

# Effects of Acculturation of Eating Disorder Prevalence Across Generations of Asian American Immigrants

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## Research Article

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# Abstract

The growing prevalence of eating disorders in the United States is expected to stay on the rise and is attributed to the various changes in lifestyle and diet in the past two decades. This research paper analyzed the extent that acculturation, the absorption of one dominant culture over another, impacts the rate of eating disorders in the United States and whether the variable is significant. This study investigates various ethnic and cultural variables that can influence immigrants' and children of immigrants' susceptibility to eating disorders. Specifically, the study analyzes the extended exposure to American cultural standards of physical attractiveness, generally differing from their own. The data will be collected by conducting surveys amongst a randomly sampled first/second-generation Asian-American population in the United States. The study participants will be screened using the Eating Disorder Examination Questionnaire (EDE-Q) in addition to an Acculturation Index, specifically the General Ethnicity Questionnaire (GEQ). Researchers expect to observe a positive correlation between the extent of acculturation and the prevalence of eating disorders amongst the sample population, in this case, being first and second-generation Asian Americans residing in the United States. Results disproved this hypothesis, analyzing 131 responses from around the United States, acculturation had no significant correlation to eating disorder prevalence in the study group. Significant trends were found between levels of acculturation in each generation, second generation Asian Americans being significantly more acculturated. Second generation immigrants were however had lower global EDE-Q scores compared to their first generation counterparts.

# Summary

Acculturation, the assimilation of individuals into a dominant culture, has been identified as an indicator of eating disorders (ED) within many immigrant groups in America. Because east Asians are statistically the most at risk for eating disorder development internationally, this study aims to analyze the extent to which acculturation impacts eating disorder frequency within first and second generation Asian Americans, as to observe whether acculturation increases their ED prevalence the same way studies reveal it does to other immigrant groups. National administration of two surveys – the Stephenson Multicultural Acculturation Scale (SMAS) and Eating Disorder Examination Questionnaire (EDE-Q) – to a random population of Asian Americans was used in the study to expose correlations between identification with American culture and frequency of eating disorder behavior. Results indicate a statistically significant correlation between generation (first vs. second generation immigrant) and extent of acculturation, but a statistically insignificant correlation between acculturation and eating disorder prevalence within the sampled population. These conclusions imply that acculturation is not a valid indicator of eating disorders in Asian Americans as it is in other demographics, begging for further study of other variables that may better predict ED prevalence within the Asian American population.

# Background

The United States, infamous for its “melting pot” phenomenon due to its diverse population of immigrants, appropriately experiences a massive amount of acculturation within its millions of inhabitants (Lara et al., 2005). Acculturation, defined as “those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent change in the original culture patterns of either or both groups” (Sam et al., 2010), is a common process encountered by inhabitants of a certain area combined with experiences of inheritance as well as development through intergenerational processes (Berry & Sabatier, 2010). This intercultural contact between cultural groups is one of the primary sources for understanding the distinction, display, and development of human behavior, including the likelihood of acquiring culture-influenced illnesses, such as eating disorders.

Eating disorders, on the other hand, often stem from body dissatisfaction which is derived from social pressures of slenderness and/or unrealistic body expectations (Reel, 2013). The EDE-Q (Eating Disorder Examination Questionnaire) establishes 4 main scores that reflect causes of eating disorders, namely: restraint, eating concern, weight concern, and shape concern. These categories are believed to be the main underlying factors of problematic eating behaviors and attitudes which can be induced by cultural influences. The test also allows for a global score, and an overall gauge of an individual's eating behaviors, to be calculated.

It has been widely established that culture influences the onset of eating disorders (Gordon, 2000), but the extent to which it does and the precise ratios at which it affects those of different racial backgrounds remains a question for many. Prior studies performed on Mexican Americans demonstrated a significant positive correlation between the extent of their identification with American culture (as opposed to their native Mexican culture) and their prevalence of eating disorder tendencies (Cachelin et. al. 2006). Following this research, our study aims to observe a similar trend, as existing data concerning the same phenomena as targeting Asian Americans are often lacking in representation of the entire Asian American population, a problematic discrepancy considering the extensive degrees to which Asian demographics are traditionally impacted by eating disorders – increasing rates of eating disorders have the highest prevalence in the East Asian nations of Japan, Hong Kong, Singapore, Taiwan, and South Korea (Kathleen, 2015). These non-Western cultures share a strict expectation of upholding societal standards, holding beauty ideals concerning thinness and body structure is considerably high regard (Kashmar et al., 2019). Though previous literature has surveyed the condition of the variables at hand and formulated findings including the idea that “leading sociocultural predictors, namely, pressure for thinness and thin-ideal internalization, are predictive of disordered eating in Asian American females” (Akoury, 2019), rates of eating disorders in Asian American males are often underreported in most studies (Akoury et al., 2019), an effect likely grounded in stigma currently surrounding men concerning eating disorders – there is a speculative assumption that only women have eating disorders, as men tend to minimize or deny the symptoms of their illness as a result of various societal pressures and inclinations (Strother et al. 2012). Hence, this study will incorporate data on rates of eating disorders in both males and females to better represent the Asian American population as a whole when examining the prevalence of eating disorders amongst them when acculturation is taken into account. Before data collection, researchers hypothesize

a positive correlation between the extent of Asian-American acculturation and the prevalence of eating disorders due to a likely subsequent increase in the urge to change to conform with local standards of physical attractiveness in American society. Not much is known about the extent of the relationship between acculturation and eating disorders, and the sphere of influence each has on the other. Thus, the aim is to explore if acculturation is associated with disordered eating behaviors. This is important as it may lead to discoveries about how the stress of being a minority in America plagues individuals in historically unnoticed ways.

### *Specific Aims*

In studying acculturation and the prevalence of eating disorders amongst first and second-generation Asian Americans in the United States, our study will investigate ethnic and cultural variables that possibly influence immigrants' and children of immigrants' susceptibility to eating disorders after prolonged exposure to American cultural standards of physical attractiveness generally different from their own. The specific purpose of this research is to establish a correlation between the extent of participants' identity with American culture versus their native Asian culture and participants' susceptibility towards eating disorders as defined according to psychologically accredited EDE-Q guidelines. These variables were measured amongst a randomly sampled population of Asian Americans residing in the United States through a survey method.

## **Materials & Methods**

To collect the data, surveys will be conducted amongst a randomly sampled population containing both first and second-generation Asian-Americans in the United States. Researchers will administer the psychologically accredited Eating Disorder Examination Questionnaire (EDE-Q), which consists of multiple-choice questions to gauge whether the person taking the survey has an eating disorder. The EDE-Q operationally measures the variables for eating disorders within our study on a numerical scoring basis rather than on a qualitative scale. This part of the survey will make up the bulk of the survey as it will take about 4 minutes to complete and enter the results given. The second half of the survey will concern demographic information as well as to measure the extent of Asian-American acculturation of the participants. There will be questions asking from which specific country the participant has roots to filter our data even more by geographical region. The General Ethnicity Questionnaire (GEQ) will be administered to understand the extent of acculturation. The GEQ will ask concretely answerable questions such as "Do you identify as a first or second-generation Asian American?" will be administered as multiple-choice options, whereas their agreement with traditionally American beliefs and their identity with American culture versus their own ethnic culture will be presented as a scale of options indicating the strength of their response. The entire test will approximately take the participant 8-10 minutes.

We plan to send out our survey on public platforms like Reddit, LinkedIn, and Facebook, as well as asking the Harvard T.H Chan School of Public Health to send our survey throughout their network. Our search will be within more specified groups, such as subreddit specifically for Asian Americans or groups for those

who identify with having eating disorders. Additionally, other organizations that are made up of either 1st or 2nd generation Asian-Americans will be contacted in hopes of being able to reach more of the specific population group. The pool of participants will be through random selection and through posts in non-biased environments. Google Forms will be used to collect and organize data, which will then be analyzed through JASP and RStudio.

The study will begin with a simple outreach phase, reaching out to cooperating organizations such as DREAM EQUAL, National Council of Asian Pacific Americans, Stimulus, Asian American Psychological Association et cetera concerning our study group, first and second-generation Asian-Americans. After distributing surveys, information will initially be collected through Google Forms and Google Sheets. The data will then be transferred to an Excel file to be used in RStudio and JASP. JASP will be used for smaller tests, quickly understand relationships, and conduct simpler ANOVA and T-Tests while RStudio will be used to clean, filter, and get specific data.

To extract the required information and obtain a thorough understanding of what the survey results entail, researchers plan to perform several statistical tests to demonstrate the reliability of our data and potentially support our hypothesis. Such tests include an ANOVA test to observe the overall trend and statistical significance of the difference between the various variable groups. Following that, multiple T-Tests will be carried out to investigate the relationships surrounding them.

The study will follow all ethical procedures. The idea of discussing eating disorders can be sensitive, as such the survey will ask for extremely limited personal identification and information, including heritage and geographical location (state specificity). Our proposal and survey method were reviewed and approved by the federal Institutional Review Board (IRB) bwason OHRP and/or FDA ethical guidelines for research studies under Section 7 of Expedited Review.

## **Results & Discussion**

### *Data Analysis*

To examine the impacts of acculturation on the development of eating disorders within the first and second-generation Asian-American population through analysis of acquired data, both the use of inferential and descriptive statistical measures was employed. Upon obtaining 130 survey responses over the course of 10 days, researchers assigned numerical values to each of four subscales of responses to the EDE-Q as well as formulated a global score for the test as per guidelines released by the Centre for Integrative Health (Centre for Integrative Health, 2019). Simultaneously, survey responses concerning the SMAS were scored through the addition of the values of participants' responses. T- and ANOVA tests were run using those scores to produce the results as described below.

### *Implications*

Independent sample t-tests utilizing the SMAS (acculturation) score as a dependent variable of participants' generation demonstrate a strong positive correlation between generation and SMAS score (Figure 1). With a p-value of .030, these results are eligible to be deemed significant, indicating that participants' generation identity can serve as a viable measure of their extent of acculturation as defined by the SMAS. Taking this into consideration, researchers can employ generation as a grouping variable representing acculturation for further data visualization testing.

The expected outcome for this study satisfies the hypothesis that there is a significant trend among generations when measuring the level and rate of acculturation in the United States. The p-value was .030, which indicated a significant correlation of acculturation among generations. However, the prevalence of eating disorders was not as statistically significant as expected when it was measured within each generation – t-test and regressions run using the values for those respective variables produced a p-value of .159, which exceeded the .05 significance threshold. Thus, the conclusion that acculturation does not have as significant of an impact on eating disorder prevalence as originally thought to be, contradicting researchers' hypothesis predicting a positive correlation between the extent of acculturation – as defined by both participants' generation and SMAS score – and prevalence of eating disorders, as measured in accordance with EDE-Q score.

Nonetheless, the production of descriptive visuals, including that of a box and a bar graph (Figure 2) detailing the correlation between generation and EDE-Q score, demonstrates a consistent negative correlation between generation and each of the 4 subscales of the EDE-Q, suggesting an underlying relationship between the two despite values despite formal T- and ANOVA tests deeming those values insignificant. This implies the prospect for the need for further study in the topic to investigate whether or not the significance of such a relationship fluctuates when different parameters – such as the usage of larger sample size or consideration of a third or fourth generation – are taken into account.

Although the relationships observed in surveyed data are statistically insignificant, they nonetheless produce a trend consistent with that described in previous studies concerning populations of different racial backgrounds, including that which took into account the extent to which acculturation impacted Mexican Americans' tendencies towards eating disorder-associated behaviors (Cachelin et. al. 2006). Those studies, as our plots vaguely suggest, demonstrate a positive relationship between values of acculturation and eating disorder risk, enforcing the hypothesis that assimilation into American culture tends to produce detrimental effects when concerning acculturated populations' likelihood of acquiring eating disorders. Our data contrasts those claims as applied to an Asian American population, as the plots generally display a lessened EDE-Q value as in correspondence with participants' generation (which has proved in Fig. 1 to be a reliable measure of acculturation). The difference between Asian Americans' results in this study as compared to that of Mexican Americans in Cachelin et. al.'s previous work introduces the predicament that consideration of native cultures' tendencies towards unhealthy eating habits and body image influences the nature of which assimilation into American culture affects later generations' tendencies towards those same habits. Because those identifying with Asian, particularly East Asian, cultures such as those in Japan, Hong Kong, Singapore, Taiwan, and South Korea tend to

globally be among the most at risk for eating disorder contraction (Kathleen 2015), integration into American society reduces their risk relative to their native cultures. On the contrary, demographics who originate from cultures without a significant susceptibility to eating disorders tend to demonstrate a higher risk for eating disorders after acculturation, as evidenced in Cachelin et. al. 2006.

To further investigate other demographic variables that might have affected the outcome of statistical tests, researchers divided participants in accordance with their ethnicity, a variable acquired from demographic questions in the survey. The two largest populations, Indian (43.9%) and Chinese (33.3%) Americans, demonstrated a fluctuation in their results.

As exhibited in nearly all 4 of the EDE-Q subscale results of the two respective populations, Indian American participants tended to produce a slightly more statistically significant (in congruence with p-value) correlation between EDE-Q score as affected by the extent of their acculturation into American culture as compared to the Chinese population. This suggests that ethnicity may have played a role in scattering the spread of data and thus contributed to the lack of overall statistical significance in initially run general t-tests. Such phenomena imply the need for future studies investigating ethnicity-specific groups in relation to the topic at hand to explore the different nuances between Asian American populations, which should not be regarded as a single monolith.

## **Conclusion**

### *Limitations*

This study exists with limitations, as all studies do, including those beyond what was previously mentioned. The researchers recognize the many additional confounding variables that may have affected the results obtained by this research, including, but not limited to, an inability to verify participants' identities, relatively low response rates (rendering this a pilot study), and simple interpretation errors and response inaccuracies stemming from the repetitive nature of some of the posed questions and simple human differences, respectively. Additionally, survey responses proved a tendency to decrease towards the end of the survey, suggesting possible loss of participant interest as a result of the survey's length. These variables may very well have contributed to the considerably high p-values observed in the relationships of our variables, resulting in researchers' inability to conclude a confirmation or contradicting claim to the initial hypothesis. To prevent these limitations from interfering with similar studies in the future, researchers suggest employing an extended open window for participants to complete the survey, with the intention of expanding the number of participants and thus generalizability of results.

## **Declarations**

### *Ethics approval and consent to participate*

This study has been approved by the International Socioeconomics Laboratory Institutional Review Board. All participants provided consent prior to filling out administered surveys.

#### *Consent for publication*

The results/data/figures in this manuscript have not been published elsewhere, nor are they under consideration (from any contributing authors) by another publisher. All of the material is owned by the authors and no permissions are required. All authors give consent for the publication of identifiable details, which includes figures and details within the text to be published in the above Journal and Article.

#### *Availability of supporting data*

The authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials. The raw data that support the findings of this study are available on request from the corresponding author, S.P.

#### *Competing interests*

The authors of this study declare that the authors have no competing interests as defined by BMC, or other interests that might be perceived to influence the results and/or discussion reported in this paper.

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#### *Authors' contributions*

T.D. wrote the abstract of the paper. V.D. and B.C. wrote on the introduction of the paper. K.L. and G.G. refined the introduction and wrote the discussion and results. B.C. and E.T. edited the overall paper. V.D. wrote the materials and methods which T.D. revised. T.D., C.T., K.L., and B.C. analyzed the data, where T.D. created all figures while B.C. wrote the figure descriptions. J.O. and K.X. wrote the conclusion while B.C. and V.D. wrote the limitations. The survey was designed by E.T., V.D., and T.D. which was then edited by K.L. and B.C. before being distributed. Contacts were found by E.T. and G.G. who then distributed the survey. S.P. and D.D. worked as principal investigators for the paper who contributed significantly in helping with data analysis, refining the paper, and formatting, earning them authorship. All authors reviewed the manuscript.

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## Figures

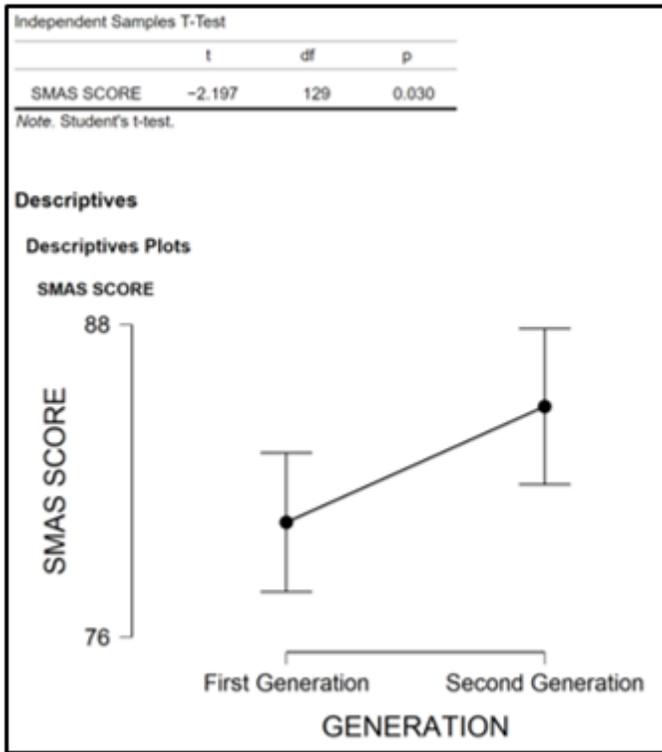
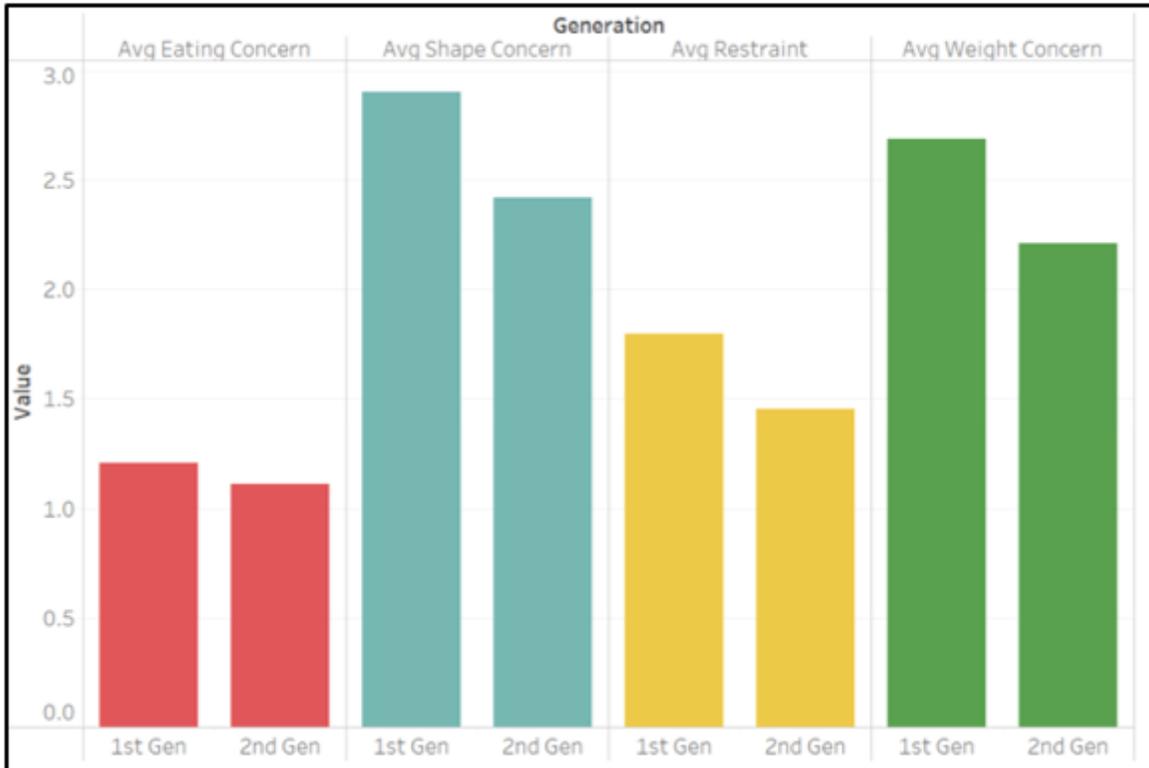


Figure 1

This figure represents a T-test conducted with the independent variables of generation and SMAS test scores. The p-value can be found above the figure, which is referenced below, and the figure itself represents the data from the table in a graph, which also compares the SMAS score within the first and second generations.



**Figure 2**

Bar Graph (Generation vs. EDE-Q Subscale Score). The graph details a significant trend of all four average EDE-Q subscores being larger in 1st generation immigrants, which goes against our hypothesized correlation of first-generation immigrants being less acculturated relative to their second-generation sub-ethnic counterparts and therefore have lower eating disorder scores.

**Correlation between Eating Disorder Subcategories in Indian Study Group - Conditioned on Acculturation Levels ▼**

Pearson's Partial Correlations		EDEQ GLOBAL SCORE	EDEQ 1 - RESTRAINT	EDEQ 2 - EATING CONCERN	EDEQ 3 - SHAPE CONCERN	EDEQ 4 - WEIGHT CONCERN
1. EDEQ GLOBAL SCORE	Pearson's r	—				
	p-value	—				
2. EDEQ 1 - RESTRAINT	Pearson's r	0.473	—			
	p-value	< .001	—			
3. EDEQ 2 - EATING CONCERN	Pearson's r	0.772	0.310	—		
	p-value	< .001	0.021	—		
4. EDEQ 3 - SHAPE CONCERN	Pearson's r	0.528	0.410	0.391	—	
	p-value	< .001	0.002	0.003	—	
5. EDEQ 4 - WEIGHT CONCERN	Pearson's r	0.673	0.513	0.513	0.774	—
	p-value	< .001	< .001	< .001	< .001	—

Conditioned on variables: SMAS SCORE AVG

**Figure 3**

The figure above represent, the Indian and Chinese sub ethnic groups' correlational data between the EDE-Q eating disorder test, and the extent of the effect of acculturation. Both groups represented a statistically significant correlation between the variables tested.

**Correlation between Eating Disorder Subcategories in Chinese Study Group - Conditioned on Acculturation Levels**

Pearson's Partial Correlations

Variable		EDEQ 1 - RESTRAINT	EDEQ 2 - EATING CONCERN	EDEQ 3 - SHAPE CONCERN	EDEQ 4 - WEIGHT CONCERN	EDEQ GLOBAL SCORE
1. EDEQ 1 - RESTRAINT	Pearson's r	—				
	p-value	—				
2. EDEQ 2 - EATING CONCERN	Pearson's r	0.371	—			
	p-value	0.018	—			
3. EDEQ 3 - SHAPE CONCERN	Pearson's r	0.372	0.265	—		
	p-value	0.018	0.099	—		
4. EDEQ 4 - WEIGHT CONCERN	Pearson's r	0.418	0.308	0.814	—	
	p-value	0.007	0.053	< .001	—	
5. EDEQ GLOBAL SCORE	Pearson's r	0.705	0.466	0.620	0.654	—
	p-value	< .001	0.002	< .001	< .001	—

Conditioned on variables: SMAS SCORE AVG

**Figure 4**

The figure above represent, the Indian and Chinese sub ethnic groups' correlational data between the EDE-Q eating disorder test, and the extent of the effect of acculturation. Both groups represented a statistically significant correlation between the variables tested.