# Eugenics, genetics, and mental illness stigma in Chinese Americans

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## Abstract

**Background**—The increasing interest in the genetic causes of mental disorders may exacerbate existing stigma if negative beliefs about a genetic illness are generally accepted. China's history of policy-level eugenics and genetic discrimination in the workplace suggests that Chinese communities will view genetic mental illness less favorably than mental illness with non-genetic causes. The aim of this study is to identify differences between Chinese Americans and European Americans in eugenic beliefs and stigma toward people with genetic mental illness.

**Methods**—We utilized data from a 2003 national telephone survey designed to measure how public perceptions of mental illness differ if the illness is described as genetic. The Chinese American ($n = 42$) and European American ($n = 428$) subsamples were analyzed to compare their support of eugenic belief items and measures of stigma.

**Results**—Chinese Americans endorsed all four eugenic statements more strongly than European Americans. Ethnicity significantly moderated the relationship between genetic attribution and three out of five stigma outcomes; however, genetic attribution actually appeared to be de-stigmatizing for Chinese Americans while it increased stigma or made no difference for European Americans.

**Conclusions**—Our findings show that while Chinese Americans hold more eugenic beliefs than European Americans, these attributions do not have the same effect on stigma as they do in Western cultures. These results suggest that future anti-stigma efforts must focus on eugenic attitudes as well as cultural beliefs for Chinese Americans, and that the effects of genetic attributions for mental illness should be examined relative to other social, moral, and religious attributions common in Chinese culture.

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**Keywords**

Stigma; Eugenics; Chinese American; Mental illness; Genetics

## Introduction

### Stigma in Chinese communities

Recent research demonstrates that mental illness stigma is an important issue in Chinese communities not only in mainland China [1], but also in Hong Kong [2], Singapore [3, 4], Malaysia [5], and the UK[6]. Stigma appears to exert similar negative influences in these communities as it does in the Western world, causing public fear and perceptions of dangerousness towards those with mental illness [7], as well as shame and fear of rejection [2] for patients and their families. Actual social rejection and discrimination often ensue, as in American and European groups [1, 2, 8].

However, some aspects of Chinese culture, history, and philosophy may contribute to differences in stigma processes, such as the social and moral consequences of mental illness. In general, stigma in Chinese societies must be understood within the context of the centrality of family structure and the individual's place in an ancestral legacy [9]. One's family responsibilities and societal roles are highly valued and thus seriously threatened by mental illness [10]. Shared beliefs about the origin of the illness find fault not just in the individual, but also in the individual's family, causing severe shame and isolation for everyone involved [11, 12]. As a result, mental illness becomes a highly guarded secret in order to protect both the individual's and the family's standing in society, or in more appropriate terms, to "save face". This concept of "face" symbolically represents one's social prestige where loss of standing results in "loss of face" [10] and is thought to be an important mediating process for stigma in Chinese societies.

These beliefs comprise what Haslem [13] describes as culturally determined explanations for mental illness that are important in understanding the associated stigma in different communities. Hector Tsang and Patrick Corrigan pioneered the critical analysis of mental illness "lay theories" in Chinese groups [14] and found that their origin is often religious, mystical, and spiritual, and that generally, mental illness is considered a moral failing on the part of the individual and his/her family [15]. In support of their assertions, research to date suggests that the defining feature of mental illness stigma in Chinese groups is the endorsement of social, moral, and religious explanations for mental illness rather than biological ones [16–21]. Because many of these social explanations imply severe moral contamination, such individuals are threatened with loss of moral standing (or 'face') and encounter both subtle and outright forms of exclusion from local social life [21]. These spontaneous social attributions and an accompanying loss of 'personhood' pose great threats to 'what matters most' in Chinese societies—the perpetuation of one's ancestral lineage and the accrual of social resources to bring honor to this ancestral line. Ultimately, attributing mental illness to social instead of biological causes may imply serious moral contamination, which underlies stigmatizing attitudes [22].

### Genetic mental illness stigma

While many of the attitudes and behaviors described above may be deeply rooted in traditional beliefs, cultural change is likely to interact with such conceptions [23]. National culture has long been shown to highly influence individual attitudes towards mental illness [24–26]. The ever-increasing interest in genetics is of particular importance because it

proposes highly publicized, plausible, but controversial explanations for the etiology of psychiatric disease that could challenge the current stigma paradigm.

Although genetic explanations for illness might be de-stigmatizing by absolving the affected individual of blame or responsibility [27, 28], one anticipated risk of the genetic revolution and its impact on mental illness stigma can be captured in the theory of genetic essentialism, which is the popular idea that genes are largely deterministic of individual characteristics and behavior [29]. In genetic essentialism, the presence or absence of a crucial gene first reinforces cognitive separation, or the "normal versus deviant" dichotomy in the stigma labeling process [30]. The stigmatized individual is thus viewed as more fundamentally "different" due to the deviance in his/her genetic makeup. Secondly, because genes can be transmitted from parent to child, a genetically transmitted mental illness can be shared by family members. A pathogenic gene provides an additional and tangible link that not only associates family members with a stigmatized trait, but arouses suspicion that they actually possess the trait themselves. Thirdly, the view that genes are the "essence" of a human being is likely to also dictate that a genetically based mental illness is persistent and unchangeable, especially because genes are not (yet) alterable. Finally, for all of the above reasons, any genetic problem may be considered to be more serious than one with no genetic basis, thus leading to discrimination based on genetic status [31]. Genetic essentialism thus predicts that people will be less willing to interact intimately with a person with a genetic mental illness and will disapprove of him/her getting married or having children.

In support of genetic essentialism, one study utilizing nationally representative data found that people who attributed genetic factors as a cause of schizophrenia also believed that the problem was persistent and transmissible to family members [32]. In a vignette experiment where the genetic etiology of a mental disorder was randomly varied, Phelan [30] found that a genetic attribution significantly increased perceptions that a mental illness was serious and lasting, and that family members were likely to develop it. Participants in this sample also desired more social distance from the sibling of a person with a mental illness where genetic etiology was offered as an explanation.

## Genetics and mental illness in Chinese communities

Although social causes in China are often linked to beliefs of moral contamination, very little is known about how genetic attributions might influence views of mental illness among Chinese groups. One logical point of departure is to examine community attitudes toward genetics and perceptions about genetic influences on health, family choices, and daily life. Within this spectrum, eugenic attitudes may capture negative and stigmatizing perspectives about supposed "genetic" personal characteristics.

China's history of policy-level eugenics suggests that the genetic revolution will increase stigmatizing attitudes and behaviors. National eugenic beliefs have been historically used as justification for population control in China. In 1994, the Chinese government passed an internationally criticized law requiring premarital examination for hereditary illnesses, including mental disorders, that denied a license to anyone deemed 'unfit' for marriage [33]. Article 38 of the law specified 'relevant mental illnesses' as 'schizophrenia, manic-depressive psychosis and other mental diseases of a serious nature'. If the examining physician found evidence of these disorders, the couple was asked to postpone or cancel their marriage or else agree never to bear children (Articles 9 and 10). Principles of eugenics have motivated marriage restrictions in China since the 1930s, and similar laws and regulations were enacted from 1950 to 1986, often including abortion of malformed fetuses and sterilization of those with mental disorders in some provinces [34–36].

More recently, mental illness stigma has manifested in the form of genetic discrimination in the workplace when several people were either fired or refused employment by the Hong Kong civil service because they had a first-degree relative with schizophrenia, even in the absence of genetic testing and personal history of mental illness [37]. Hong Kong's "disciplined forces", responsible for law enforcement, had a policy against hiring people with a first-degree relative with mental illness until 1997 [38]. China's history of eugenic policies and incidences of genetic discrimination may indicate that the geneticization of mental illness will generate even further stigma, which, due to deep cultural and historical factors, has already been described as pervasive and severe [39].

In Chinese American groups, a definitive genetic etiology of mental illness might also act to replace the existing myriad of psychosocial attributions that imply moral contamination. However, it is currently unknown whether a genetic attribution of mental illness might act to ameliorate or exacerbate the pre-existing levels of severe stigma found among Chinese groups. Replacing pre-existing social attributions of mental illness with genetic attributions might have different effects among Chinese groups, who attach more meanings of moral contamination with social attributions when compared with European Americans [16, 19]. This study aims to investigate these important questions by determining whether Chinese Americans and European Americans differ in their eugenic beliefs and examining how eugenic beliefs change the way Chinese Americans and European Americans react to a genetic mental illness. Although the effect of replacing pre-existing social attributions with genetic attributions among different cultural groups is not yet well understood, due to China's long history of eugenic policies, we offer the following hypotheses. First, Chinese Americans have more positive attitudes toward eugenic policies than their European American counterparts. Second, due to differences in eugenic beliefs, ethnicity moderates the relationship between genetic attribution and stigma outcomes (i.e., Chinese Americans stigmatize more in response to genetic attributions compared to European Americans).

## Method

This study utilizes a 2003 US nationally representative telephone survey to evaluate how public perceptions of mental illness might change if the illness is found to have a genetic basis. Respondents were given vignettes about a person displaying symptoms of either major depressive disorder or schizophrenia. Genetic etiology was manipulated experimentally as strongly genetic, partly genetic, or not genetic. Respondents were then asked to rate items about the vignette character, whose ethnicity and gender were matched with those of the respondent.

The sample was obtained from a random-digit-dialed telephone frame, which as expected, yielded very few Chinese American respondents. Thus, ethnic surnames from a national telephone directory were used to attain a larger sample. The response rate for the supplemental sample of Chinese Americans was 24%, while the response rate for the original random-digit-dialed group was 62%. Chinese American respondents took the survey in English, Mandarin, or Cantonese, depending on their preference. The survey methodology is described in more detail in Phelan [30].

### Sample selection

The survey included two experimental manipulation checks that allowed us to select our final sample based on participants' recall of and agreement with the experimental condition in which they were assigned. At the end of the interview, respondents were asked if they recalled what the genetic expert said about the cause of the vignette subject's problems ('genetic', 'partly genetic', or 'not genetic'). If they recalled correctly, their agreement was measured with the question: "Do you accept what the expert said—that is, do you agree that

what the expert said about the cause of the problem could be correct?" In order to capture the effect of the experimental manipulation on the stigma outcomes, we restricted our study sample to include only subjects who correctly recalled the expert statement and who 'somewhat' or 'strongly' agreed with it. Out of the total 57 Chinese American respondents, 13 (22.8%) were eliminated for incorrect recall, and out of those remaining, 36 respondents (63.1%) that "somewhat" or "strongly" agreed with the expert statement remained in the final sample. European Americans had a similar rate of correct recall, but much higher agreement. Out of 589 of the original sample, 144 (24.4%) were eliminated for incorrect recall, and out of those remaining, 378 respondents (84.9%) agreed with the expert statement.

We also sought to identify initially excluded respondents who still might validly be included in the study sample. Analysis of one category of initially excluded participants—those that correctly recalled the expert statement, but 'somewhat' or 'strongly' disagreed with it—showed that they scored similarly on the study variables as included participants who were assigned the opposite genetic statement. For example, a participant who was assigned to receive the 'strongly genetic' expert statement, correctly recalled the statement, but *disagreed* with it, had similar attitudes towards the vignette subject as another participant who was assigned to receive the 'not genetic' expert statement, correctly recalled the statement, and *agreed* with it. Because the vignette experiment depends on whether or not the participant believes the experimental condition is true, and to maximize power, we re-assigned those who recalled the expert statement but disagreed with it to the opposite genetic attribution category. This added 75 more participants (69 European Americans and 6 Chinese Americans) for a final total sample of 470.

## Sample characteristics

This study presents data from Chinese American ($n = 42$) and European American ($n = 428$) subsamples. Prior to administering the vignette experiment, respondents were asked about their age, gender, education, and household income. As shown in Table 1, the Chinese American subsample is significantly younger than their European American counterparts (43.7 vs. 48.8 years old, respectively; $t(468) = 1.96$, $P = 0.05$) with a similar proportion of females (64.3 vs. 62.9%). The Chinese and European Americans also reported similar rates of post-high school education (66.7 vs. 64.0%). While roughly comparable proportions of Chinese Americans and European Americans made <$40,000 per year (40.7 and 38.1%, respectively), another 40.6% of the Chinese American sample made over $80,000 annually compared with only 23.9% of European Americans (although this latter difference is not statistically significant). The two groups greatly differ in religious makeup [$\chi^2(6, N = 463) = 146.3$, $P < 0.001$]. The majority of European Americans in this sample were Protestant (49.2%) and Catholic (20.9%) while a majority of the Chinese American respondents reported being Buddhist (31.0%) or having no religion (47.6%). Finally, both groups had similar levels of political conservatism with about a third of each group describing themselves as "somewhat" or "very liberal" (35.0% of Chinese Americans vs. 22.6% of European Americans), and slightly more participants describing them-selves as "somewhat" or "very conservative" (35.0% of Chinese Americans vs. 43.3% of European Americans). Because of these sociodemographic differences between ethnic groups, we restrict the potential effects of these variables on stigma in later regression analyses. Statistical adjustment for these covariates in our multiple regression models allows us to correct for these differences in demographic variables between Chinese Americans and European Americans. In other words, after restricting for these covariates, we will be able to determine that the differences in outcome are due to the differences in the independent variables (ethnicity and genetic attribution) rather than differences in demographic variables [40].

## Eugenic attitudes

Before the vignette experiment was performed, respondents were asked to rate their agreement with three items measuring eugenic attitudes and one item measuring the importance of genetics in mental health. The eugenic item responses employed a 4-point Likert scale ranging from "strongly disagree" to "strongly agree" while the last item provided response choices ranging from "not important at all" to "very important". The four items are listed here:

1. "If a couple has a 1-in-4 chance of having a child with a serious genetic defect, they should not give birth to any children of their own."

2. "Every person should be required to have a genetic screening test before getting married."

3. "In choosing a marriage partner, it's important to know whether there is history of mental illness in the family."

4. "How important do you think a person's genetic makeup is in influencing whether or not a person will develop a serious mental illness?"

## Vignette disorder

Each respondent received a single vignette that described a person with symptoms of either schizophrenia or major depressive disorder. The vignette disorder was randomly assigned, and is represented by the variable *schizophrenia* (1 = schizophrenia, 0 = major depressive disorder).

Certain demographic variables such as the gender and race of the vignette subject were randomly varied. Since these vignette demographic variables were randomly distributed among respondents and did not significantly correlate with any stigma outcomes ($P < 0.05$ for each), they are not discussed further. There were two versions of the vignettes that were also randomly varied, both containing the same major features needed to characterize each disorder, but one including more details about the vignette subject. Examples of the short schizophrenia and major depressive disorder vignettes used in this study are given below.

**Schizophrenia—**Imagine a person named Jung. He is a single, 25-year-old Chinese American man. Usually, Jung gets along well with his family and coworkers. He enjoys reading and going out with friends. About a year ago, Jung started thinking that people around him were spying on him and trying to hurt him. He became convinced that people could hear what he was thinking. He also heard voices when no one else was around. Sometimes he even thought people on TV were sending messages especially to him. After living this way for about 6 months, Jung was admitted to a psychiatric hospital and was told that he had an illness called "schizophrenia". He was treated in the hospital for 2 weeks and was then released. He has been out of the hospital for 6 months now and is doing well.

**Major depressive disorder—**Imagine a person named Jung. He is a single, 25-year-old Chinese American man. Usually, Jung gets along well with his family and coworkers. He enjoys reading and going out with friends. About a year ago, Jung started feeling very down and unhappy. He found it very hard to get out of bed, get dressed, go to work, or do anything. He just did not get any pleasure out of anything the way he normally would. He often did not feel like eating and he had trouble sleeping. Jung also felt completely worthless and even had thoughts about killing himself. After having these problems off and on for about 6 months, Jung was admitted to a psychiatric hospital and was told that he had an illness called "major depressive disorder". He was treated in the hospital for two weeks and was then released. He has been out of the hospital for 6 months now and is doing well.

### Independent variables

The experimental variable is the *genetic attribution* of the illness, which was randomly assigned. Following the description of the vignette subject, respondents were told that a genetics expert said the problem was either 'genetic', 'partly genetic', or 'not genetic', depending on the experiment assignment. Following Phelan [30], the categories 'genetic' and 'partly genetic' were combined into one category coded as '1' while 'not genetic' was coded as '0'.

Respondents were asked about their race and ethnicity. The Chinese American subsample is comprised of respondents that identified themselves to be Chinese or Taiwanese. The variable *Chinese American* was coded as '1' for Chinese American respondents and '0' for European Americans. We were also interested in determining whether ethnicity moderates the relationship between *genetic attribution* and stigma outcomes; that is, do Chinese Americans react differently to a genetic mental illness than European Americans? This difference is represented by the interaction term *Chinese American* × genetic attribution.

### Dependent variables

The three items that describe intimate social distance are: (1) *unwillingness to date*—"How would you feel about [vignette subject] having a date with one of your children?"; (2) *unwillingness to marry*—"How would you feel about [vignette subject] marrying one of your children?"; and (3) *unwillingness to have children*—"How would you feel about [vignette subject] having a baby with one of your children?" Respondents rated their agreement with these items on a 4-point Likert scale ranging from "definitely willing" to "definitely unwilling".

The two social restriction items are: (1) *marriage restriction*—"[vignette subject] should not get married, i.e., he/she should stay single," and (2) *reproductive restriction*—"[vignette subject] should not have any children of his/her own, i.e., he/she should remain childless." Respondents rated their agreement with these items on a 4-point Likert scale ranging from "strongly disagree" to "strongly agree".

### Covariates

Analyses controlled for sociodemographic variables: gender (1 = male, 0 = female); age; education (eighth grade or less = 1, some high school = 2, high school graduate or GED = 3, trade or technical school = 4, some college = 5, college graduate = 6, postgraduate work/ advanced degree = 7); household income (under $20,000 = 1, $20,000–$39,999 = 2, $40,000–$59,999 = 3, $60,000–$79,999 = 4, $80,000 or more = 5); political conservatism (very liberal = 1, somewhat liberal = 2, moderate = 3, somewhat conservative = 4, very conservative = 5); and religion (dummy variable coded for Catholic, Jewish, Buddhist, 'other religion', and 'no religion', using Protestant as the reference category). The two randomly assigned design variables, vignette disorder and vignette version (described above), were also controlled.

### Analysis

First, we used multiple regression analyses to determine the role of ethnicity in predicting eugenic attitudes. For each eugenic item, the effect of being Chinese American (with European American as the reference category) was assessed in two models, one where Chinese American status was the lone predictor and another that included sociodemographic variables.

Second, we tested two regression models for each of the five dependent variables to examine how ethnicity moderates the relationship between genetic attribution and the intimate social

distance and restriction items. Model 1 assesses the effects of ethnicity (being Chinese American), genetic attribution, and the interaction term for the two variables (Chinese American × genetic attribution). In order to assess the importance of eugenic attitudes in predicting stigma outcomes, these items were added to Model 2. Both models control for sociodemographic variables and vignette design variables.

The focus of our analyses was on the mean response of each group for both the independent and dependent variables. While there are large differences in sample size between the Chinese American and European American samples, these differences should not affect their mean scores.

Regression coefficients and standard errors are presented in Tables 2 through 4. Conditional mean imputation techniques were used to replace missing values for predictor variables [41].

# Results

## Ethnicity and eugenics

Our first question is whether Chinese Americans are stronger in their endorsement of eugenic policies than their European American counterparts. Table 2 reports bivariate results (Model 1) and results controlled for sociodemographic variables (Model 2) for each of four eugenic attitudes (should not have children if there is a one-in-four chance of birth defects, mandatory pre-marital genetic screening, the importance of knowing a spouse's family history of mental illness, and the importance of genetics in serious mental illness). At the bivariate level (Model 1) three of the four coefficients for ethnicity are significant at the $P < 0.05$ level and for the fourth (concerning a couple having a one-in-four chance of birth defects), the coefficient is significant at a trend level ($P < 0.08$). When controls are added, the coefficients change only slightly but sometimes change the level at which they are significant. With controls, all four coefficients for ethnicity are significant at the $P < 0.05$ level. In general, then, the results are consistent with our hypothesis that Chinese Americans are significantly more likely to endorse eugenic policies than European Americans.

## Genetics, ethnicity, and stigma

The analyses in this section serve to answer the following question: Does the effect of genetic attribution on stigma vary in Chinese Americans as compared with European Americans? Model 1 in Table 3 reports the effects of ethnicity, genetic attribution, and the interaction term combining the two on each of the five stigma outcomes (unwillingness to date, marry, or have a baby and marriage and reproductive restriction) while controlling for sociodemographic and design variables. Figures 1–5 are graphs of these interactions. The interaction terms in Table 3 show that the effect of the genetic manipulation on three out of five stigma outcomes differed by ethnicity: (1) unwillingness to date ($B = -0.97$, $t = -2.83$, $df = 14$, $P < 0.01$), (2) unwillingness to marry ($B = -0.92$, $t = 2.65$, $df = 14$, $P < 0.01$), and (3) reproductive restriction ($B = -1.05$, $t = -2.98$, $df = 14$, $P = 0.01$). However, graphs of these interactions in Figs. 1, 2, and 5 show that the direction of change in stigma was not what we anticipated. Attributing mental illness to genetic causes appears to decrease stigma in Chinese Americans and increase it among European Americans.

While the significance of the interaction term indicates that the change in stigma between genetic attribution categories for Chinese Americans and European Americans is non-homogenous, it cannot tell us whether the effect of genetic attribution on stigma is significant *within* each ethnicity. Thus, we performed a separate analysis to determine whether or not genetic attribution predicts stigma for each group alone. Such an analysis would indicate whether the two groups have truly opposite reactions to genetic attribution or if only one group has a strong reaction compared with no reaction in the other group. We

tested only genetic attribution, controlling for the same covariates used in the original analysis (results shown in Table 4). For Chinese Americans, out of the three stigma outcomes that had significant interaction terms in the previous analysis, there were two significant results and one trend finding. Genetic attribution reduced the following items: (1) unwillingness to date ($B = -0.80$, $t = -2.21$, $df = 12$, $P < 0.05$), (2) reproductive restriction ($B = -1.02$, $t = -2.32$, $df = 12$, $P < 0.05$), and (3) unwillingness to marry ($B = -0.74$, $t = -1.96$, $df = 12$, $P < 0.06$). Among the same three items for European Americans, genetic attribution significantly increased unwillingness to marry ($B = 0.22$, $t = 2.41$, $df = 12$, $P < 0.05$) and there was a trend finding in the same direction for reproductive restriction ($B = 0.15$, $t = -1.36$, $df = 12$, $P < 0.10$). There was no effect of genetic attribution on unwillingness to date for this group. In summary, when a mental illness is said to be genetic, both unwillingness to marry and reproductive restriction are reduced for Chinese Americans but increased for European Americans. Unwillingness to date is also reduced for Chinese Americans but does not change for European Americans.

## Discussion

This study compared Chinese Americans and European Americans in eugenic attitudes and opinions on the role of genetics in mental illness. We also examined how stigmatizing attitudes and behaviors differ between levels of genetic attribution of a mental illness with and without controlling for eugenic beliefs.

### Chinese American eugenic statements

In support of our first hypothesis about ethnic differences in eugenic attitudes, Chinese Americans were more likely to endorse all four eugenic statements than their European counterparts. Chinese Americans' support of reproductive restriction when there is a chance of genetic defects and premarital genetic screening is not surprising given the historical nationwide policies restricting marriage licenses to those with genetic illnesses. More specifically, Chinese Americans are more likely to think it is important to know a marriage partner's family history of mental illness. While the previous statements reflect a serious concern with the transmissibility of genetic illnesses in general, the latter statement directs that concern towards genetic mental illness specifically. This item may also capture an overall perceived detrimental effect of mental illness on family relationships and marriage since it not only implies genetic transmission, but also social transmission. As mentioned earlier, mental illness stigma not only affects the individual who has the illness, but also the individual's associates and the family members in Chinese societies. Furthermore, a trend finding suggests that Chinese Americans place more importance on genetics in the development of a serious mental illness than European Americans. Chinese Americans' support of these items suggests that genetic attribution adds another level of undesirability via genetic transmission, and that the resulting stigma manifests itself heavily regarding marriage choices.

### De-stigmatizing genetic mental illness

The analysis of the stigma outcomes to test our second hypothesis, however, reveals a different effect of a genetic attribution than we expected. While the effects of the genetic manipulation on stigma were indeed different between Chinese Americans and European Americans for three out of five measures of stigma, the direction of change was opposite to what we hypothesized. Consistent with the theory of genetic essentialism, European Americans endorsed reproductive restriction more strongly when the mental illness was genetic than when it was not genetic with a trend finding in the same direction for unwillingness to marry (Table 4). For Chinese Americans, the genetic attribution was de-

stigmatizing for unwillingness to date and reproductive restriction, with a trend finding in the same direction for unwillingness to marry.

Although the interaction terms for unwillingness to date, unwillingness to marry, and should not have children remain significant with the addition of the eugenic items, controlling for them does lessen the differences between how the two ethnic groups react to genetic mental illness. Because we observed a significant difference in eugenic beliefs for Chinese Americans versus European Americans, it makes sense that taking these beliefs into account when examining stigma outcomes makes Chinese reactions to a genetic mental illness look more similar to those of their European American counterparts. But while the increase in stigma for European Americans can be explained by the theory of genetic essentialism, we are surprised to find that Chinese Americans were less influenced by a genetic attribution—and in fact had their stigma outcomes decreased in three cases—when compared with European Americans. Nonetheless, the fact that the interaction terms remained significant in Model 2 may indicate that while the eugenic items account for some of the difference in how the two groups react to a genetic mental illness, most of that difference is driven by something other than eugenic beliefs.

## Alternative explanations

Interpreting these initially surprising interaction findings is made clearer when placed in their overall context. Stigma levels were higher for Chinese Americans than European Americans for four out of five of the outcomes studied, regardless of the genetic attribution. For the three stigma items where the ethnicity-genetic attribution term was significant, the initial stigma level was higher among Chinese Americans when compared with European Americans for a non-genetic mental illness. Even after the genetic attribution caused an (expected) rise in stigma among European Americans and an (unexpected) decrease among Chinese Americans, the stigma attitudes exhibited by these two groups appear roughly equivalent. That is, the ameliorating effects of genetic attribution among Chinese Americans do not fully dispel negative beliefs towards people with mental illness. Even at the lower level of stigmatization, Chinese Americans still stigmatize more strongly or at best, match the levels of their European American counterparts. Having a mental illness, regardless of its cause, still denies one even the most basic of human rewards in love, relationships, and family in this group.

As mentioned earlier in this text, the use of "lay theories" [14, 15], including diverse sociocultural explanations that link moral, social, and spiritual wrongdoing with mental illness, aids in our understanding of the highly stigmatizing responses to non-genetic mental illness among the Chinese participants in our sample. In the absence of biomedical knowledge, respondents select explanatory causes from a matrix of indigenous etiological conceptions that imply moral contamination [11, 42]. In fact, our experimental condition of an expert stating that mental illness is 'not genetic' implies to respondents that the cause instead must be moral or psychosocial. Prior studies have indicated that Chinese respondents predominantly attributed schizophrenia to social, interpersonal, and psychological problems [18] while another study found that Chinese respondents endorsed sociological explanatory models as opposed to biological models [19]. Further, Furnham and Wong [16] found that their Chinese sample believed that both the cause and treatment of schizophrenia was superstitious and religious in nature, with many of these attributions suggesting moral wrongdoing by the patient or family. When considering these cultural attributions and their consequences on stigma, these studies appear to clarify our results for the non-genetic condition of this experiment.

The "lay theory" approach also provides a complement to this perspective in that attributing mental illness to genetic factors incites less fear and negative feelings because they replace

spontaneous causal explanations of social, familial, or spiritual problems that imply moral contamination. Hence, being told of the genetic component of mental illness in this experiment may have improved participants' knowledge of mental illness etiology, thereby reducing stigma that would be due to culturally informed "lay theories". It is important to note, however, that although a genetic etiology might in fact reduce stigma among Chinese Americans, it only does so relative to the extremely negative sociocultural explanations that might have spontaneously existed before it. While very little is known about how genetic factors rank relative to these other causes, our results suggest that a genetic attribution is less stigmatized than an attribution to an unknown social cause.

### Study limitations

This study has certain limitations. First of all, the Chinese American sample size was small, which limited the study's statistical power to detect differences between levels of predictors. However, the imbalance between group sizes should not affect their mean scores. Further, that we still managed to find significant ethnicity-genetic attribution effects speaks to the strength of the difference of this effect among Chinese Americans and European Americans. The non-probability method of selecting much of the Chinese American sample combined with the low response rate (24%) for this sample also limits the generalizability of our findings. This study should be replicated among a larger and more representative sample of Chinese American subjects. Vignette experiments also pose certain limitations. This study used vignettes about plausible, but still hypothetical situations to measure behavioral intent, and it is possible that actual behavior as a result of real-life situations might be different. However, this study does mimic how genetic information is transmitted in society through written media. Finally, this study may lack culturally appropriate constructs that might reveal important aspects of genetic mental illness stigma that have not yet been observed. Very little is known about (1) how genetics information is publicized in China, 2) how Chinese interpret genetic causality, and 3) how that genetic causality fits into existing stigma processes. Although this study attempts to shed some light on the last issue, it cannot determine the specific thoughts and attitudes associated with genetics that lead one to behave in a stigmatizing way. Phelan [30] hypothesized that perceptions that a person with a genetic illness is "different" from others and that his/her illness is serious, persistent, and transmissible lead to stigmatizing behaviors. But Chinese groups may arrive at these outcomes via completely different pathways. Yang and colleagues [43, p. 1528] posit that the objective of future stigma research should be to capture what they call one's "moral experience", or how stigma affects what matters most in the daily life of participants in a local world. Our findings suggest that how genetic contamination threatens what is held as most dear for Chinese Americans may be completely different from how it threatens what European Americans value. Or perhaps, the threat that genetic contamination poses is not as severe as the threat of moral contamination from the social attributions that Chinese Americans alternatively ascribe to, explaining why stigma would decrease for a genetic mental illness. Results of this approach may greatly inform the pathways that lead to the stigma outcomes described here. Assessment of spontaneous etiological beliefs and their effects on baseline stigma prior to the impact of anti-stigma strategies has been a neglected area of stigma intervention research. Both qualitative and quantitative methods might be used to productively study this issue.

## Conclusion

Our study has several important implications for the use of genetic models as a form of psychoeducation to lower stigma associated with psychiatric illnesses. First of all—as emphasized by Yang et al. [22]—broad-based stigma interventions may have very different effects on diverse cultural groups. That our Chinese American sample manifested reduced

stigma given a genetic etiology but our European American group expressed greater stigma illustrates this point clearly. Secondly, as highlighted by our discussion, it becomes essential to not only examine the effects of psychoeducational content on stigmatizing attitudes, but to assess them in relation to the spontaneous beliefs that a particular cultural group might endorse. In this case, although we expected a genetic etiology to be even more stigmatizing for Chinese Americans, it appears it was more positive than the spontaneous beliefs originally held by this set of respondents. Assessment of the original set of etiological beliefs and their effects on baseline stigma prior to the impact of anti-stigma strategies has been a neglected area of stigma intervention research.

This study also provides valuable data on how mental illness stigma might change for Chinese Americans in an increasingly geneticized world. Mental illness stigma is already an important issue in Chinese societies, and this study has shown that eugenic beliefs appear to be an important part of the puzzle. Although a long history of policy-level eugenics in China has already been damaging to marginalized groups, the controversy surrounding the possible genetic component of mental disorders may not increase stigmatizing attitudes and behaviors in the near future for Chinese Americans. This ameliorating effect of genetic attribution supports the underlying theory behind current anti-stigma campaigns that use biological models of mental disease to further blame-reduction strategies, at least in this cultural group. However, the benefits of genetic attribution appear to be limited in that they only lower stigmatizing attitudes to the levels endorsed by the European American majority culture and not below.

Although our findings show that Chinese Americans react better than European Americans to a genetic attribution of mental illness, eugenic attitudes were still significant predictors of the desire for intimate social distance and marriage and reproductive restriction, regardless of ethnicity and genetic attribution. These findings point to the need for targeted anti-stigma campaigns that address eugenics and future research that monitors the social effects of eugenic policies. Eugenic beliefs may very well be part of the cause and a very serious effect of genetic mental illness stigma, and it should not be ignored in our quest to understand the social and legal implications of the genetics revolution. At the same time, the fact that Chinese Americans hold stronger eugenic beliefs than European Americans should continue to motivate anti-stigma campaigns in this ethnic group. Culturally appropriate research must also be done to determine how stigma processes might change as knowledge and publicity of genetics increases.

## Acknowledgments

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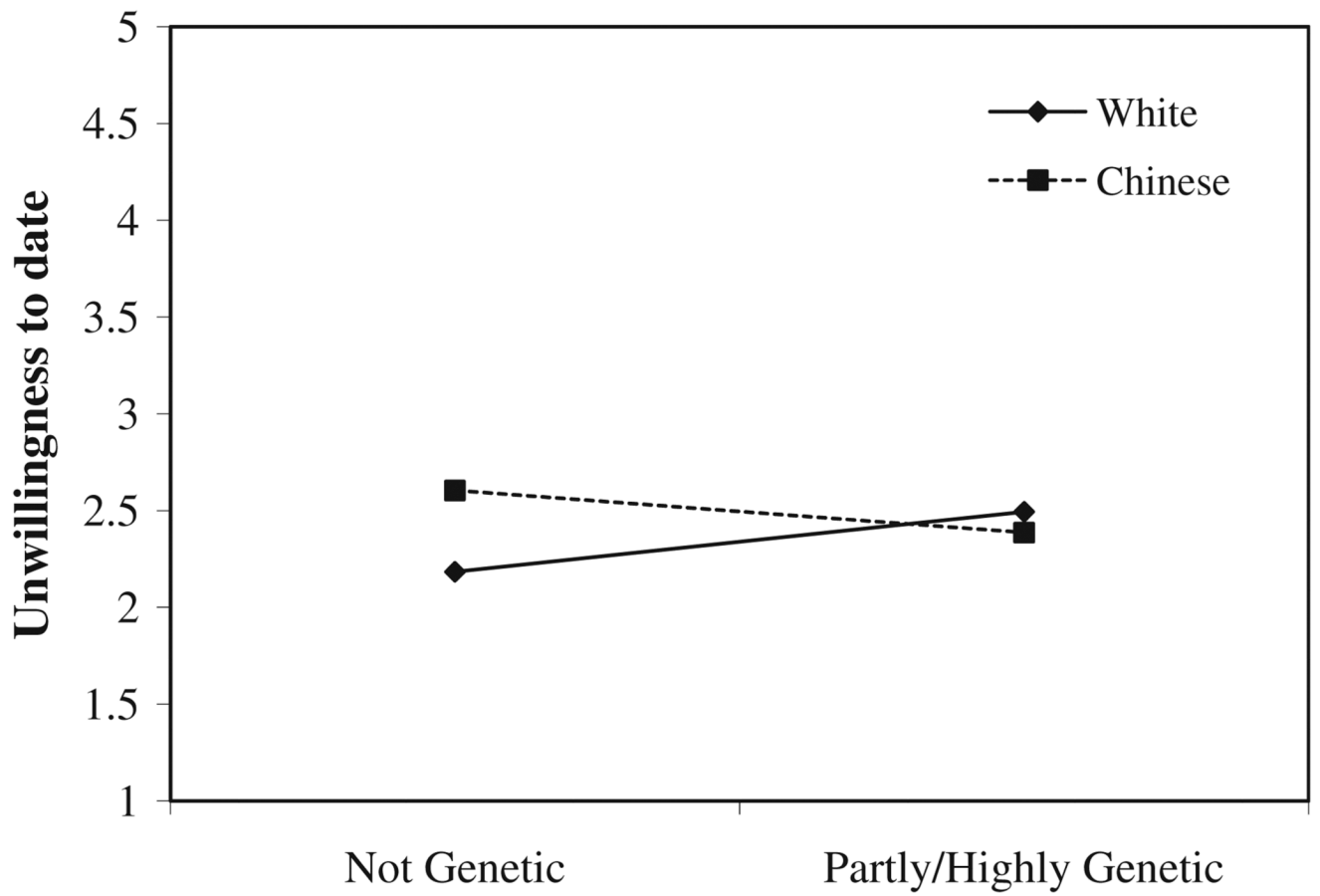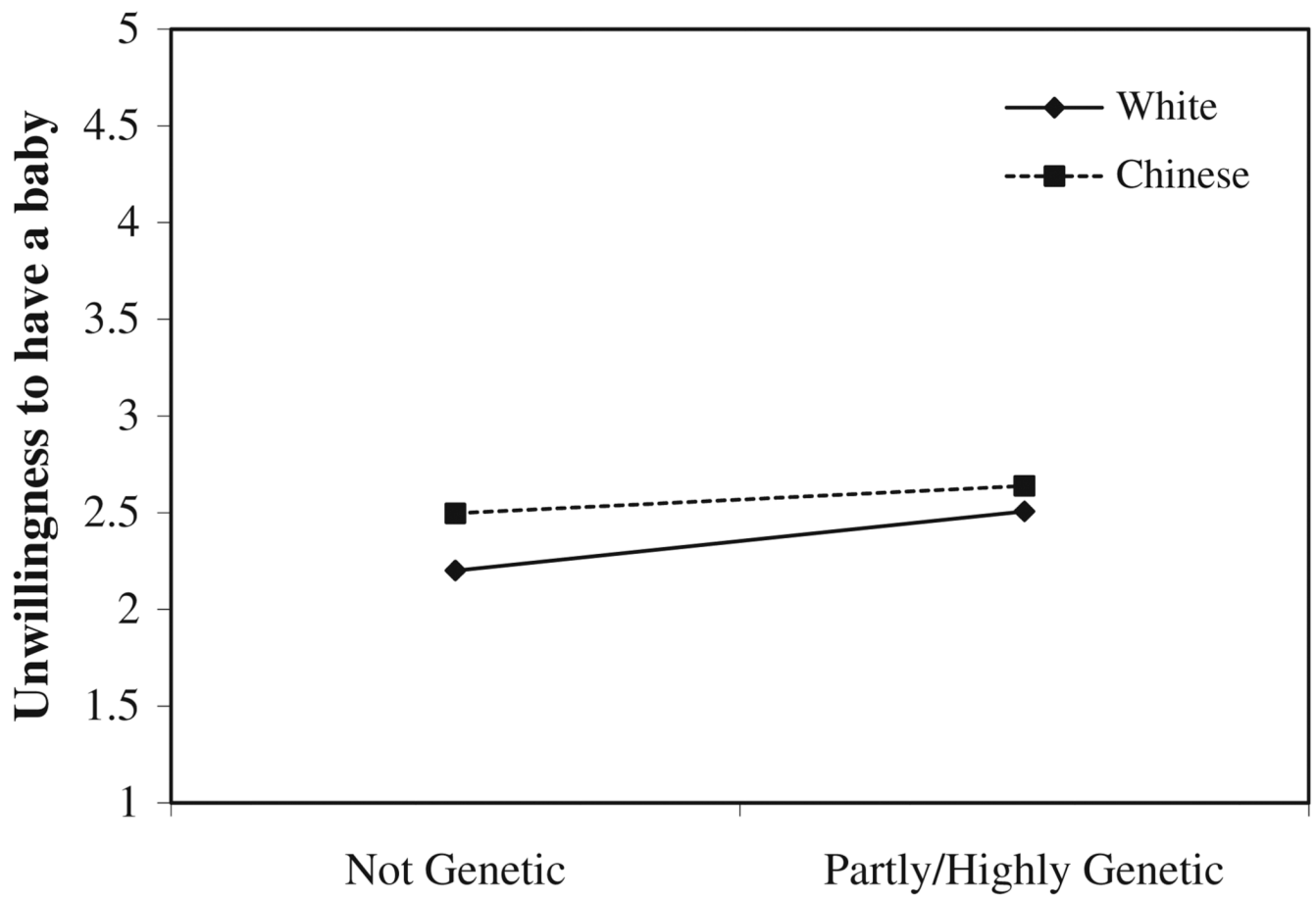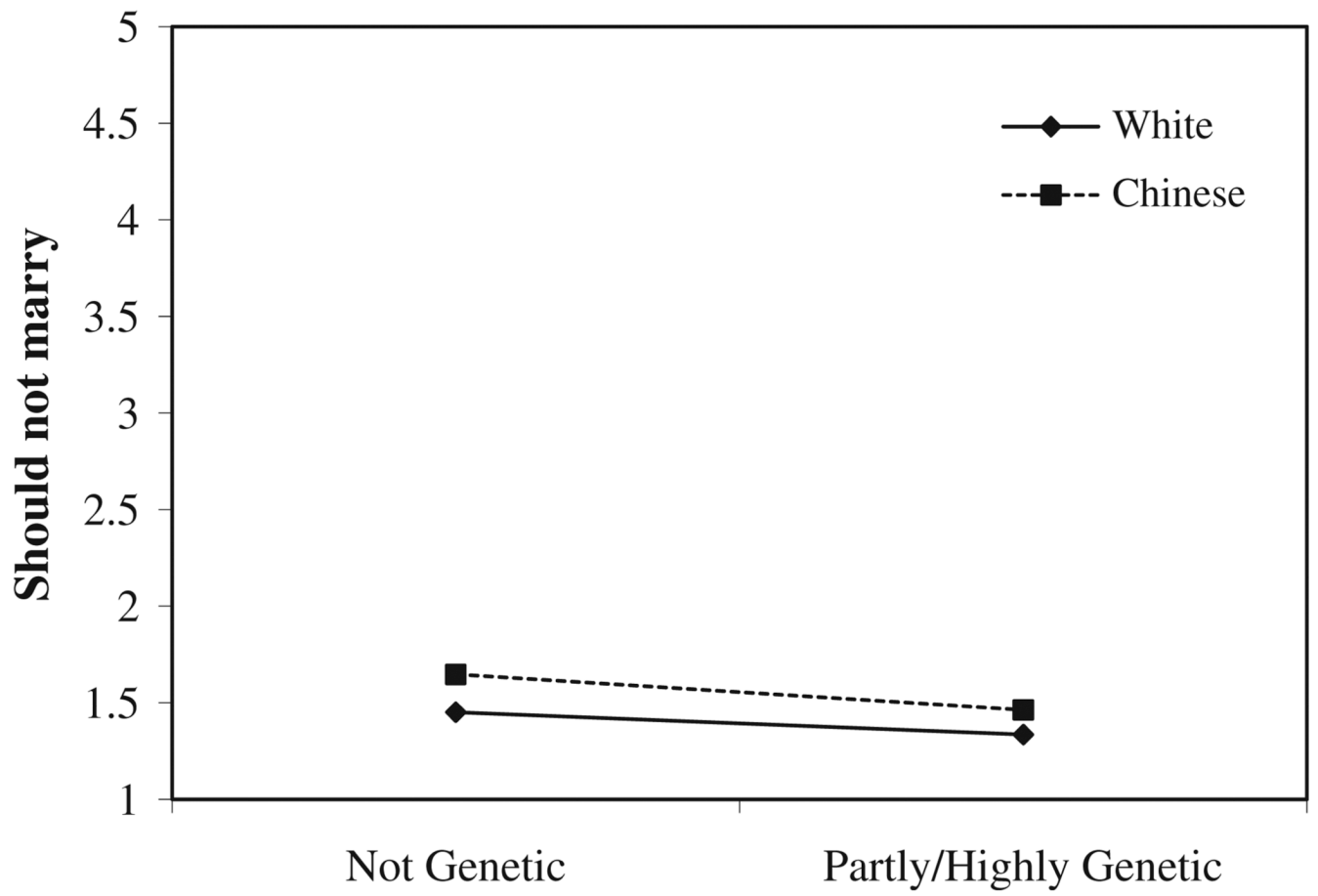
**Fig. 1.**
Unwillingess to date by genetic attribution
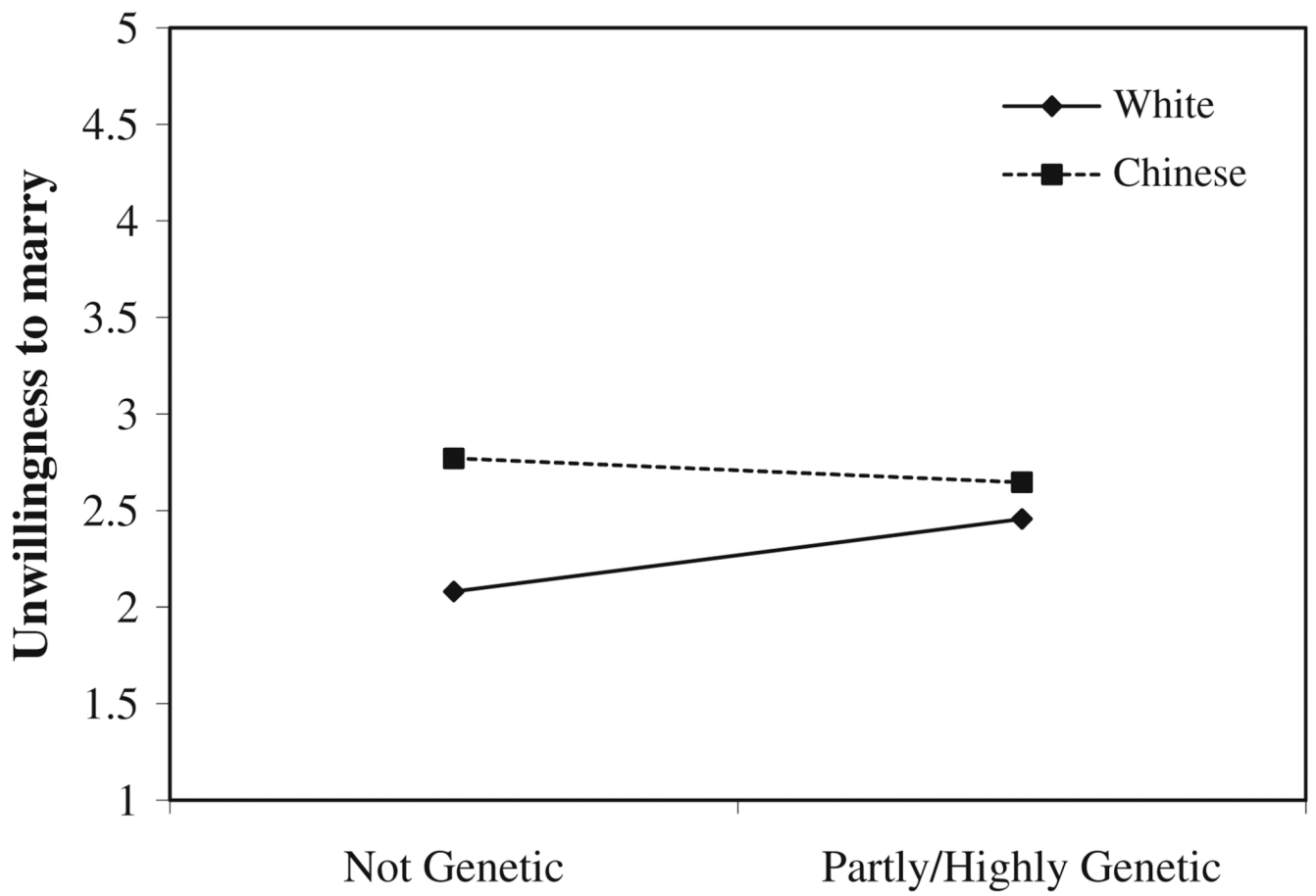
**Fig. 2.**
Unwillingess to marry by genetic attribution

**Fig. 3.**
Unwillingness to have a baby by genetic attribution

**Fig. 4.**
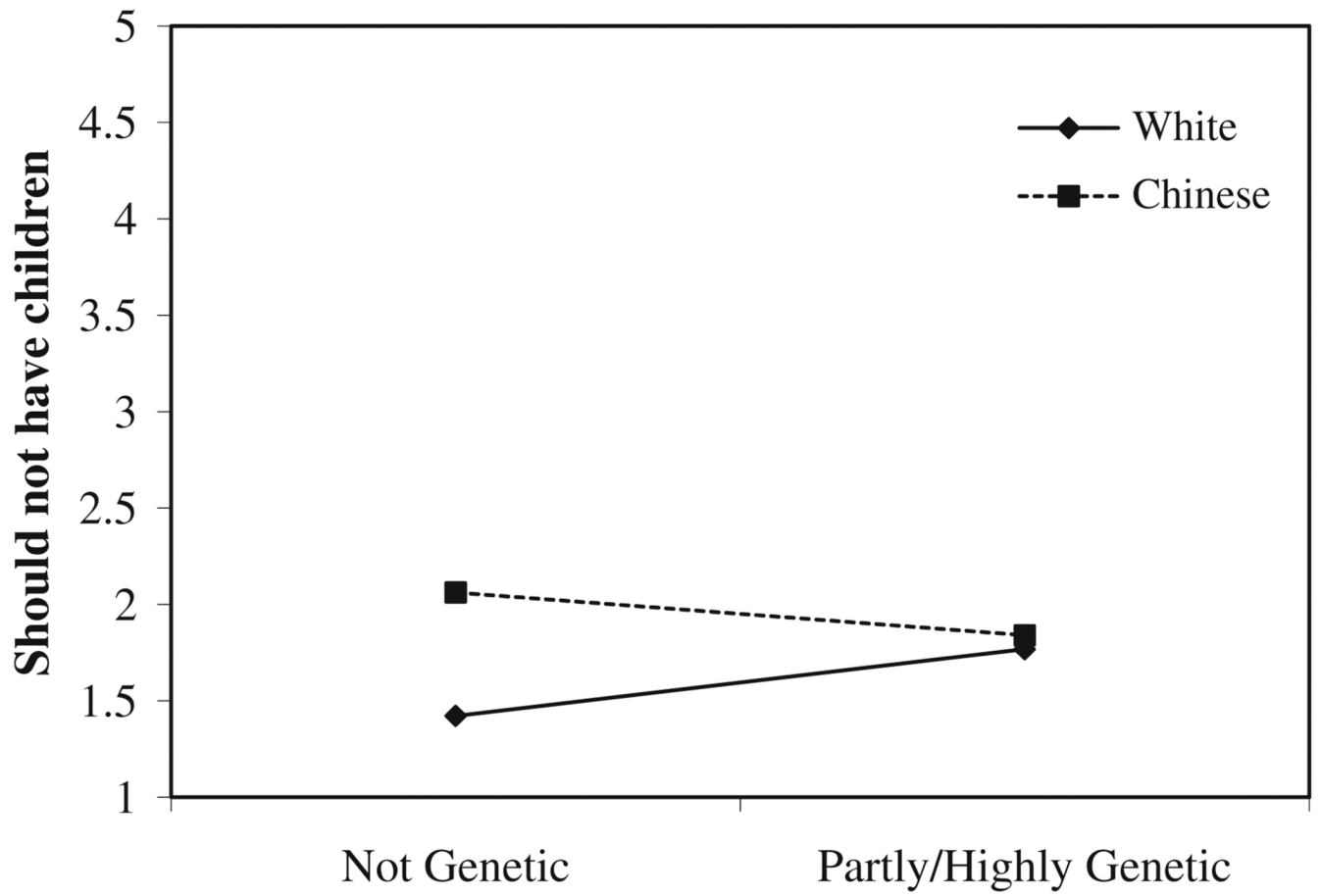Marriage restriction by genetic attribution

**Fig. 5.**
Reproductive restriction by genetic attribution

**Table 1**

Sample characteristics ($N = 470$)

| Sociodemographic variables | Chinese Americans | European Americans |
|---|---|---|
| Average age (years)[*] | 43.7 | 48.8 |
| Female (%) | 64.3 | 62.9 |
| More than high school education (%) | 66.7 | 64.0 |
| Household income per year (%) | | |
| <$20,000 | 21.9 | 13.4 |
| $20,000–39,999 | 18.8 | 24.7 |
| $40,000–59,999 | 9.4 | 22.0 |
| $60,000–79,999 | 9.4 | 16.0 |
| ≥$80,000 | 40.6 | 23.9 |
| Religion[**] | | |
| Protestant | 16.7 | 49.2 |
| Catholic | 2.4 | 20.9 |
| Jewish | 0 | 2.9 |
| Buddhist | 31.0 | 0.5 |
| Other | 2.4 | 9.5 |
| None | 47.6 | 17.1 |
| Political conservatism | | |
| Very liberal | 7.5 | 6.0 |
| Somewhat liberal | 27.5 | 16.6 |
| Moderate | 30.0 | 34.1 |
| Somewhat conservative | 25.0 | 32.2 |
| Very conservative | 10.0 | 11.1 |

[*] $P < 0.05$;

[**] $P < 0.001$

**Table 2**

Chinese American's support for eugenic attitudes

| Eugenic item | Ethnicity[a] | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Model 1 | | | Model 2[b] | | |
| | *B* | SE | $R^2$ | *B* | SE | $R^2$ |
| If a couple has a 1-in-4 chance of having a child with a serious genetic defect, they should not give birth to any children of their own | 0.31 | 0.17 | 0.01 | 0.42* | 0.20 | 0.12 |
| Every person should be required to have a genetic screening test before getting married | 0.94*** | 0.16 | 0.07 | 0.89*** | 0.19 | 0.16 |
| In choosing a marriage partner, it is important to know whether there is a history of mental illness in the family | 0.48*** | 0.16 | 0.02 | 0.47** | 0.19 | 0.11 |
| How important do you think a person's genetic makeup is in influencing whether or not a person will develop a serious mental illness? | 0.33** | 0.12 | 0.02 | 0.28* | 0.14 | 0.05 |

*
$P < 0.05$;

**
$P < 0.01$;

***
$P < 0.001$

[a]For the variable Ethnicity, 0 = European American and 1 = Chinese American

[b]Model 2 includes ethnicity and the covariates: gender, age, education, annual household income, political conservatism, and religion

**Table 3**

Regression models predicting stigma outcomes

| Outcome | Model 1[a] | | | Model 2[b] | | |
|---|---|---|---|---|---|---|
| | B | SE | R² | B | SE | R² |
| Unwillingness to date | | | 0.09 | | | 0.13 |
| Genetic attribution | 0.14 | 0.09 | | 0.09 | 0.09 | |
| Ethnicity | 0.92** | 0.31 | | 0.64* | 0.31 | |
| Genetic attribution × ethnicity | −0.97** | 0.34 | | −0.80* | 0.34 | |
| 4-in-1 chance of defect | | | | 0.00 | 0.04 | |
| Genetic screening | | | | 0.10* | 0.05 | |
| Family history | | | | 0.11* | 0.05 | |
| Genetics and mental illness | | | | 0.06 | 0.06 | |
| Unwillingess to marry | | | 0.14 | | | 0.17 |
| Genetic attribution | 0.22* | 0.09 | | 0.17 | 0.09 | |
| Ethnicity | 1.39*** | 0.31 | | 1.10*** | 0.32 | |
| Genetic attribution × ethnicity | −0.92** | 0.35 | | −0.74* | 0.35 | |
| 4-in-1 chance of defect | | | | 0.02 | 0.04 | |
| Genetic screening | | | | 0.09* | 0.05 | |
| Family history | | | | 0.10* | 0.05 | |
| Genetics and mental illness | | | | 0.06 | 0.06 | |
| Unwillingness to have a baby | | | 0.10 | | | 0.15 |
| Genetic attribution | 0.26** | 0.09 | | 0.21* | 0.09 | |
| Ethnicity | 0.58 | 0.33 | | 0.26 | 0.33 | |
| Genetic attribution × ethnicity | −0.31 | 0.37 | | −0.10 | 0.36 | |
| 4-in-1 chance of defect | | | | 0.02 | 0.05 | |
| Genetic screening | | | | 0.09 | 0.05 | |
| Family history | | | | 0.12* | 0.05 | |
| Genetics and mental illness | | | | 0.11 | 0.06 | |
| Should not marry | | | 0.14 | | | 0.17 |

| Outcome | Model 1[a] | | | Model 2[b] | | |
|---|---|---|---|---|---|---|
| | B | SE | R² | B | SE | R² |
| Genetic attribution | −0.15 | 0.08 | | −0.18* | 0.08 | |
| Ethnicity | 0.37 | 0.29 | | 0.10 | 0.29 | |
| Genetic attribution × ethnicity | −0.12 | 0.32 | | 0.05 | 0.32 | |
| 4-in-1 chance of defect | | | | 0.03 | 0.04 | |
| Genetic screening | | | | 0.11** | 0.04 | |
| Family history | | | | 0.06 | 0.04 | |
| Genetics and mental illness | | | | 0.02 | 0.05 | |
| Should not have children | | | 0.22 | | | 0.30 |
| Genetic attribution | 0.16 | 0.09 | | 0.12 | 0.09 | |
| Ethnicity | 1.32*** | 0.32 | | 0.83** | 0.31 | |
| Genetic attribution × ethnicity | −1.05** | 0.35 | | −0.69* | 0.34 | |
| 4-in-1 chance of defect | | | | 0.19*** | 0.04 | |
| Genetic screening | | | | 0.13** | 0.05 | |
| Family history | | | | 0.01 | 0.05 | |
| Genetics and mental illness | | | | 0.05 | 0.06 | |

*
$P < 0.05$;

**
$P < 0.01$;

***
$P < 0.001$

[a] Model 1 includes the sociodemographic controls (gender, age, education, annual household income, political conservatism, and religion) and design variables (disorder and version)

[b] Model 2 adds the four eugenic items to the variables in Model 1

**Table 4**

Effects of genetic attribution on stigma outcomes by ethnic group

| Outcome | Chinese American | | European American | |
|---|---|---|---|---|
| | *B* | SE | *B* | SE |
| Unwillingess to date | −0.8* | 0.36 | 0.15 | 0.09 |
| Unwillingess to marry | −0.74 | 0.38 | 0.22* | 0.09 |
| Unwillingess to have a baby | 0.04 | 0.41 | 0.26** | 0.09 |
| Should not marry | −0.56 | 0.47 | −0.14 | 0.08 |
| Should not have children | −1.02* | 0.44 | 0.15 | 0.09 |

Models include the sociodemographic controls (gender, age, education, annual household income, political conservatism, and religion) and design variables (disorder and version)

*
$P < 0.05$;

**
$P < 0.01$