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Changes of Implicit and Explicit Asian Attitudes from 2018 to 2021

Wang Zhiyan[1,a,*]

[1]*Chung Yuan Christian University, Zhongli Dist., Taoyuan City, Taiwan, China*
a. cepheues@gmail.com
**corresponding author*

Abstract: Discrimination against Asians increased after the 2019 COVID-19 outbreak. To study the current state of implicit and explicit attitudes, we used the Project Implicit "Asian American IAT" data from 2018 to 2021 (n = 127,239) to examine whether implicit and explicit attitudes toward Asian Americans changed before and after the COVID-19 pandemic. We found that implicit bias toward Asians (Asian=Foreigners) persisted from 2018 to 2021, and showed an upward trend after May 2020. Explicit Asian bias fluctuated but decreased over time from 2018 to 2021. More importantly, age, race, education, state, year, and citizenship were all significant factors influencing people's implicit and explicit attitudes toward Asian Americans. These findings inform the mechanism of attitude change, indicating the impacts of significant social events on attitude change.

Keywords: Asian American, COVID-19, implicit association test, implicit attitudes, ethnic prejudice

1. Introduction

Prejudice against Asian Americans continued to increase and reached a record-high level. From March 2020 to December 2021, the reporting forum Stop AAPI Hate received more than 10,900 self-reports of hate incidents against Asian Americans [1]. Of all reported incidents, verbal harassment and physical assault were the most common forms of discrimination in all reported incidents. Of all those who provided the report, most were Chinese-Americans, followed by Koreans and Filipinos.

As COVID-19 continues to spread, discrimination and prejudice against Asians had grown [2]. Wu et al [3]. found that Asian immigrants and Asian Americans experienced higher levels of mental disorders than whites after the onset of COVID-19, and demonstrated that discrimination related to COVID-19 could partly explain the differences in mental health between Asian and white people. Related research showed that prejudice affects the mental, and physical health [4], income [5], and test scores of students in minority groups [6]. The contagion of COVID-19 fueled xenophobia among the population. Public stigma and prejudice against Asians were increasing due to fear of disease [7]. Asian Americans were blamed for the COVID-19 pandemic and faced racism and discrimination as a result [8].

Two types of attitudes exist: explicit attitude refers to the attitude that people deliberately think and express, and implicit attitude is the evaluation of something people unconsciously do [9]. To measure implicit racial attitudes, an implicit association test has been developed, to measure the difference between associations with two target concepts and attributes. Implicit and explicit bias

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could predict participants' relevant social behavior, and implicit racial attitude could predict the measure of intergroup behavior [10].

Since the beginning of the pandemic, there have been many studies using the IAT to study people's explicit and implicit attitudes. The study conducted by Darling Hammond et al [11]. on prejudice against Asian Americans found that the trend in bias against Asian Americans gradually decreased from 2007 until the beginning of 2020, but then started to rise in March 2020. They also found that this change in trend was more obvious among conservatives. According to Charlesworth and Banaji [12], the results of quizzes using the male-career/female-family or the male-science/female-art IAT showed that participants with different races, genders and geographic locations changes in implicit gender stereotypes were different.

Given the above-mentioned literature, we used Project Implicit "Asian American IAT" to measure how easily participants associate Asian-American and European-American faces with America or American symbols. The test measures the difference in participants' reaction times, and when the score is positive, it means participants believed that European-Americans were more American than Asian Americans, and when it's negative, it's the opposite. We hope to identify factors that influence attitudes and examine the trends in attitude changes by researching people's implicit and explicit attitudes toward Asian Americans.

We focused on factors including education, age, gender, and religion, that are likely to affect one's beliefs and thoughts. For example, the likelihood that a person will engage in racially discriminatory behavior is influenced by the relative levels of explicit and implicit self-esteem [13]. Other literature had also demonstrated that older adults showed greater implicit prejudice than younger adults [14-15]. Hagendoorn considered that education could implicitly change attitudes related to prejudice by increasing a person's knowledge and cognitive skills [16]. To sum up, we can conclude that these demographic variables can be the factors that cause differences in implied attitudes.

1.1. The Present Study

We used Project Implicit "Asian American IAT" data from 2018 to 2021 to examine the trends in bias in Asian Americans relative to European Americans before and during the COVID-19 epidemic. Our research questions focus on whether participants would demonstrate implicit and explicit Asian bias, the factors that affect their implicit and explicit Asian bias, and how the implicit and explicit Asian bias changed from 2018 to 2021. For the second question, we propose six factors that may affect people's prejudice, namely age, race, education, state, year, and citizenship. We generated three hypotheses as shown below:

Hypothesis 1: Participants would show implicit and explicit Asian bias.

Hypothesis 2: All the factors would affect their implicit and explicit Asian bias.

Hypothesis 3: Implicit Asian bias changed continuously from 2018 to 2021.

2. Method

2.1. Participants

Data were drawn from the Website of Project Implicit (PI). Samples included participants who completed the Project Implicit "Asian American IAT" from 2018 to 2021 (N = 127,239; 82,073 females).

The age of all samples was between 18 and 99.5 years (M = 33.79, SD = 14.14). In the dataset, 34,213 were Asians (26.9%), 63,682 were Whites (50%), and 29,344 were categorized as other or unknown (23.1%); A total of 16,430 participants had a high school degree or below (2.9%), 80,118 participants graduated from university with associate's degree or bachelor's degree (63%), 30,691 participants had a graduate degree and above (24.1%).

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2.2. Measurements

Asian American IAT. The Asian American IAT required the ability to recognize White and Asian-American faces and images of places that were either American or Foreign in origin. Consistent with the standard IAT [17], Asian-American IAT measured how easily participants associated Asian-American and European-American faces with U.S. or U.S.-related symbols. Scores ranged from -2 to 2. A negative score indicated that participants believed that Asian Americans were more American than European-Americans, and a positive score indicated that participants believed that European-Americans were more American than Asian Americans.

Explicit Asian Bias. The Explicit Asian Bias ("belief") was the result of a Likert 7-point scale. The scale ranked Asian-Americans and European-Americans as more American and asked participants to directly select the response that best described their beliefs.

2.3. Data Source

All data came from Project Implicit's 34 independent websites, from https://implicit.harvard.edu. Each country's website was independent and used that country's language. The data included participants' implicit attitudes on Asian-American IAT and responded to the survey including explicit racial attitudes. The test also recorded some demographic variables to facilitate cross-country comparisons. All participants had informed consent prior to the test, and all the raw data were depersonalized before pre-treatment and analysis, all results reported in the current manuscript are secondary analyses of depersonalized data [18].

3. Results

3.1. Data Clean

This study recorded some variables in the 2018-2021 dataset. All 2018-2021 Asian IAT data included 615,954 samples, of which 270,893 (44%) and 10,041 (1.6%) were participants from the USA and China. After selection, there was a total of 280,934 samples, with participants from the USA accounting for 96.4% and China accounting for 3.6%. Those who did not complete the task (n = 95,840, 34.1%) were excluded, leaving 185,094 samples for follow-up analysis. We also excluded participants who did not finish the Asian IAT (n = 950) given our primary interest in implicit Asian bias. The D score ("Overall IAT D score") is missing, leaving 184,144 valid samples.

We calculated the approximate age of participants when they took the IAT. Participants aged between 18 to 99.5 years were selected (n = 154,498). On the education variable, 2,373 samples were removed, leaving 152,175 samples for further analysis. The educational attainment of the cases was reclassified into three categories: high school or below, Undergrad which included participants who have graduated from college or had a bachelor's degree, and Graduate which included people with a graduate degree or above.

The race of the cases was categorized into Asian, white people, and other. Cases consider how well Asian Americans and white Americans identify with the United States and all things American and calculate the difference between the two, and use it as the explicit Asian bias.

States were classified into two categories based on the result of 2020 United States presidential election [19]: "red" and "blue" states. The Maine and Nebraska samples were removed since their voters predominantly vote for two parties. We excluded 24,886 samples that did not meet the requirements, leaving 127,239 samples for final analysis.

The variable "year" we used in the subsequent multiple linear regression calculations meant the time the participant took IAT, the variable "citizenship" was the nationality of the participant and

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there were only two options “China” and “U.S.A.”. We renamed the 48 months from January 2018 to December 2021 in numerical order and recorded them in the new variable “Time”.

3.2. Descriptive Analysis

The sample consisted of 127,239 participants aged 18 to 99.5 years (M = 33.78 years, SD = 14.14 years, 82,073 female). Among them, 63,682 were Whites (50%), 34,213 were Asians (26.9%), and 29,344 were Other or unknown (23.1%).

There were 16430 participants from elementary school to high school who graduated (12.9%). 80118 participants graduated with a bachelor’s degree, associate’s degree, or college graduates, (63%). 30,691 participants had a graduate degree or above (24.1%).

A total of 90,895 participants were categorized as belonging to the blue state (71.4%). 36,344 participants in the red state (28.6%).

Among the participants who completed the tasks, 21,994 completed the test in 2018 (17.3%), 24,679 participants completed the test in 2019 (19.4%), and 42,632 participants completed the test in 2020 (33.5%). In 2021, 37,934 participants completed the test, (29.8%).

There were 124,677 participants whose nationality was the United States (98%). There were 2,562 participants whose nationality was China (2%).

3.3. Implicit Asian Bias

In this study, the one-sample t-test was conducted to determine whether the mean D score of the subjects was different from zero (no bias). The results showed that the subject’s mean D score was .22 (SD = .49), and the difference from the overall population mean D score was 0.22 (95% CI = [0.21, 0.23]). The one-sample t-test results showed that t (127,238) = 156.74, p = .000, indicating that participants regard European-Americans as more American than Asian Americans.

D scores were computed separately for Asian and non-Asian participants. The independent sample t-test found that the differences between mean D scores were significant, t(59,867.976) = -96.58, p = .000. These results indicated that Asians (D = .002) showed lower Asian bias than non-Asians (D = .30), suggesting that non-Asians regard European-Americans as more American than Asian-American to a larger extent than Asians.

Additionally, D scores were computed separately for the “blue” state and “red” state stimuli. The independent sample t-test found that the differences between mean D scores were significant, t (68,722.192) = -28.77, p = .000. These results indicated that the “blue” state (D = .19) showed lower Asian bias than the “red” state (D = .28), suggesting that the people from “red” state regard European-Americans as more American than Asian-American to a larger extent than Asians.

To identify the predictors of implicit Asian bias, multiple regression was conducted with D scores entered as the dependent variable, age, race, education, state, year, and citizenship entered as the independent variable. Collinearity statistics of all predictor variables across all models were within acceptable limits (Variance Inflation Factors < 10; std. residual min = -4.49, std. residual max = 3.56). The data also met the assumption of independent errors.

Table 1 provided a summary of results from the multiple regression analysis in the D score. The regression model was statistically significant, ΔR^2 =.06, F (6, 127,232) = 1,230.81, p = .000. The independent variables explained 6% of the changes in the D score. The effects of the six independent

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variables included in the model on the D score were all statistically significant. All the variables accounted for the significant proportion of variance.

Table 1: Summary of Multiple Regression Analysis for Variables D Scores in Implicit Asian Bias.

Variables	β	t	p	Part r
Age	.17	56.73	.000	.16
Race	.13	45.53	.000	.12
Education	-.06	-18.97	.000	-.05
State	.07	25.36	.000	.07
Year	-.02	-7.40	.000	-.02
Citizenship	-.05	-17.82	.000	-.05

Age significantly positively predicted D score, β = .17, part r = .16, p = .000, specifically higher age was associated with higher levels of implicit Asian bias. Race significantly positively predicted D score, β = .13, part r = .12, p = .000. Whites and others were associated with higher levels of implicit Asian bias than Asians. Education significantly negatively predicted D score, β = -.06, part r = -.05, p = .000, and higher educational attainment was associated with lower levels of implicit Asian bias. State significantly positively predicted D score, β = .07, part r = .07, p = .000, red states were more associated with higher levels of implicit Asian bias than blue states. Year significantly negatively predicted D score, β = -.02, part r = -.02, p = .000, implicit Asian bias against Asian Americans decreased over time. Citizenship significantly negatively predicted D score, β = -.05, part r = -.05, p = .000. Americans had higher levels of implicit Asian bias than Chinese.

3.4. Explicit Asian Bias

The one-sample t-test was conducted to determine whether the mean explicit Asian bias of the subjects was different from four ("I consider Americans of European and Asian descent to be equally American"). The results showed that the subject's mean explicit Asian bias was 4.34 (SD = .83), and the difference from the overall population mean D score was 0.34 (95% CI = [0.34, 0.34]). The one-sample t-test results showed that t (125,011) = 145.10, p = .000, indicating that participants expressed an explicit attitude that European Americans were more American than American.

To identify the predictors of explicit Asian bias, multiple regression was conducted with explicit Asian bias entered as the dependent variable. Collinearity statistics of all predictor variables across all models were within acceptable limits (Variance Inflation Factors < 10; std. residual min = -4.74, std. residual max = 3.75). The data also met the assumption of independent errors.

Table 2: Summary of Multiple Regression Analysis in Explicit Asian Bias.

Variables	β	t	p	Part r
Age	-.06	-20.65	.000	-.06
Race	-.11	-36.95	.000	-.10
Education	-.01	-3.58	.000	-.01
State	-.01	-4.19	.000	-.01
Year	-.06	-19.41	.000	-.05
Citizenship	.04	15.68	.000	.04

Table 2 provides a summary of results from the multiple regression analysis in explicit Asian bias. The regression model was statistically significant, ΔR2 = .03, F (6, 125,005) = 555.63, p = .000. The

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independent variables could explain 3% of the changes in D score. The effects of the six independent variables included in the model on the explicit Asian bias were all statistically significant. All the variables accounted for the significant proportion of variance.

Age significantly negatively predicted explicit Asian bias, β = -.06, part r = -.06, p = .000. Specifically, higher age was associated with lower levels of explicit Asian bias. Race significantly negatively predicted explicit Asian bias, β = -.11, part r = -.10, p = .000, whites and others were associated with lower levels of explicit Asian bias than Asians. Education significantly negatively predicted explicit Asian bias, β = -.01, part r = -.01, p = .000, and higher educational attainment was associated with lower levels of explicit Asian bias. State significantly negatively predicted explicit Asian bias, β = -.01, part r = -.01, p = .000, red states were more associated with lower levels of explicit Asian bias than blue states. Year significantly negatively predicted explicit Asian bias, β = -.06, part r = -.05, p = .000, explicit Asian bias against Asian Americans decreased over time. Citizenship significantly positively predicted explicit Asian bias, β = .04, part r = .04, p = .000. Chinese had higher levels of explicit Asian bias than Americans.

In order to study the change of implicit and explicit Asian bias from 2018 to 2021, we conducted linear regression calculation on the D score and explicit Asian bias in months and drew a broken line chart of the time change of the average values of the D score and explicit Asian bias. Collinearity statistics of predictor variables month across all models were within acceptable limits (Variance Inflation Factors < 10; in implicit Asian bias, std. residual min = -4.10, std. residual max = 3.342; in explicit Asian bias, std. residual min = -4.19, std. residual max = 3.33). The data also met the assumption of independent errors.

Table 3 provided a summary of results from the regression analysis in D score and explicit Asian bias. The regression model about the D score was statistically significant, F (1, 127,237) = 24.69, p = .000. The independent variables could explain 1% of the changes in the D score. The effects of the independent variable included in the model on the D score were statistically significant. The variable accounted for the significant proportion of variance. Month significantly positively predicts the D score, β = .01, part r = .01, p = .000, which showed that the D score was gradually increasing over time. This regression model about explicit Asian bias was statistically significant, F (1, 125,010) = 626.15, p = .000. The independent variables could explain 7% of the changes in explicit Asian bias. The effects of the independent variable included in the model on the explicit Asian bias were statistically significant. The variable accounted for the significant proportion of variance. Month significantly positively predicts explicit Asian bias, β = -.07, part r = -.07, p = .000, which showed that the explicit Asian bias gradually decreased over time.

Table 3: Summary of Regression Analysis in D score and Explicit Asian Bias by Month.

Variables	β	t	p	Part r
Time (D score)	.01	4.97	.000	.01
Time (Explicit Asian Bias)	-.07	-25.02	.000	-.07

Figure 1 showed how the mean of the D score changed between 2018 and 2021. The graph showed that implicit Asian bias was significant from 2018 to 2021. The D score dropped significantly from January to May 2020, and it had almost continued to increase since then.

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As shown in figure 2, explicit Asian bias was significant from 2018 to 2021, the trend of explicit Asian bias was flat but decreasing.

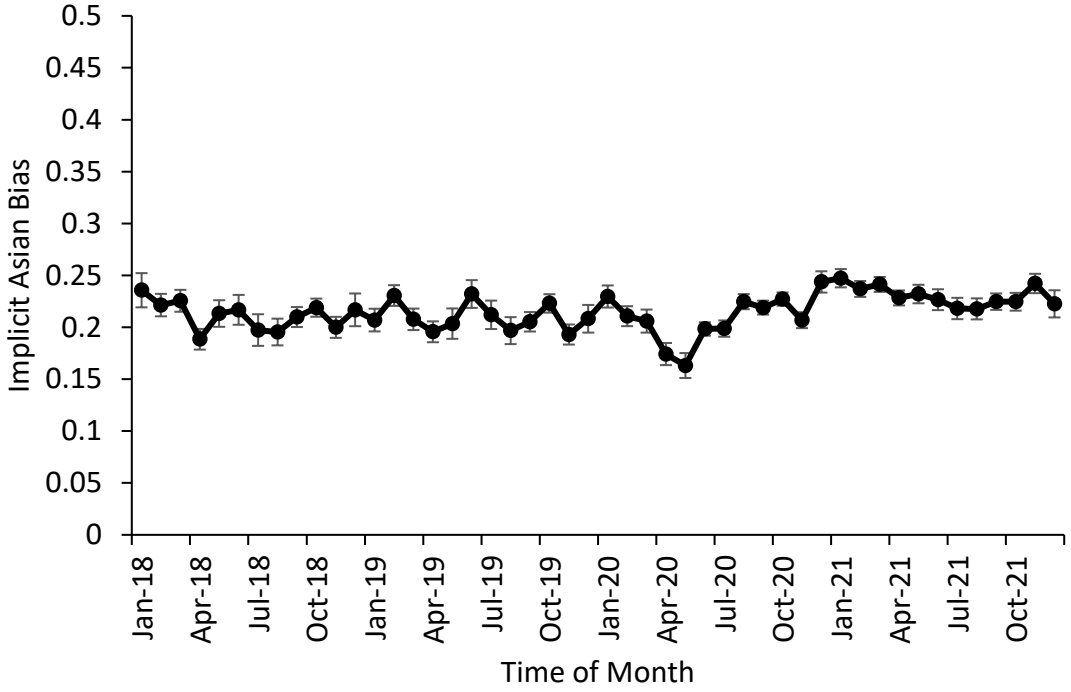


Figure 1: Changes in the Mean of the D Score and the Standard Error of the Mean from 2018 to 2021.

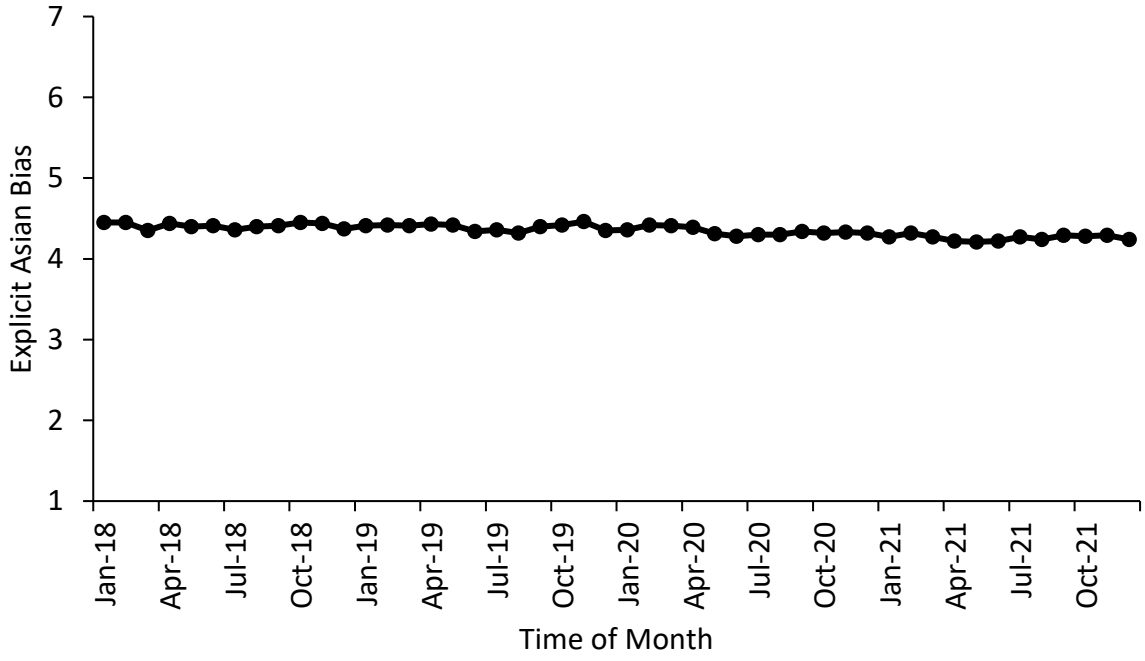


Figure 2: Changes in the Mean of Explicit Asian Bias. Error bars represent standard errors.

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4. Discussion

After the COVID-19 pandemic, prejudice and discrimination against Asian Americans have increased. In this article, we attempted to explain whether participants would demonstrate implicit and explicit Asian bias from 2018 to 2021, and the factors that affected their implicit and explicit Asian bias, how the implicit and explicit Asian bias changed from 2018 to 2021. We used the Project Implicit "Asian American IAT" to measure how easily participants associate Asian-American and European-American faces with America or American symbols, and the results of the test were used as the basis of judging whether participants have explicit Asian bias, and the self-reported results ("belief") were used as the basis of whether they have implicit Asian bias.

The results of this study showed that participants had implicit and explicit Asian bias from 2018 to 2021. Six factors of age, race, education, state, year, and citizenship had significant effects on implicit Asian bias. Among them, higher implicit Asian bias levels were associated with higher age, non-Asian, lower education, and red state. Americans had higher levels of implicit Asian bias than Chinese. The explicit and implicit Asian bias gradually decreased over years. But they appear to be different in months. The implicit Asian bias gradually increases over the months, with some fluctuations and reaching its lowest point in May 2020. The explicit Asian bias decreases over the months, but the overall trend is flat. Chinese had higher levels of explicit Asian bias than Americans. Red states, non-Asians, higher education, and higher age were associated with lower explicit Asian bias. The findings were consistent with all hypotheses.

We made some guesses about how the six factors affect explicit and implicit attitudes toward people. The answer to why older adults were associated with higher implicit Asian bias could be found in a 2009 study by Stewar [14]: older adults had less control or losses in control of their automatic prejudicial associations, and hence they showed greater higher racial prejudice than younger adults. Our results showed that explicit Asian bias decreased with age, which was consistent with Baron and Banaji's findings on children's racial attitudes [20]. Olsson et al [21]. found that between whites and blacks in the United States, non-race-specific individuals were more likely to associate with aversive stimuli than their own-race counterparts, and this fear may be reduced by close, positive interracial contact. Therefore, we speculate that as age increases, the communication between in-group members and out-group members increases, and they gradually reduce the negative effects on out-group members. Eventually, they will change their prejudice against outside group members.

People in red and blue states of the US show different degrees of prejudice against Asians, which may be related to the policy preferences and political inclinations of different state governments towards Asians and immigrants. Research showed that anti-Asian attitudes were associated with concerns about COVID-19, xenophobic behavior, and policy preferences [22]. When federal and state laws criminalize illegal immigration, which exacerbates local perceptions of threat and conflict, as a result of these behaviors, the difference between in-groups and out-groups is more clearly apparent, and ultimately forms prejudices [23].

Many studies have proposed explanations for the negative impact of educational attainment on prejudice. Jenssen and Engesbak proposed and proved that people with a high level of education have more opportunities to obtain jobs with high social status [24], and they can avoid employment competition with immigrants to a certain extent. Some studies found that differences in cognitive ability could be used to explain the differences in participants' prejudice [25]. Research showed that commitments to democratic norms of equality are associated with formal education, and it could be assumed that they influenced people's exclusion of out-groups [26]. Carvacho [27] found that income and education level have negative effects on prejudice, and their influence on prejudice is adjusted by social dominance orientation and right-wing authoritarianism. Carvacho's research concluded that

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people with higher social class status have a lower level of social dominance orientation. That is, they are less inclined toward the hierarchy of the social system, which indirectly affects people's degree of prejudice.

There are some limitations in this study, which could lead to further studies and recommendations for future directions. First, this study used data from the Project Implicit "Asian American IAT", which was self-selected by participants and based on Social Desirability theory. Participants may make choices that are more in line with social expectations or political correctness, which may be particularly evident when testing explicit attitudes. Second, the test cannot measure the attitudes of the participants after the test is completed, and follow-up research can explore the longitudinal trends and factors of the participants' attitudes change. Future studies might focus more on the social, health, and economic impact of stigma and prejudice on Asian Americans, and how to use the IAT as a tool to change the prejudice dilemma of minorities.

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