

Priming Effect: A Heuristic in Behavioural Economics

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Abstract. Strategic decision making involves the active computation of costs and benefits. Though classical economic theory assumes perfect rationality, it is far from the truth. The priming effect largely affects rational decision making subconsciously, and even subtle stimuli can cause significant implications. This paper explores the effect of cultural bias on priming, as well as the malleability of the effects depending on the priming agents. Through research, it has been found that priming significantly affects one's altruistic behaviours, positively or negatively affecting their decisions when playing strategic public good games. It has also been seen that the effects of priming through the same stimuli is dependent on one's experiences and conceptions to their surroundings. Red, while usually acts as an aversive stimulus that decreases one's risk preference and confidence outlook, has instead had the opposite effect on Chinese stockbrokers who are exposed to red as a positive stimuli. Thus, when used in practice in areas such as public relations, media, and advertisement, effects of subconscious stimuli should be considered under the context of the audience, especially for firms active multinationally.

Keywords: Priming Effect, Public Good Games, Culture Bias.

1. Introduction

The assumption of homo economicus, the economic man, is the foundation of classical economics [1, 2]. Yet, such an assumption, though practical for modelling theoretical work, is highly incongruent with the reality of consumer behaviour, especially in microeconomic terms [2]. Consumer behaviour, in reality, cannot be modelled with one single generalised equation, but rather dependent on a series of variables that are ever changing, where subconscious influences hold significant implications [3]. However, it is not to say that consumer behaviour is completely unpredictable. People are only intendedly rational [4]. Behavioural economics, in contrast to classical economics, is based on the theory of bounded rationality. Due to bounded rationality, our brain develops shortcuts to assist in making decisions that are mentally daunting, referred to as heuristics. Heuristics are mental processes that allow people to make such decisions efficiently, however can often lead to systematic errors [5].

Priming effect is one of many heuristics that, though intensively studied, still has shadows of ambiguity. First coined by American psychologist Karl Lashley in 1951, the term refers to how exposure to certain stimuli can induce unconscious biases in decision making. Karl characterised it as “setting the stage for subsequent actions to occur smoothly.”

Most of the literature currently on the topic of priming largely overlap with academia of psychology, and the effects of priming on economic choices is relatively small. Also, behavioural economics, or irrationality, being something affected significantly by belief, lacks cross culture comparisons. Consequently, there is limited insight into the aggregate effect or implications of current findings on behavioural economics, and how the aggregate effect challenges the classical models of economics.

This report seeks to investigate and speculate on some implications posed by several studies on the topic of priming in behavioural economics.

2. Colour Priming

Colour can carry psychological meaning [6]. There is a large body of well-established literature on the topic of colour and its correlation with emotions, where it is generally accepted that colour is able to affect one's moods and emotion [7].

However, the question lies on whether the meaning of colour is consistent for all.

Red is a colour where it is almost universally accepted as a negative stimuli: Stop signs, traffic lights, and the colour of blood. On the other hand, the colour green tends to correspond to positive implications: green lights, the colour of the dollar bill, etc. The two colours are often seen as polar opposites in most colour wheels and associated meanings. Most importantly, in the stock markets and financial institutions worldwide, green represents a colour indicating growth in value, while red corresponds to a decrease [7].

However, the Chinese stock market is a unique case: historically in China, the colour red symbolises prosperity and fortune, its use prominent in various posters as well as Chinese New Year decorations. The tradition was carried down to the modern era, into the representation of the stock market. Contrary to most markets worldwide, in Chinese markets, red indicates the increase in value of a stock, and green indicates the fall of value. This directly reverses the symbolic meaning of the colour red, especially for those in the financial industry in China.

2.1. The Reversed Red Effect

Red has been seen to induce negative impacts on performance on tasks such as IQ tests. For example, in a study conducted by Lichtenfeld et al. [8], where 4 experiments were conducted to investigate if priming subjects to the concept of the colour “red” led to impairment in intellectual performance. It was found that all intensities (whether subtly or more directly introducing red) of priming to the idea of red led to observable amounts of impairment in intellectual performance when compared to a control group. It was also concluded that exposure to “red” induced anxiety which in turn impaired the intellectual performance of the primed participants. Red has also been seen to cause an increase in risk aversive behaviour. This was evident from a study conducted by Bazley ET. al. [9], where a sample of over 1,400 showed up to 20% increase in risk aversive behaviour when potential losses were presented in red.

2.2. The Experiment

However, if the subjects were to be exposed to red as a positive stimuli for prolonged periods of time, the red may not cause an aversive effect, or may even improve intellectual performance and reduce risk aversive behaviour. An experiment conducted by Zhang et al. investigates the phenomenon of reversed meanings of colours for Chinese stock brokers, in the context of colour priming [10]. As to the context provided above, Jiang hypothesised that priming Chinese stock brokers to the colour red would have a positive effect on the performance on certain tasks for stock brokers compared to the general public.

There were only male subjects in the study, due to the lack of female samples from the stock brokerage industry in China. 24 stock brokers and 24 college students volunteered to participate in return for monetary compensation. All brokers have worked in the industry for at least a year, and the college students had no experience in stock investment. Zhang utilised a 2 x 2 between subjects design, where half of each sample group was allocated to contrasting treatments. The treatments were either green or red. He primed the groups to their respective colours via a solid fill of the text box behind the title of each task. Upon being informed that they were going to receive an IQ test, both treatments received 3 tasks: Difficulty preference; Avoidance motivation; Raven Standard progressive matrices IQ test. After completing the administered tasks, only then were participants checked for colorblindness, as to avoid priming due to the colorblindness sheet and demand characteristics. The experiment yielded results that were consistent with the presented hypothesis. It was observed from task one that college students exposed to red were more anxious compared to their counterparts in the green treatment group, but less observable differences were recorded for the stock brokers. Little useful data were gathered from the second task, as it was based on local similarity judgements or global similarity judgements. Even though the participants were told to follow their instinct when selecting their choices, Chinese participants tended to follow through with a single strategy when selecting similar pairs, thus data were mostly meaningless. Finally, IQ tests showed a significant

disparity between the two sample groups (see figure 1). For college students, those primed with green scored, on average, 3 questions more correct. However, for stock brokers, those primed with red scored 4 more correct than stock brokers primed with green.

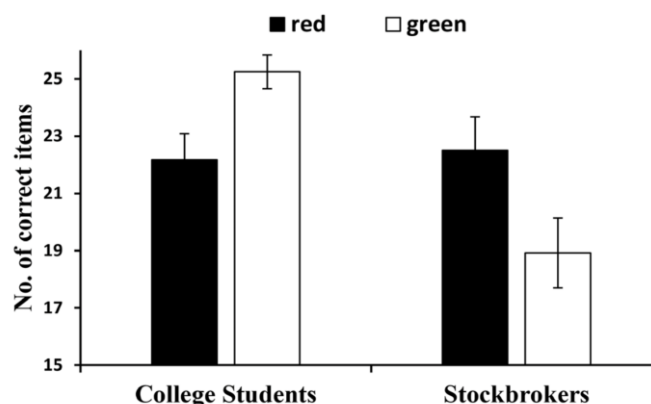


Figure 1. Number of correct answers on task 3 [10].

2.3. Implications

The results of the experiment directly supports the validity of colour priming being able to affect decision making, via carrying psychological meaning. It also suggests that the associated meaning carried by the colours can be changed via experience. This can imply that certain non-lingual stimuli may have different meanings under different cultures, as we have seen with the colour red. Thus, the use of colour should be carefully considered, especially in terms of colour such as red and green in financial contexts. Also, the use of such stimuli under different cultural contexts should be kept in mind, for example, for Chinese companies expanding abroad, and their use of red in public relations materials. For instance, use of red should also be mitigated in materials such as financial statements to avoid unnecessary loss in shareholder confidence. Ultimately, coloured stimuli is an origin of irrational decisions, subconsciously influencing the decision making of consumers and stakeholders via inducing emotions such as anxiety to affect risk preference of individuals.

3. Altruism and Priming - Public Good Games

Public good games have often been used in the field of behavioural economics to investigate altruistic behaviour and the effect of heuristics on such behaviour [11, 12]. It often involves playing a game where participants are presented with a choice of contributing to the community for extra returns. However, the returns are applied to everyone, and are calculated based on the aggregate contribution per round of the entire community, making it prone to free riders [13]. Hence, the nash equilibrium of the game is 0 contributions. Priming can also be used to affect prosocial behaviours. Kahneman, in his book *Thinking Fast and Slow* [14], has provided an example of how priming participants with monetary stimuli led to an unconscious selfish behaviour. For example, when individuals were primed with concepts such as money and investment and were put in a situation to help someone who had dropped their pens, they tended to pick less pens up when compared to neutrally primed individuals. Combining the two pieces of knowledge above, it can be logically hypothesized that priming can promote or negate altruistic or prosocial behavior in public good game situations.

3.1. The Experiment

There is relatively a solid amount of laboratory evidence and literature on the effect of priming on public good game behaviors. One such example that investigates prosocial behaviours via priming to prosocial vocabulary is conducted by Drouvelis ET. al. [15]. Drouvelis hypothesised that the

cooperation priming will lead to increased cooperation in the public good games played. He had the following main hypotheses:

- (1) Such priming will subconsciously activate prosocial behaviours;
- (2) Priming to such stimuli will make the participants believe others will also contribute more, influencing their own decisions;
- (3) Positively primed individuals will report stronger positive emotions;
- (4) Women would be more responsive to priming, and thus higher contributions.

The sample consisted of 105 students from the University of York, with the majority being undergraduate students of various academic backgrounds. There were a little more female participants than males, but no great disparities were observed in the sample. They were assigned randomly into the two treatment groups: Neutrally primed group (NP-treatment) and positively primed group (P-treatment).

The experimental design utilised consisted of 3 sections: The priming task, the public goods game, and the measurement of beliefs and emotions. The first priming task was disguised as a wordsearch puzzle, where the words used for the P-treatment group consisted of prosocial vocabulary such as teamwork, assist, and responsibility. The NP-treatment, instead had neutral words, such as butterfly, umbrella, and stapler, which are unrelated to the idea of teamwork nor self-interest. For the second task of public good game, Drouvelis utilised a one-shot linear public good framework. Participants were split into groups of 3, and were given 20 tokens each to contribute an endowment of their own choice every round to the group fund. The fund was then to be multiplied by 1.5 and evenly distributed among the group. It is obvious that the rational consumer in this scenario would likely not contribute, and to free ride along the contributions of others. Finally for the final task, the participants were administered a questionnaire collecting information regarding how much they believed the other two group members contributed, and also reported about their emotional responses, including happiness, warmth, anger and envy.

The results, unsurprisingly, were consistent with the hypotheses. Participants in the P-treatment group contributed more tokens than those in the NP treatment. However, there was a significant difference among gender: females in the P-treatment were significantly more affected by the priming intervention and thus contributed more compared to the male participants. Male participants, on the other hand, were not significantly affected by the priming intervention. Priming was also seen to shift beliefs on others. Positively primed individuals expected others to contribute more than those neutrally primed. Similarly to the previous result, females were more likely to believe that other group members would contribute more. Finally, positively primed individuals reported stronger positive emotions. However, negative emotions, such as envy, did not vary much between the two treatment groups. Such an effect, again, was more pronounced for females than male subjects.

3.2. Implications

The study supports the idea that priming can enhance one's prosocial decisions if primed to collaborative concepts. Also, the significant disparity between the effectiveness of priming between male and female should be considered when applying such an effect in terms of contexts such as marketing. There are significant implications for those findings, especially under the context of policy making, revolving real life public goods such as welfare and infrastructure. For example, one of the most common real life dilemmas, taxation policies. When promoting a new policy regarding taxation, the government may consider using more prosocial vocabulary to prime citizens to cooperative behaviour and increase the likelihood of acceptance of taxation policies. Another example is information campaigns for general welfare, such as campaigns for sustainability, which often requires collective input for an impact. This may also apply to other forms of communal policies, such as advertising for community service, or public messages. The results can also apply in workplace or educational environments, where cooperation plays a key factor. Priming, for example, school children, to collaborative stimuli can foster a better environment for cooperative learning. However,

it should still be kept in mind that other factors such as political stance, the specific scenarios and backgrounds of individuals matter in real life settings for public policies.

4. Conclusion

The priming effect can have huge impacts on the decision making of individuals, especially in strategic situations. The first study provides solid foundational evidence for the acquirability of biases, and priming's dependence on pre-established conceptions of one's surrounding world. The second provides evidence for the extent malleability of the effects depending on the stimuli participants were primed to. These impacts, though subconscious, can have significant aggregate implications on the general dynamics of, for example, a public good game. However, it has also been seen that the subconscious responses to those stimuli can vary among different populations due to differing experiences and contextual exposures. It may also vary according to biological differences, such as sex. Thus, when applying the results known of, other factors should still be considered, such as context, and the target population.

For further investigation, cross-cultural comparisons could be made to explore other forms of cultural biases, which may have strong implications on the practicality of the effect. This can be done through primed public good games utilizing ethnocentric samples of different regions. The learned characteristic of priming can also be further dug into, via investigation of repeated priming, and whether it leads to the formation of new habits/primes. The long term effects of such new priming effects can be studied as well, in order to provide more insight on the fluidity of priming biases. Priming may also have an effect on depending on detailed personal differences (personal bias) in terms of factors such as political orientation and socioeconomic status, which can be investigated via the utilization of psychometric surveys with primed activities such as public good games.

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