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Gender Stereotypes of Color among Adolescents

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Abstract: The color of the masks displays people's stereotypical idea of the relation between color and gender. Although the concept of gender stereotype has been recognized long ago and a lot of people are working on it. There are few studies on gender relations from the perspective of color. This research is to investigate if people's reaction time to objects is delayed when the object is different from our traditional view. Therefore, a group of participants' reaction time to three sets of colored words is recorded and analyzed. After comparing the three sets of data, it is found that the 'participant's reaction time to recognize the vocabulary is less the first time than the second time, but is more than the third time. In that case, people's reaction time to objects is delayed when the object is different from our traditional view. In a short period, the subjects are forced to make a decision, and the choices they make are based on their perception and their first reaction.

Keywords: Color, Stereotype, Gender, Teenagers

1. Introduction

Nowadays, there is increasing attention to the study of gender stereotypes. Stereotypes are in people's subconscious minds which can affect people's judgment unnoticing.

Nowadays, people are suffering from the widespread coronavirus. Masks become a necessity in people's lives. But the different colors of masks people choose to wear, actually reflect the underlying stereotype of color and gender in our subconscious minds.

Color is one of the indispensable ways how humans understand the world. Humans use language to code color which makes the vocabulary for representing, color [1]. After decades of evolution, a stereotypical relation of certain color and gender developed and was ingrained in people's subconscious minds. Gender is one of the most salient social categories, starting early in childhood and continuing into adulthood[2]. When it comes to gender, people always think that men are rational while women are emotional. For personality, such as strong, the first thing we think of is men; When it comes to color, people will think that cool color has a strong and reliable temperament of men, like blue, while warm color can set off woman's softness, like pink. This kind of color-related gender stereotype is easily seen in people daily lives, just as parents buy blue clothes and toys for boys and pink for girls.

Nowadays, many people have heard derogatory words such as "sissy" and "tomboy". These words,

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it shows that people have some stereotyped ideas about men and women. Moreover, it is not only the gender stereotypes among human beings but also similar situations when it comes to artificial intelligence. Therefore even if it is a non-life object, it will still be labeled with gender [3] These studies show that gender stereotype is not limited to describing human. Previous studies on gender stereotyping and the relationship between gender and art have been done, and works of realistic style and abstract works have been studied to help realize whether gender stereotypes in attribution are effective for men or women [4]. Research on children's cognition of gender roles helps team members establish correct self-identity and break through gender role stereotypes, to integrate multiple personality traits in a pleasant group atmosphere, and improve gender role androgyny cognition [5].

The influence of stereotype threat on woman's spatial perspective-taking ability, and which part of executive function in inhibition, refresh, and conversion may play a mediating role in the influence of stereotype threat on spatial perspective taking [6]. People's perception of what a typical man or woman looks like can affect our awareness and cause bias in evaluating other people's behavior [7]. The researchers found that the gender role pressure of men and women due to gender stereotypes is very different. The formation of gender stereotypes is related to age, cognition, culture, and other factors, which further promote the self-development of individual behavior, motivation, and socialization [8].

Today, development research is limited by narrow stereotypes, so researchers propose a more complex model and use the new model to investigate the development of gender stereotypes. It has been found that children seem to first learn the connection between their gender-related characteristics, and then for other genders, and that older children's stereotyped judgments are more extreme than younger children. Through discussion, it was found that these results had an impact on the development of stereotypes, the assessment of gender knowledge, and the understanding of social judgment [9]. However, this study wants to fill in the gap in the extent to which stereotypes change. By testing the reaction time of men and women to different gender-related words and colors, we can observe the difference in time, observe why people have gender stereotype on color, and whether the reaction time is slowed down due to sudden cognitive reversal. However, there are not many types of studies that combine gender and stereotypes to study their impact on human cognition. Most of them focus only on the human gender, but not together. This experiment is almost the first study to combine gender and cognitive stereotypes. Our goal is to measure gender stereotypes of color among adolescents. Suppose that in Experiment 1, the reaction time of male participants in choosing the color meaning opposite to the meaning represented by the referred word was significantly lower than that when the color meaning was the same as the meaning represented by the referred word. The reaction time of female participants in choosing the color meaning opposite to the meaning of the referred word was significantly lower than that of the color meaning and the meaning of the referred word. In Experiment 2, the reaction time of male participants in choosing the color meaning opposite to the meaning represented by the referred word was significantly lower than that when the color meaning was the same as the meaning represented by the referred word. The reaction time of female participants in choosing the color meaning opposite to the meaning of the referred word was significantly lower than that of the color meaning and the meaning of the referred word. In Experiment 3, the reaction time of male participants in choosing the color meaning opposite to the meaning represented by the referred word was significantly lower than that when the color meaning and the meaning represented by the referred word were the same. The reaction time of female participants in choosing the color meaning opposite to the meaning of the referred word was significantly lower than that of the color meaning and the meaning of the referred word.

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2. Methods

2.1. Participants

Participants were recruited for this experiment voluntarily after being informed of the rules. The number of participants was 19, ranging in age from 15 to25. The reason why we don't choose older people is that age can be an important factor, since aging results in an overall decline or slowing down of the cognitive system [10]. Participants must not be color blindness, achromatic, or red-green colorblind. All participants are native Chinese speakers, so to reduce the time they needed to read, all experiments were conducted in Chinese. At the same time, the words in the experiment are often used or seen in daily life. This also prevented participants from increasing their reaction time to think about the meaning of words because they did not recognize the meaning.

2.2. Experiment

This experiment was based on the Implicit Association Test (IAT) proposed by A.G.Greenwald [11]. A mixed experiment design was used. The experiment was online and the software used was PsychoPy. The independent variable (IV for short) is 2*2*2, which were color tone (cold tone and warm tone), vocabulary (e.g. bow, basketball, cosmetics, plumber), and gender (male and female). The dependent variable (DV for short) was the reaction time of the participant to recognize the words. Also, they are all words that are often exposed to in daily life, so that participants will not be unaware of the meaning of the words.

3. Results

Through this research, it is found that nineteen participants between 15 to 25 were recruited through this experiment confirmed our hypothesis. There are 3 loops and 7 trails in this experiment. In order to prevent participants from remembering vocabulary in the previous test, new vocabulary is added in each loop.

In the first item of the experiment, the reaction time of male participants in choosing the meaning of color that is opposite to the meaning represented by the word being referred to is significantly lower than the reaction time of the color meaning that is the same as the meaning represented by the word being referred to. The reaction time of female participants in choosing the opposite meaning of color meaning and the word being referred to is significantly lower than that of the same meaning of color meaning and the word being referred to. In the second item of the experiment, the reaction time of male participants in choosing the meaning of color that is opposite to the meaning represented by the word being referred to is significantly lower than the reaction time of color meaning that is the same as the meaning represented by the word being referred to. The reaction time of female participants in choosing the opposite meaning of color meaning and the word being referred to is significantly lower than that of the same meaning of color meaning and the word being referred to. In the third item of the experiment, the reaction time of male participants in choosing the meaning of color that is opposite to the meaning represented by the word being referred to is significantly lower than the reaction time of color meaning that is the same as the meaning represented by the word being referred to. The reaction time of female participants in choosing the opposite meaning of color meaning and the word being referred to is significantly lower than that of the same meaning of color meaning and the word being referred to. It is consistent with the experimental conclusions predicted by Hypothesis 1, Hypothesis 2, and Hypothesis 3.

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Table 1: Descriptive statistics.

	Experiment 1		*Experiment 2*		*Experiment 3*	
	M	*SD*	*M*	*SD*	*M*	*SD*
RT	2.70	1.74	1.88	0.95	4.31	2.94
Accuracy	9.41	1.00	9.41	0.71	9.18	1.01

The first experiment showed how long participants initially reacted to words alone. As can be seen from the figure, the reaction time of the participants in the third experiment was longer than the reaction time of the previous two experiments, and the correct rate also decreased. This explains that if people suddenly see a change that is different from their perception, it will take them longer to think and affect their accuracy.

4. Discussion

In this study, it was found that the reaction time required by participants to judge words was lower than that required by participants to judge words' color and meaning as the same color. It was higher than the time participants needed to determine the color of words and the meaning of words as opposite colors. It shows that people will have a stereotype of color, and the reaction time will be slow due to sudden cognitive reversal. The participants were not told all the details and rules of the experiment as they entered the experiment. For example, the words and colors in the experiment. It's more likely to reflect their true reactions when they don't fully understand the experiment. Different people have different reaction times and options, which also shows how different colors and things are defined in their cognition.

5. Limitations

Because of the small scale of the experiment, there will be shortcomings in many areas.

5.1. Environment

This experiment was an online experiment, so there are many uncontrollable factors. There were problems with the lab site, the outbreak, software problems, and an inability to supervise participants as they completed the experiment. Or experiment offline to make sure the participants fully understand the rules of the experiment and supervise their completion. Because of the limited conditions, this experiment is conducted in the form of words. But gender bias can be present in educational resources in the type of language and visual content. Visual content comprises images (drawings and pictures) and videos (film and animations) [12]. Therefore, using pictures is a better way to see gender stereotypes.

5.2. Sample Size

The small sample size raises concerns about the representativeness and generalizability of the results. Future studies can use a larger sample size to measure multiple samples to test whether teenagers would change their gender stereotypes because of the change of color. The results showed that teenagers would not change their gender stereotypes because of the change of color. As a result, the adolescents did not change their gender stereotypes because of the color change, but their reaction times were correspondingly slower.

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5.3. Emotion

Before the experiment, emotion will affect the reaction time and judgment of the subjects. Some words may affect the emotions of the subjects and lead them to make wrong judgments, resulting in inaccurate experimental results and conclusions. Future research should ask the subjects to listen to soothing music for 30 minutes before experimenting, and then experiment after they have stabilized their mood.

5.4. Color

Each person has a different understanding of color, and participants with a poor understanding of color may not be able to tell whether some colors are cool or warm. It will affect the reaction time of the subjects and the correctness and error of the judgment, resulting in errors between the final experimental results and the experimental conclusions as well as the normal experimental results and experimental conclusions. Future research should begin the experiment with a quiz in which subjects decide whether a cool or warm color is needed.

6. Conclusion

To sum up, gender stereotypes are still controversial. This experiment only tested people's understanding of color and gender, and we can only conclude that had a slower reaction time to make judgments because they knew things differently than they did before. People's definition of color and gender is not a day or two that can change. Can people's perception of color stereotypes disappear? Whether their stereotypes can be changed, and whether they can reduce the negative impact of some people's gender stereotypes on color on others still need to be discussed.

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