control	20	32.35
What types of clothes would you go for when you intend to go shopping next time?	Nature Prime	25	38.06
	Technology Prime	20	27.08
	Control	21	34.19
Advantages of biometric attendance over traditional?	Nature Prime	24	33.1
	Technology Prime	18	26.19
	Control	19	32.89
Total of the five questions above	Nature Prime	24	37.04
	Technology Prime	18	24.47
	Control	18	27.81
	Total	60	

In the final task of preference-based decision problems, the authors did not find any significant differences in the answers given by participants in individual questions. But the total rank score showed a difference when the authors applied the Kruskal-Wallis Test ($\chi^2(2, N=60)=5.99$, p=.05). A posthoc using Mann-Whitney Test only showed the difference between Nature related prime and Technology-related prime group (U=127, p=024). There was no difference when the authors compared the treatment group individually with the control group.

Table 2: Whether the scenario given at the start of the survey had any effect on the participants' decisions?

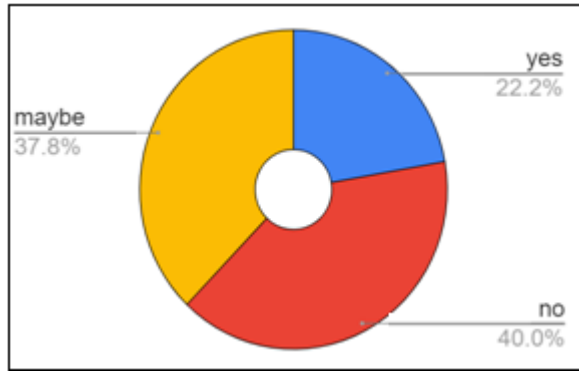|	Frequency	Percent
Yes	10	22.2
No	18	40
Maybe	17	37.8
Total	45	100

Figure 1: Whether the scenario given at the start of the survey had any effect on the participants' decisions?

It was found that 22.2 percent of the participants believed that the scenarios presented to them had any effect on their decisions. In contrast, 40 percent believed the scenarios did not affect them, 37.8 percent reported maybe.

4. Discussion

The current study did not report any substantial evidence that priming occurred in the word completion task. Only 3 out of 12 total words showed a clear pattern that differentiated the treatment group from the control group, where one word showed an opposite trend than expected. It is hard to imply as evidence is very weak to ascertain whether the participants remembered anything from the scenario given to them at the start of the study. Previous studies generally showed the effect of the priming through changes in the behavior; the current study used a word completion task to investigate any subconscious retention of information. A mundane task was provided right after the scenarios to distract the participants, so the next word completion task was not affected consciously by the scenarios.

Mann-Whitney's U reported a difference in the total score of the five-choice problems between the nature-related prime group and technology-related prime group. The nature-related group made choices that were eco-friendlier, cheap, whereas the technology-related group showed preferences that were more convenient and tech-oriented. It implied that there was some role of the scenario presented to the participant in their choices, which conformed with previous studies that the priming effect influences people's choices and decisions. In the current study, the authors tried priming indirectly through scenarios that didn't make any straight suggestions on how the participant ought to think or behave. Only 22 percent of the total participants admitted that the scenario presented had any effect on them.

This study, in a way, suggests that many times information privy to our consciousness sometimes has an effect on how people make small day to day decisions, which may not influence major and significant life decisions. Still, such small decisions drive daily judgment and decisions of humans. The current study relies on priming through vignettes, rather than presenting a stimulus visually or physically to participants. Priming through vignettes are more convenient for the researchers. In the future, more focus on the convenient modes of data collection can perhaps establish their validity, and prove useful for short-term research works or online data collection.

5. Limitations

1) The current study was done on smaller sample size; a higher sample may reduce sampling error and increase reliability and validity.
2) Data was entirely collected via google survey forms; future studies can work on evoking priming conditions under a more controlled setting.
3) The choice problems presented in the study lack statistical reliability or validity in terms of measuring people's preferences. Future studies may rely on more standardized tests or problems.
4) The scenarios in the study were given without any prior face validity.

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