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The Effects of Time on Stereotyping: An Experimental Study

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Abstract: ***This research examines the relationship between exposure time and stereotypical judgments made by young adults. Using an experimental design, participants were exposed to images for different durations (0.5s, 0.7s, or 0.9s) and asked to make judgments about individuals. Results indicate that shorter exposure time led to more stereotypical judgments. However, certain stereotypes persisted across all conditions. These findings suggest the current generation is sensitive to inclusivity but targeted interventions are needed to combat persistent biases. Striving to overcome such biases and reject harmful stereotypes can lead us to a more equitable and inclusive society.***

Keywords: Stereotyping, Exposure time, First impressions, Young adults, Bias & Prejudice

1. Introduction

Stereotyping

The negative impact of stereotyping on individuals and society as a whole was made clearer than ever after the George Floyd case of 2020. Stereotyping is a phenomenon which is widely talked about in today's day and age. It is regularly seen in our language (Kite & Whitley, 2012) through our assumptions about certain groups of people. It is a social phenomenon that can have an adverse effect on how individuals are perceived and treated (Cuddy et. al, 2008). Several possible consequences of stereotyping have been researched including discrimination (Devine, 1989), social exclusion (Macrae & Bodenhausen, 2000), and even effects on physical health (Pascoe & Smart Richman, 2009). Stereotypes can be on the basis of an individual's sex, skin colour, age, appearance (eg. Choice of clothes), etc. Stereotypes are usually formed and maintained through exposure to media and cultural norms (McKenna & Bargh, 1998), but there is little research on how stereotypes change with time.

Sex stereotypes have been prevalent in society with several assumptions about both males and females. Common stereotypes like men are better drivers (Moè, et. al.2015; Yeung & von Hippel, 2008) or females are more trustworthy (Shinners, 2009) have had adverse effects on society as a whole and how we tend to automatically form assumptions about people as soon as we see them. Assumptions such as dark skinned individuals are more violent (Dixon & Maddox, 2005; Kleider - Offutt et. al.2017) have caused several problems in society such as the George Floyd case which gave rise to the influential social movement 'Black Lives Matter'.

Age stereotypes are often seen in our society and even have a negative impact on older adults' mental and physical health, and their overall wellbeing (Levy, 2003). These stereotypes can lead to discrimination in employment, healthcare, and social interactions, and can affect an individual's sense of belonging. Dressing style stereotypes are also often seen in our society; people make judgements based on one's clothing choices and these choices are often influenced by gender and other stereotypes. For example, women who dress in revealing clothing are often perceived as less competent and less intelligent, while men who dress in casual clothing are often perceived as less competent and less capable of leadership (Howlett et. al.2015; Gurung & Chrouser, 2007; Küster et. al.2019; Esparza, 2017).

Stereotypes have a significant impact on individuals as well as on society as a whole. They are often the causes for in and out group bifurcations, and can be at the root of several mental and physical health issues. Understanding their role and how they are different in the current times can help us combat these harmful attitudes and beliefs which make a less inclusive society.

First Impressions

First Impressions are often the product of long held stereotypes in people. They are formed quickly and often have a lasting impact (Tetlock, 1983) on how someone is perceived. Studies show that accurate impressions of others can be formed in as little as 30 seconds (Zebrowitz, 2017). Minor cues can influence first impressions which subsequently shape subsequent interactions and affect how people communicate and behave with another (Funder, 2012).

Facial expressions also play a huge role in the formation of first impressions. An individual's trustworthiness and likeability tends to be judged on the basis of their facial expression. Individuals with large eyes, round faces and small noses are often perceived as more trustworthy than those who have angular features (Funder, 2012; Zebrowitz & Montepare, 2008).

Thus, it is vital to understand the roles that first impressions, and by extension stereotypes, play on an individual's social perception. Stereotypes can often be formed and grown through minor incidents and confirmatory bias in further interactions (Rabin & Schrag, 1999). These affect daily interactions and can lead to adverse consequences towards certain groups of people (Rule & Ambady, 2010).

Rationale

Stereotypes have been prevalent for a long time now, but we argue that the current generation is more sensitive and does

not stereotype individuals. With the growth of the internet and ease of communication across borders, the current generation of young adults has a lower likelihood to assume personality traits and competencies and they pause to check for biases before making judgements. Therefore, on average, if given enough time, they will have a neutral stance towards people.

To test this, we conducted an experiment to test if certain established stereotypes such as thin people being better dancers or males being better fighters are prevalent among today's youth. Our experiment design was inspired by an existing experiment by Willis and Todrov (Willis & Todorov, 2006). We also wanted to see if these stereotypes were reversed and if longer exposure to stimuli has an effect on stereotypes. Understanding the current generation's relationship with stereotypes and which stereotypes are prevalent can serve as a checkpoint to humanity's changing mind - set to be more inclusive as well as highlight the areas where we can work to reduce stereotypes and increase an inclusive mind - set.

Hypotheses

H1 - Exposure time is negatively associated with the proportion of stereotypical judgments made by young adults.
H0 - There is no significant relationship between exposure time and the proportion of stereotypical judgments made by young adults.

2. Methods

Study Design

The study design for this research was experimental. An experimental design was chosen as it would allow the manipulation of the independent variable and determine its effect on the dependent variable. The participants were randomly assigned to three experimental groups - short, medium or long. Each participant was shown a video where they were shown a question, for example, "Who is a better dancer?" They were then shown two pictures side by side, for example, of a female and a male, for a brief amount of time (0.5s, 0.7s or 0.9s). The participants then had to choose between the two pictures by saying 'A' or 'B' which the experimenter recorded. Each picture was of the same dimension, was a close up of the face and was in black and white to minimise extraneous variables. Written informed consent was taken before the experiment and each participant received a debriefing after the experiment.

Participants

The participants in this study were young adults aged between 17 to 25 years. The participants were recruited through a combination of convenient sampling and snowball sampling methods. There were a total of 53 participants, 27 females and 26 males. All participants were from the middle class socioeconomic background and resided in metropolitan cities.

Variables

The independent variable for this study was the exposure time to the photographs. The short group was exposed to photographs for 0.5 seconds, the medium group for 0.7 seconds, and the long group for 0.9 seconds. The dependent variable was the proportion of stereotypical judgements by the participants. The proportion of stereotypical judgments was calculated by dividing the number of times the participant chose the stereotypical option by the total number of questions.

Bias

To minimise the bias in the study, participants were randomly assigned to one of the three groups. The pictures were standardised to reduce bias. Each picture was of the same dimensions, black and white and a close up of the face.

Statistical Methods

The data was analysed with the use of descriptive as well as inferential statistics. The descriptive statistics discussed the variations, mean, standard deviation, trimmed mean, mean absolute deviation, minimum, maximum, range, skew kurtosis and standard error each question distinctively. The Chi Square Test was used to determine which questions have significant differences in proportions across the time conditions. If the p - value was less than 0.05, we would reject the null hypothesis of no difference and conclude that the proportion of participants who gave a stereotype answer was significantly different across at least one of the time conditions for that question.

One way ANOVA was used with time condition as the independent variable and proportion of stereotyped responses was dependent variable. Follow - up analyses were done to determine which specific levels were significantly different from each other. Turkey's HSD Test was used to determine which groups were significantly different from one another. The means of all pairs of groups were compared after finding a significant difference in the ANOVA test. The test was performed on the Time Condition variable. Welch Two Sample t - test was done thrice for: 1. Short - Medium, 2. Medium - Long, and 3. Short - Long. This was done to compare the difference between each of the groups. A significance level of 0.05 was used for all statistical analyses.

3. Results

Table 1: Descriptive statistics

vars	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
Q1	53	0.66	0.48	1	0.7	0	1	1	-0.66	-1.6	0.07
Q2	53	0.57	0.5	1	0.58	0	1	1	-0.26	-1.97	0.07
Q3	53	0.62	0.49	1	0.65	0	1	1	-0.49	-1.79	0.07
Q4	53	0.58	0.5	1	0.6	0	1	1	-0.33	-0.92	0.07
Q5	53	0.75	0.43	1	0.81	0	1	1	-1.15	-0.69	0.06
Q6	53	0.42	0.5	1	0.4	0	1	1	0.33	-1.92	0.07
Q7	53	0.64	0.48	1	0.67	0	1	1	-0.57	-1.7	0.07

Q8	53	0.64	0.48	1	0.67	0	1	1	-0.57	-1.7	0.07
Q9	53	0.77	0.42	1	0.84	0	1	1	-1.27	-0.39	0.06
Q10	53	0.72	0.45	1	0.77	0	1	1	-0.94	-1.14	0.06
Q11	53	0.66	0.48	1	0.7	0	1	1	-0.66	-1.6	0.07
Q12	53	0.57	0.5	1	0.58	0	1	1	-0.26	-1.97	0.07
Q13	53	0.53	0.5	1	0.53	0	1	1	-0.11	-2.03	0.07
Q14	53	0.68	0.47	1	0.72	0	1	1	-0.75	-1.47	0.06
Q15	53	0.62	0.49	1	0.65	0	1	1	-0.49	-1.79	0.07
Q16	53	0.6	0.49	1	0.63	0	1	1	-0.41	-1.86	0.07
Q17	53	0.64	0.48	1	0.67	0	1	1	-0.57	-1.7	0.07
Q18	53	0.75	0.43	1	0.81	0	1	1	-1.15	-0.69	0.06
Q19	53	0.51	0.5	1	0.51	0	1	1	-0.04	-2.04	0.07
Q20	53	0.74	0.45	1	0.79	0	1	1	-1.04	-0.94	0.06
Q21	53	0.62	0.49	1	0.65	0	1	1	-0.49	-1.79	0.07
Q22	53	0.53	0.5	1	0.53	0	1	1	-0.11	-2.03	0.07
Q23	53	0.55	0.5	1	0.56	0	1	1	-0.18	-2	0.07
Q24	53	0.72	0.45	1	0.77	0	1	1	-0.94	-1.14	0.06
Q25	53	0.85	0.36	1	0.93	0	1	1	-1.9	1.62	0.05
Q26	53	0.64	0.48	1	0.67	0	1	1	-0.57	-1.7	0.07
Q27	53	0.77	0.42	1	0.84	0	1	1	-1.27	-0.39	0.06
Q28	53	0.6	0.49	1	0.63	0	1	1	-0.41	-1.86	0.07

Note. vars - Variables, sd - Standard deviation, mad - Mean Absolute Deviation, min - minimum, max - Maximum, SE - Standard error.

Table 2: Chi Square Test

Question 1	0.01311837
Question 2	0.00870111
Question 3	0.07891435
Question 4	0.90424374
Question 5	0.17644342
Question 6	0.02461059
Question 7	0.43852421
Question 8	0.25997463
Question 9	0.00164745
Question 10	0.05949898
Question 11	0.07170623
Question 12	0.10354273
Question 13	0.00097552
Question 14	0.02587515
Question 15	0.31151558
Question 16	0.19815746
Question 17	0.04759261
Question 18	0.00664099
Question 19	0.28027858
Question 20	0.28879777
Question 21	0.52762732
Question 22	0.14924871
Question 23	0.01379811
Question 24	0.10388665
Question 25	0.08231768
Question 26	0.00367035
Question 27	0.01291865
Question 28	0.16239173

Table 3: One way ANOVA

	Df	Sum sq	Mean Sq	F Value	Pr (>F)
Time Condition	2	0.5586	0.27929	20.12	3.87e - 07 ***
Residuals	50	0.6939	0.01388		

Note. Df - degree of freedom, Pr (>F) - p value of the statistic from F test; Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '. ' 0.1 ' ' 1

Table 4: Turkey's HSD Test

	diff	lwr	upr	P adj
Medium - Long	0.04634354	-0.05662554	0.1493126	0.5264279
Short - Long	0.2255102	0.136607	0.3144134	0.0000004
Short - Medium	0.17916667	0.07526572	0.2830676	0.0003563

Note. diff - difference in mean, lwr - lower, upr - upper, p adj - p - value adjusted.

Table 5: Welch Two Sample t - test: Short - Medium

t = 4.1501, df = 29.316, p - value = 0.0002614
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
0.09091238 0.26742095
sample estimates:
mean of x mean of y
0.7714286 0.5922619

Table 6: Welch Two Sample t - test: Long - Medium

t = - 1.3, df = 22.637, p - value = 0.2067
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
- 0.12015538 0.02746831
sample estimates:
mean of x mean of y
0.5459184 0.5922619

Table 6: Welch Two Sample t - test: Long - Short

t = - 5.8352, df = 33.087, p - value = 1.553e - 06
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
- 0.3041296 - 0.1468908
sample estimates:
mean of x mean of y
0.5459184 0.7714286

4. Interpretation of Results

Preliminary statistical analysis included Kurtosis, Chi Square Test and a ranking of questions according to their stereotype prevalence. The kurtosis values obtained for 24 out of 28 questions suggested that the distribution of responses for each question is approximately normal.4 questions had a negative kurtosis value, indicating that the response to these questions are less extreme than what would be expected in a normal distribution, highlighting a possibility that these questions were less stereotypical than other questions. The chi - square test highlighted the questions (if p - value < 0.05) where the proportion of participants who gave a stereotype answer was significantly different across at least one of the time conditions for that question.

The question which had the most stereotypical prevalence was, "Who is a druggie?" where one of the pictures being of a male with short hair and the other being of the same male with long hair. Most people selected the long hair option, likely due to the influence of 'hippie culture' (Dean & Rud, 1984; Brand, S.1995; Макова, 2013). The question with the least stereotypical prevalence was, "Who is a better teacher?" where one of the pictures was of a male with dark skin and the other was of a male with fair skin. Nearly 50% divide in choice indicates that the choice was random and not due to a stereotype based bias.

The ANOVA test showed a significant effect of Exposure Time on the stereotype endorsement scores ($F(2, 50) = 20.12$, $p < 0.001$). This indicates that there are differences in the proportion of stereotyped choices between the three groups (Short, Medium, and Long). Further analyses were done to determine which specific levels are significantly different from each other.

The Turkey test indicated that there was a significant difference between Short - Long and Short - Medium groups as the adjusted p - values were less than the 0.05 significance level. However, there was no significant difference between the Medium - Long group.

The Welch's t - tests further supported the above findings. The t - test between Short and Medium groups showed a significant difference in proportion of stereotype choices ($t(29.316) = 4.1501$, $p = 0.0002614$), with the Short group having higher scores than the Medium group. The t - test between the Long and Medium group showed no significant difference ($t(22.637) = -1.3$, $p = 0.2067$), indicating that the proportion of stereotype choices of these two groups were not significantly different. Finally, the t - test between Short and Long group showed a significant difference in proportion of stereotype choices ($t(33.087) = -5.8352$, $p = 1.553e-06$), with the Short group having significantly higher scores than the Long group. Taken together, the results suggest that there are significant differences in the proportion of stereotype choices between the Short, Medium, and Long groups, with the Short group having significantly higher scores than the other two groups.

5. Discussion

Analysis using ANOVA, t test and Turkey Test indicate that individuals' exposure to images in the short time condition (0.5s) led to more stereotypical responses compared to exposure to medium (0.7s) and long (0.9) time conditions. This suggests that young adults of the current generation are more sensitive about being inclusive and less likely to assume personality traits or competencies by solely looking at a person.

Young adults might have stereotypical ways of thinking reflexively, but given time, they pause to check for biases before making judgements. These findings also have important implications for understanding how time pressure affects social cognition and the formation of stereotypes. Under time pressure, people may rely more on pre - existing stereotypes and make more stereotypical judgments. Research has previously shown that stereotypes in our society are reducing with time as we move towards an egalitarian and inclusive world (Stangor & Lange, 1994).

This trend was not found in all questions, and there were some areas where stereotypical choices were largely prevalent, irrespective of the time exposure, such as the stereotype of long haired people being hippies who take drugs in contrast to short haired people. On the other hand, racial discrimination has considerably reduced among the young adults of this generation. The question with the least stereotypical showcased that people don't judge an individual's teaching competency based on the colour of their skin. This is a testament to humanity's progress in making an increasingly inclusive world.

Most of us, in today's day and age, actively work on our stereotypes and keep our prejudices out of mind to avoid discrimination (Richeson & Shelton, 2007). Getting past stereotypes is a real possibility, although it can take some effort on our part (Blair, 2000). There are a number of techniques to improve our attitudes and reduce stereotypical behaviour. Some of these techniques include practising to be less stereotypical (Kawakami et al., 2000), visualising people of a group with non - stereotypical characteristics (Blair et al., 2001), or even thinking about atypical exemplars from a stereotyped group (Bodenhausen et al., 1995).

It is important to note that this study has some limitations. First, the study used a convenience sample, so the results may not generalise to all populations. Second, the study used a hypothetical scenario to measure stereotyping, so the results may not fully capture real - world stereotyping behaviour.

Future research could explore the mechanisms underlying these effects and investigate whether interventions aimed at reducing time pressure could help reduce stereotyping. Factors such as social norms and individual differences in personality and beliefs could be further explored as underlying mechanisms. Future research could also sample a more diverse population that can be easily generalised.

6. Conclusion

This research aimed to investigate the relationship between exposure tie and the proportion of stereotypical judgements by young adults. The findings provide invaluable insights into the current generation's attitude towards stereotypes and the potential for reducing the bias produced through these stereotypes and promote inclusivity.

The results showcased that young adults exposed to images for shorter durations (0.5 seconds) were more likely to make stereotypical judgments compared to those exposed for longer durations (0.7 and 0.9 seconds). This suggests that the current generation, on average, exhibits a higher sensitivity towards being inclusive and less likely to rely solely on appearance - based assumptions when forming judgments about others. These findings align with previous research indicating a reduction in stereotypes as we progress towards a more egalitarian and inclusive society.

It is also essential to note that a few stereotypes still persist in our society, as there were a few questions that would consistently have stereotypical responses regardless of exposure time. These persisting stereotypes thus emphasise the need for targeted interventions to neutralise this bias.

This study did provide some invaluable insights into the changing attitudes of young adults towards stereotypes, but it also had some limitations, such as the use of convenience sampling and a hypothetical scenario to measure stereotyping. Future research could expand on these findings by exploring the underlying mechanisms behind stereotyping.

The current generation has massive potential to challenge stereotypes and promote inclusivity, increasing equitability and developing a future with a more understanding society. We can collectively build a society that strives to overcome biases and embrace diversity, celebrates individuality and rejects harmful stereotypes, leading to a more cohesive and harmonious world for everyone.

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