INDIVIDUAL DIFFERENCES AND STEREOTYPE SUSCEPTIBILITY

By

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ABSTRACT

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Past research has found that priming stereotyped-identity before administrating a challenging cognitive test influences a group member's performance outcomes (Cheryan, et al., 2000; Shih et al., 1999). This dissertation explored the individual differences that make group members more or less susceptible to this effect on a challenging math test among Asian American and Hispanic American female participants. Chapter 1 examined the effect of identity salience on a challenging math test. The results showed that only Hispanic Americans were susceptible to this effect. Chapter 2 examined one of the indicators of individual differences: ethnic identity. Results suggested that the level of ethnic identity predicted how Hispanic American participants become more or less susceptible, but not for Asian American participants. Past research on Asian American bicultural individuals showed that Asian Americans respond to stereotypes differently as a function of how they structure their Asian and American identities (Benet-Martinez and colleagues 2002; 2005). Therefore in Chapter 3, the degree to which bicultural Asian Americans and Hispanic Americans cognitively structure their two identities (Bicultural Identity Integration, BII) was examined as an individual difference that determines Asian American and Hispanic American participants' susceptibility. Results showed that BII predicted how Asian American participants become more or less susceptible to stereotype, but not for Hispanic Americans. Overall, the current study found that individual differences influence both Asian American and Hispanic American participants' stereotype susceptibility. The study also found that Asian American and Hispanic American's stereotype susceptibility was

predicted by the different indicators of individual difference. The potential explanation for such differences, and the implications for classroom and educational practice are discussed.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
Individual Differences that Lead People to be More or Less Susceptible to Stereotypes

Despite efforts to narrow the achievement gap between minority and mainstream students, gaps still exist (Harris & Herrington, 2006; Lee, 2002) although the cause remains unclear. Some argue that the gaps are a result of different performance expectations for minority and mainstream students (e.g., Mickelson, 2003; Phelan, Davidson, & Cao, 1991). Others argue that the lack of content domain identification and the weak ethnic/racial identity of minority students may lead to a lack of motivation and educational aspirations among such students (Phelan, et al., 1991).

Research shows that students' identification with a subject domain (i.e., having high subject-related self-concept) and students' group identification (i.e., high ethnic identity) enhances their academic achievement by strengthening their self-efficacy and self-esteem (Bandalos, Yates, & Thorndike-Christ, 1995; Marsh, 1992). Paradoxically, studies also show that these same identifications can impede students' academic achievement when they over-identify with the tested content domain and/or social group (Schmader, 2010; Spencer, Steele, & Quinn, 1999). Scholars identify this effect as stereotype threat, which has been defined:

> When a negative stereotype about a group that one is a part of becomes personally relevant . . . stereotype threat is the resulting sense that one can then be judged in terms of the stereotype or that one might do something that would inadvertently confirm it (Steele, Spencer, & Aronson, 2002, p. 389).

Steele et al., (2002) asserted that this effect is independent of the skills, training, and knowledge that are relevant for academic performance. That is, simply being aware of a negative stereotype about a group of which one is a member can cause minority students to

underperform on high-stakes tests. Studies have also suggested that this effect may be a contributing factor to the existing achievement gap among different ethnic groups and their underrepresentation in STEM (science, technology, engineering, and mathematics) fields (Cheryan, Plaut, Davies, & Steele, 2009; Spencer, Steele, & Quinn, 1999). How can the same factor cause divergent outcomes? These contradictory research findings merit further investigation.

Ethnic identity and its function on youth

Researchers of minority youth development argue that the maturation of ethnic identity is crucial for the well-being and academic achievement of minority youth. For example, Martinez & Dukes (1997) found that a higher score of ethnic identity was associated with higher self-esteem. Umaña-Taylor (2004) also found the same relationship between ethnic identity and self-esteem among Mexican American adolescents in three schools to differ according to how Latinos were numerically represented at each school. These studies suggest that a healthy sense of self as an ethnic person is important for psychological and social well-being. Relatedly, Syed & Juan (2012) found that co-ethnic friend dyads hold similar levels of ethnic identity, suggesting that ethnic minority youth may develop friendships based on the same levels of maturity of ethnic identity, or that co-ethnic friendships could passively help adolescents explore their ethnic identity, resulting in ethnic identity maturity. To sum up, youth development researchers generally agree that higher and greater ethnic identity is related to better and positive psychological and social outcomes stemming from self-esteem. The question is, does racial/ethnic identity promote student achievement in youth?

When it comes to ethnic identity and academic achievement, the relationship seems to not be as straightforward as it is for ethnic identity and self-esteem. Although some argue that ethnic

identity promotes academic achievement of minority students (Lee, 1994; Matute-Bianchi, 1986), others found identification with the larger society (e.g., American identity, rather than ethnic identity) predicts immigrants' academic achievement (Thum, 2013). Some also argue that ethnic identity predicts a positive attitude towards learning, but does not predict academic achievement of ethnic minority students (Estela, Zarate, Bhimji, & Reese, 2005). How can the same factor cause divergent outcomes? These contradictory research findings merit further investigation. The inconsistent findings may have occurred because academic achievement, particularly when measured by GPA, is largely dependent on other factors such as teacher quality, school climate, and resources available at schools (Lee & Shute, 2010). Alternatively, such inconsistent findings could also be attributed to different definitions and measurements of ethnic identity (Ashmore, Deaux, McLaughlin-Volpe, 2004), or researchers were informed by different theoretical perspectives and looked at the functions of identity differently.

Ethnic identity as social category

Social category, such as ethnicity, becomes the basis of one's social identity. Scholars such as Allport (1954) and Tajfel (1974) argued that social group memberships, especially when such memberships are incorporated into one's working self-concept, function as a driving force of people's behaviors. Hogg & Reid (2006) focused on the cognitive mechanisms of social identity and argue that we are compelled to categorize everything in our environment, including ourselves, to understand, interpret, and predict our situation. Certain categories, such as gender and race, are chronically more accessible than other categories, such as occupation (Fuligni, Witkow & Garcia, 2005; Phinney, 1990). Such social categories not only provide a frame of reference, but also provide a prototype of behavior. At any given moment and situation, certain membership, or social category, becomes cognitively more accessible than others. Cognitively

accessible identity, in turn, helps us to interpret our immediate environment and prescribe the behaviors that are most appropriate in a given situation (Markus, 1977; Markus & Wurf, 1987).

Children acquire racial and ethnic identity after they develop their ability to recognize social patterns and attributes associated with groups in their environment (Aboud, 1984). However, merely recognizing patterns does not guarantee the development of racial/ethnic identity. Development of racial/ethnic identity requires socialization (Hughes, Rodriguez, Smith, Johnson, Stevenson & Spicer, 2006) and perspective-taking abilities (Quintana, 1994; 1998; 2007), as well as the ability to ethnically and racially categorize self and others (Aboud, 1984). Quintana's theory of developmental understanding of ethnicity has important implications for ethnic identity development because it delineates how we grasp the concept of ethnicity. According to Quintana (1994; 1998), our understanding of ethnicity, in terms of visible physical features (e.g. color of the skin) and social characteristics (e.g. conversation and friendship patterns, norms, and attitudes) develops from the concrete to the more abstract. Quintana's theory implies that acquiring the concept of a particular ethnicity would include the prototypical images and characteristics of people with a particular ethnic origin. According to Hogg and Reid (2006), these prototypes would include stereotypes of that group. That is, when we learn the concept of particular ethnic group, we also learn and acquire the stereotype associated with that particular group.

Social category and academic stereotype on academic achievement

Explicit and implicit activation of the stereotyped group membership can influence the performance of individuals in the direction of the stereotypes. For example, Steele and colleagues (Steele, Spencer, & Aronson, 2002; Steele & Aronson, 1995; Steele, 1997) found that minority groups (such as African Americans, Latinos, and Native Americans) are particularly

susceptible to underperforming on high stakes, ability/diagnostic type tests because of the negative stereotypes about the academic ability of these minority groups. For Asians, however, the stereotype about academic ability is generally positive; thus being susceptible to stereotype can be a positive experience.

Shih, Pittinsky, & Ambady (1999) examined the stereotype effect among Asian American female students. They hypothesized that having Asian identity should boost participants' test performance, whereas, a female identity would likely depress the participants' test performance; each identity is associated with positive and negative stereotypes, particularly about math ability. In order to test their hypotheses, they compared: (a) those with Asian identity activation; (b) those with female identity activation; and (c) a control group using a challenging math test (a norm-referenced test comparable to GRE). Participants in each condition were asked to answer a few questions before taking the math exam. In the Asian identity condition, participants were asked about their ethnicity, the language used at home, and food preferences.

In the female identity condition, participants were asked to answer questions about their gender and their preference for co-ed versus same-sex dormitories. The control group was asked to answer filler questions. The results showed that the activation of Asian identity enhanced performance on the math test, while the activation of female identity decreased performance on the same test. These findings suggest that stereotyped group identity can be activated by as little as asking about food preferences. This is important because classroom teachers may ask such questions as a way of showing interest in their students' culture (Li, 2006), and yet such questions may actually activate stereotyped group identity among students. Activated stereotyped group identity, in turn, affects their classroom performance. The questions remain: do such identity activations have the same impact on all students of stereotyped groups and what

factors influence the effect of stereotype threat? Shih (2000) offered a framework that explained three factors that determine the performance outcome: (a) social context; (b) salience of stereotype; and (c) person. Shih's (2000) dissertation study highlighted the process by which people become more or less susceptible to stereotype and showed how performance outcomes become easily malleable when these factors are manipulated. Drawing from the personality psychology literature, this dissertation research addresses the individual differences that play a critical role in students' susceptibility toward and against stereotypes. Therefore, this dissertation adds to Shih's (2000) framework by extending its focus on the third factor—person.

Mechanisms of Stereotype Threat/Boost

Ever since the concept of stereotype threat was published (Steele & Aronson, 1995), several explanations were offered as a mechanism of stereotype threat. Shapiro & Neuberg (2007) argued that stereotype threat is not a simple concept; rather, stereotype threat is an overarching concept of several "threats" to different types of self-concepts. According to Shapiro et al., (2007), stereotype threat can be anything from a threat of being judged as inferior because of membership to a group to the threat of being judged inferior as a person. Similarly, Cheryan & Bodenhausen (2000) argue that positive stereotypes about Asian and math ability can be threatening when the target group members are made to think about how others would think of them as a representative of the group. Arguments of both Shapiro et al., (2007) and Cheryan et al., (2000) added a more nuanced approach to stereotype threat studies and expanded the existing literatures to the types of threats people may experience, but their research does not provide an explanation of why they experience threat. Today, researchers agree on a few similar, but different, mechanisms that govern stereotype threat/boost.

Cognitive consistencies. Nosek, Banaji & Greenwald (2002) argued that mental association between concepts (e.g., "math" and "male") play an important role on how people, particularly the stereotyped group members, internalize the stereotypes. Nosek et al. (2002) employed implicit and explicit measures of mental association related to math. They found that college students, both males and females in general, endorsed the association between "math" and "male," and the association between "female" and "art." Based on the cognitive consistency theory, they argue that people strive to keep consistent views about things around them. That is, when females implicitly and explicitly endorse an association between "male" and "math," and "female" and "art," such endorsed association discourages females to choose careers in a math-related field, because choosing a math-related career would throw their strongly endorsed association into question. Galdi, Cadinu & Tomasetto (2013) found the same mental association among girls as young as six years old, showing that females may be prepared to be susceptible to stereotype threat at early ages. Kawakami, Phillis, Greenwald, Simard, Pontiero, Brnjas, Kahn, Mills, & Dividio (2012) argued that people have a natural tendency to align their self-concepts to the social cues they receive in order to have a conflict-free interaction with their peers. Put together, these studies indicate that we shift our working self-concept depending on whom we are talking with, where we are, and kind of environmental cues we receive. Because some of our social identities (e.g., gender) are more prevalent than others (e.g., job), people may be chronically primed to have a certain identity and its associating attributes activated. Shih, Pittinky, & Ambady (1999) found that activation of a female identity depressed scores of a challenging math test among Asian American female participants and activation of Asian identity increased scores of a challenging math test among Asian American female participants. Shih et al.'s (1999) finding is consistent with cognitive consistency perspective, in that activation

of female identity triggered its associated characteristics, whereas activation of an Asian identity triggered its associated characteristics about math.

Social categorization theory, or SCT (Turner, Hogg, Oaks, Reicher, & Wetherell, 1987), suggests that members of a social group strive to fit the prototype and group norms that include stereotypes. Hogg & Reid (2006) described that belonging to a social group is a fundamental need for us. Furthermore, the stronger we identify with the group, the more we try to conform to the group norms. Armenta (2010) used SCT as the underlying mechanism for stereotype threat and tested whether one's level of group identification predicts one's susceptibility toward stereotype threat. Armenta (2010) found that highly Asian-identified Asian Americans scored higher when they were reminded about the stereotypes, and highly Latino-identified Latinos scored lower when they were reminded about the stereotypes. Schmader (2002) also reported that the stereotype threat was only evident among female students who had a high female identity.

To sum up, cognitive consistency and related theory (i.e., SCT) explain that the stereotype threat occurs as a function of our need to have consistency. That is, a well-known stereotype, whether it is positive or negative, can be thought as a mental association between the two concepts of groups and group characteristics. Well-known stereotypes can be thought of as well-connected concepts, in which reminding a person of one of the concepts will automatically trigger other. The key distinction between this perspective, and the others that follow, is that this perspective does not take affective reaction toward stereotype into account.

Cognitive imbalance and mental capacity. Spencer, Steele, & Quinn (1999) argued that impairment of the challenging test score was a result of the situationally induced anxiety that makes test-taking more overwhelming. Schmader & Johns (2003) argued that the stereotype

threat manipulation caused stigmatized group members to momentarily lose their cognitive capacity. In their three experiments, stereotyped group members (i.e., females and Latinos) scored significantly lower on the test of working memory compared to their counterparts in the control condition. Ben-Zeev, Fein, & Inzlicht (2005) argued for a similar mechanism. In two experiments, they demonstrated that the stereotype manipulation (diagnostic of intelligence and the perception of being a target of the stereotype) caused a physiological reaction (e.g., arousal) that suppressed motivation and test performance of the target group members.

Schmader, Johns, & Forbes (2008) synthesized and integrated arguments of various research findings and argued that decline of test performance was a result of increased cognitive load caused by the incongruent concepts of self, group membership, and ability. Schmader and colleagues' (2008) argument is based on the premise that cognitive equilibrium is facilitative, and cognitive disequilibrium is detrimental for our functioning. Based on this premise, they argue that stereotype threat manipulation (e.g., reminding participants about stereotypes) disrupts equilibrium among the abovementioned three concepts. However, in order for this to be true, another proposition needs to be established; stereotype threat would only occur among people who have positive regard for each of three domains. This is consistent with Steele and Aronson (1995), in that they argued that stereotype threat only occurs among people who strongly identify with a tested domain (e.g., math), and also strongly identify with stereotyped group (e.g., African American).

Stereotype threat/boost as priming effect. The Stereotype Threat/Boost study often uses experimental research designs that employ priming of a certain social identity (Shih et al., 1999), or stereotype (Steele & Aronson, 1995). Earlier studies of priming focused primarily on the effect of verbal stimulus on people's attention and perceptual information processing, such as

distinguishing words from mere combination of alphabets (e.g., NURSE vs. NAORHG) (Gibson, 1971; LaBerge & Samuels, 1974; Meyer & Schvaneveldt, 1971). In these studies, researchers found that we identify words faster and more accurately when the task and stimuli presented are in the same categories (e.g., DOCTOR and NURSE), because by default we pay more attention to meaning of the words we process (Maxfield, 1997). Other research included non-verbal information such as pictures, shapes, and faces as stimuli (Tulving & Schacter, 1990). These studies were based on the assumption that our knowledge is stored as groups of related concepts (Collins & Quillian, 1969). When we process experimentally manipulated or naturally occurring stimuli, we shift our attention to a certain group of concepts, resulting in the identification of words that represent similar concepts (e.g., CAT and DOG) or highly related concepts (e.g., CAT and ANIMAL) (Meyer & Schvaneveldt, 1971). Shiffrin & Schneider (1977) found that this retrieval of information became effortless and automatic after repeated exposure. In summary, research on our memory system showed that (1) we store information and knowledge in a systematic manner; (2) associated words and concepts (e.g., bread and butter) are stored close to each other and retrieved together upon recalling; and (3) social stimuli, or the immediate environment, gives us cues as to where to pay attention and which information to retrieve.

Social psychologists, such as Fazio, Sanbonmatsu, Powell, and Kardes (1986) extended these associations to objects and people's evaluation of such objects. Fazio et al., (1986) found that when a word (e.g., "cockroach") is introduced first, people identify negatively connotated adjectives (e.g., "disgusting") faster than those adjectives implying positive meaning (e.g., "appealing"). They reasoned that we learn new concepts in relation to others; thus the concept of cockroach, for example, is learned in association to things that are negatively evaluated.

Therefore, when people are presented the word "cockroach," the strongly associated word such as "disgusting" would automatically be recalled and activated.

Bargh (1982; 1996) further extended this automatic association used in priming research to automatic activation of self-concept and behavior. Bargh and colleagues argued that people use immediate information, either experimentally manipulated or naturally occurred, to activate sets of concepts and behavioral scripts just like Myer and Schvanveldt's (1971) study of language. For example, Bargh, Chen, Burrows (1996) showed that priming of stereotypes of another group (e.g., elderly people or African American males) provoked the behaviors that were consistent with the stereotypes on participants who were not even members of the stereotyped group. Dijksterhuis, Aarts, Bargh, & van Kippenberg (2000) showed that this effect is stronger for those who endorse stereotypes. In other words, the effect of the stereotype threat/boosts can also be regarded as an effect of the priming, or people's reaction to the priming itself. For example, Dijksterhuis, Spears, and Lépinasse (2001) demonstrated that participants' reaction time on tasks slowed down after seeing pictures of elderly people because people are primed to think about and synchronize with the stereotypes of being elderly (e.g. slow). They also demonstrated that seeing pictures of young people made participants' reaction time on tasks faster for the same reason. They argue that it is assimilation toward priming, in which people are assimilated to the images and stereotypes that are presented. Their argument is similar to that of Kawakami et al. (2011) in that we tend to respond to our immediate environment in a situationally congruent way. However, Dijksterhuis et al.'s (2001) argument is different from that of Kawakami et al. (2011) in that they argued that people would respond to the priming in opposite manner when they perceive the presented image as an extreme case. That is, they

claimed that priming can be perceived as a "general" or "extreme" example, and how people perceive priming determines the way they respond to it.

To sum up a few lines of proposed cognitive mechanism of stereotype threat/boost, scholars established that a positive stereotype enhances people's test performance because the positive stereotype is in congruence with self-concept as a member of the group. Many of the group identity measures (e.g, MEIM, Phinney et al.,1992) focus on the positive regard that people have about their membership. Thus, being reminded about positive stereotypes will not disturb cognitive and affective balance between group membership, self, and the stereotype. Negative stereotypes, on the other hand, disrupt cognitive balance among important self-concepts. Moreover, cognitive balance/imbalance explanation of stereotype threat/boost highlights the individual differences that make some people more susceptible than others.

Personal factors that affect stereotype threat/boost

Studies show that the strength of students' stereotyped identity mediates the effect of stereotype threat. Schmader (2001), for example, measured female students' strength of female identity and activated this identity by saying that the test compares the math ability between men and women. They observed a decline of math performance among highly female-identified students. Those who had low female identity, on the other hand, did not show such decline. Armenta (2010) found a similar relationship between the strength of ethnic identity and test performance. Thus, research findings of stereotype threat seem to agree that stronger group identity will increase one's susceptibility toward stereotype effects. However, this contrasts with the positive effect of ethnic identity on people's academic achievement (Bandalos, Yates, & Thorndike-Christ, 1995; Marsh, 1992). Furthermore, studies of Schmader (2001) and Armenta

(2010) assume quite simplistic nature of people's social identity. Today, scholars argue great diversities of social identities within and across groups of people (Bodenhausen, 2010).

Social category and complexity of selves

Many of the studies on stereotype threat focus on a single-group identity. In these studies, researchers invoke stereotypes by making people think about the stereotype, and then compare the outcome to control situations (Keller & Daunheimer, 2003; Shih, Pittinsky, & Ambady, 1999; Steele, 1997). The assumption here is that individuals readily identify with a single-group identity (e.g., ethnic/racial identity). However, recently researchers and theorists have started to question this over-simplistic assumption (Bodenhausen, 2010). Bodenhausen (2010) argued that social categories are not as discrete as they have been thought of and debated. Rather, he argued that many of the social categories are more ambiguously expressed, or even overlapped with other categories. Cole (2009) also argued for a more nuanced approach of social group identity and called for attention to the intersection of two or more identities (e.g., gender and race). Some of such categories may be more clearly defined in a certain context, but more ambiguous in another. For example, research has shown that ethnic/cultural identification is malleable among bicultural or multicultural people. Furthermore, research has shown that there are individual differences in how people organize their knowledge and behavioral repertoires. Some see that the two cultures are distinctly different, and others see that the two cultures are similar and overlapping one another (Sanchez, Shih and Garcia, 2009).

Complexity of self and its effect on stereotype susceptibility

While the majority of stereotype threat research focuses on the ethnic/racial identity of minority individuals, the fact that many minority individuals identify equally with mainstream American culture is overlooked. For instance, Benet-Martinez et al., (2005; 2007) as well as

Oyserman, et al., (2003) have argued that many high achieving ethnic/racial minority students strongly identify with both ethnic and mainstream cultures; thus they hold two cultural identities simultaneously. Moreover, those researchers found that bicultural individuals vary in terms of how they see their membership in ethnic groups and in the larger society. However, identification with an ethnic/cultural group may be more complex because ethnic identification itself is also controlled by various factors (Brewer, 1993; Roccas & Brewer, 2002). For instance, studies have revealed that second generation, or later, immigrants often hold two ethnic/national/cultural identities as a result of living in two distinctly different social contexts. Certain contexts can activate one identity over the other, but the activation can be mediated by how individuals mentally structure those two cultural identities. For some, the two identities overlap to a greater extent. For others, the two identities are perceived as far away from each other. Benet-Martinez and colleagues (Benet-Martinez & Haritatos 2005; Ngyuen & Benet-Martinez, 2007) called this bicultural identity integration (BII).

Two identities in one body: Identification of bicultural individuals. Hong, Morris, Chiu, & Benet-Martinez (2000) demonstrated that the bicultural, Hong Kong-Chinese way of thinking shifts after seeing cultural icons associated with China and the U.S. That is, their study showed that bicultural individuals have two cognitive patterns associated with the culture of the home (native society) and with the mainstream (host society), and that they automatically shift their cognitive pattern upon receiving situational cues (e.g., seeing cultural icons).

Benet-Martinez, Leu, Lee, & Morris (2002) replicated the before-mentioned Hong et al. (2000) study comparing how bicultural individuals with high versus low BII respond to situational cues. In their study, Asian American bicultural individuals were given a computer graphic image of a fish swimming ahead of a group of fish and were asked to interpret the

meaning of the image. Their results showed not only that Asian American bicultural individuals shifted their ways of thinking upon seeing cultural icons of the U.S. and China, but also that BII mediated the direction of the shift. People with high BII interpreted the given image as a leader leading the rest of the fish — a way that is consistent with American norms after seeing American cultural icons (e.g., Statue of Liberty, Mickey Mouse). They also interpreted the same image as a group of fish chasing the outlier — a way consistent with Chinese norms after seeing Chinese cultural icons (e.g., Dragon, Great Wall of China). In contrast, people with low BII switched their interpretation in the opposite direction; they switched to American ways of thinking upon seeing Chinese cultural icons, and to Chinese ways of thinking upon seeing American icons. This is problematic because anything in the classroom can be seen as a cultural cue.

Benet-Martinez et al.'s (2002) study suggests that not all minority students are culturally cued in the same way. Rather, the level of BII mediates the interaction between contextual cues and students' response to context. If people with different degrees of BII respond to cultural cues differently, it may also be true that they will respond to identity activation cues differently.

Nguyen & Benet-Martinez (2007) explained that low BII individuals had more negative experience associated with their bicultural orientation and saw their two cultural identities as being in conflict with each other. Inner conflict causes resistance to contextual information, resulting in cultural framework switching that is inconsistent with situational cues (Nguyen & Benet-Martinez, 2007).

While Benet-Martinez et al. (2002) consider this behavioral/cognitive shift as cultural frame switching, LaFromboise, Coleman, & Gerton (1993); and Roccas & Brewer (2002) argued that it is a shift of one's social identity in response to a situation. If the situation triggers a shift

of cultural identities of bicultural individuals, this identity switch should also influence the effect of the ethnic/racial identity on stereotype threat. Following this logic, it may be argued that one's level of BII interacts with the effect of stereotype threat. Recall that stereotype threat was invoked by the situational cues that activated one's stereotyped identity (Steele, 1997). Given that bicultural individuals use situational cues to activate their cultural identities (Benet-Martinez et al., 2005), and that levels of BII interact with this process (Benet-Martinez, et al., 2002), individual differences of BII could account for the conflicting results in the stereotype literature.

Aim of Current Study

The aim of the current study is to examine the moderating role of bicultural identity orientation (i.e., bicultural identity integration or BII) on ethnic identity priming and stereotype effect. Extending the framework depicted by Shih (2000), this dissertation examines individual differences that make people more or less susceptible to stereotype effect. This framework is depicted in Figure 1. In order to examine this effect, this dissertation asked following research questions:

RQ 1: Are all Asian American and Hispanic Americans susceptible to stereotype effects?

RQ 2: What is the effect of having strong or weak ethnic identity on stereotype boost/threat?

RQ3: How does bicultural identity of Asian Americans and Hispanic Americans influence their stereotype susceptibility?

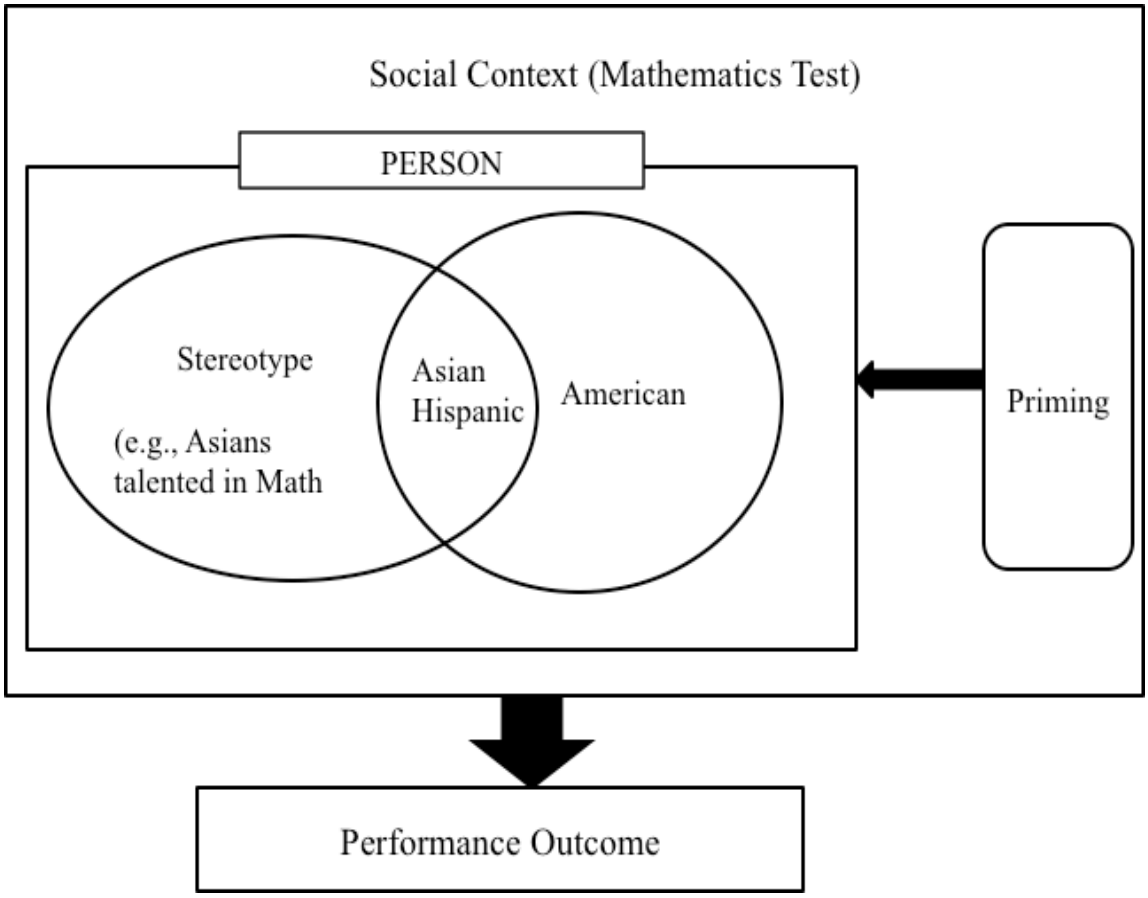

Figure1. Conceptual Framework Examining Susceptibility to Stereotype Effect, Adapted from Shih (2000)

In Chapter 2, I re-examine Shih et al.'s (1999) study using a replication study. In the past, researchers claimed to replicate their study but did not find the effect (Armenta, 2010; Cheryan, et al., 2000). However, close reading of these attempted replications revealed that these studies used different experimental manipulations (e.g., explicit vs. implicit activation of stereotype), or administered the test in different settings (e.g., individually by ethnically matching experimenter vs. in groups with different genders and ethnicities). Different manipulations and settings can introduce confounding variables and make it difficult to evaluate the effect that the researchers tried to replicate. Thus, the current study uses the materials and procedure that mirrors Shih et al.'s (1999) original study and extends it by adding an additional ethnic group that is associated

with an opposite stereotype than that of Asian Americans. By doing so, the current study adds the effect of positive or negative stereotypes on identity category salience leading to a group's performance outcome.

Chapter 3 examines the strength of ethnic identity as an individual difference in the study framework. According to the framework of Shih (2000), implicit activation of the stereotype (i.e., inquiring of a people's ethnicity without mentioning the stereotype) will produce a stronger stereotype effect, because activation of the identity subconsciously activates the stereotype and does not activate one's conscious effort to avoid the stereotype. Thus, the current study compares the effect of identity salience on stereotype susceptibility for people with different levels of ethnic identity. This chapter is also a conceptual replication of Armenta (2010), in which I examined the effect of strength of ethnic identity on one's stereotype susceptibility among Asian Americans and Hispanic Americans.

Chapter 4 further extends the idea of individual differences and addresses the dual identity of Asian Americans and Hispanic Americans. Based on the programs of research done by Benet-Martinez and colleagues (Benet-Martinez, Leu, Lee, & Morris, 2002; Cheng, Lee & Benet-Martinez, 2002; Hong, Morris, Chiu & Benet-Martinez, 2000), this chapter looks at stereotype susceptibility as students' reaction to the prime and examines how students' mental representation of bicultural identity (measured by BII-conflict) predicts contrasting versus assimilation to the prime.

Method and Procedure

This dissertation mirrors the research methods and procedures described by Shih et al., (1999) and Shih (2000).

Participants. In order to participate to the study, participants had to meet all of the following criteria: (a) female; (b) self-identify as Asian American or Hispanic American; and (c) self-identify as bicultural. Each participant participated in a study individually and was randomly assigned to the ethnic identity condition or the control condition. After completing an identity salience manipulation questionnaire, the participants worked on a challenging math test for 20 minutes and then completed questionnaires that asked their thoughts about the test. Data collection started in the fall semester of 2012 and ended in the fall of 2013.

One hundred sixty-four Asian American females (n = 116; mean age = 20.9, SD = 3.0, mean years of residence in U.S. = 16.97, SD = 6.10) and Hispanic American females (n = 48; mean age = 21.83, SD = 5.79, mean years of residence in U.S. = 20.09, SD = 7.05) from a variety of academic disciplines (roughly 30% from social science, 40% from natural science, 10% from arts and humanities, and 20% from others, including nursing and medical school) participated in this study in exchange for a coffee drink certificate (equivalent of $5) and a chance to enter a raffle for a $50 gift certificate.

Design and manipulation. Participants were randomly assigned to one of the two conditions. In the ethnic identity salient condition (Asian American, n = 58; Hispanic American, n = 24), participants were asked to complete a survey booklet entitled Student Life Survey, which included questions about (a) ethnicity; (b) generation status; (c) importance of ethnic food while growing up; and (d) participation in student organizations. In the control condition (Asian American, n = 58; Hispanic American n = 24), participants were asked to complete the same survey booklet, but had different questions: (a) how often they watch TV in a week; (b) if they have cable TV; (c) how often they eat out; and (d) how often they attend movies.

After completing the questionnaire, participants were asked to turn the page and were given scratch paper for the challenging math test. An experimenter informed them that they had 20 minutes in which to complete the math test. After 20 minutes, an experimenter told the participants to stop, and asked them to proceed to the follow up questions about the math test (e.g., "How well do you think you did on the test," or "How important was it for you to do well on the test?"). The last part of the booklet contained the Bicultural Identity Integration measure (BII; Benet-Martinez & Haritatos, 2005), and an ethnic identity measure (MEIM; Phinney, 1992).

Measurements and Instruments

Manipulation questions and the challenging math test, including the follow up questions, were obtained from Shih et al., (1999) to accurately replicate their previous studies.

Challenging math test. The challenging math test was obtained from Margaret Shih, the primary investigator of the Shih et al., 1999 study. Overall, participants attempted 10.78 out of 12 items (SD = 2.09) and correctly answered 3.72 items (SD = 1.89). Following Shih et al., (1999) and Cheryan et al. (2000) accuracy rate was calculated by the number of correct items divided by the number of items attempted. Overall, participants answered 35.38 % correctly. Asian Americans scored significantly higher than Hispanic Americans, $M_{Asian\ American} = 38.11$, $SD = 18.57$, $M_{Hispanic\ American} = 28.78$, $SD = 15.13$, $t\ (162) = 3.35$, $p < .001$.

After the math test, participants answered follow-up questions, such as, "How well do you think you did on the test?", "How difficult was the test?", "How interested are you in math?", and "How talented are you in math?" Hispanic Americans scored significantly higher on the item, "How difficult was the test?" $M_{Hispanic\ American} = 5.65$, $SD = 1.31$, $M_{Asian\ American} = 5.21$, t

(162) = -0.439, $p < .04$. Asian Americans and Hispanic Americans did not significantly differ for other items.

Ethnic identity. Ethnic identity was measured with the Multi-Group Ethnic Identity Measure (MEIM, Phinney, 1992). The MEIM includes 12 items that measure one's attachment to an ethnic group. Participants rated each item on the scale from 1 (strongly disagree) to 7 (strongly agree). Sample items include: "I have a strong sense of belonging to my own ethnic group," "I feel good about my cultural or ethnic background," and "I understand pretty well what my ethnic group membership means to me." This scale was reliable, thus all items were included to calculate one's level of ethnic identity ($\alpha = .89$). Individual scores for 12 items were averaged to form a composite score of ethnic identity. Four Asian American participants and one Hispanic American participant did not complete this measure and thus were excluded from the analysis in Chapter 3. Asian Americans scored significantly lower than Hispanic Americans, M Asian American = 5.54 , SD = 1.08, M Hispanic American = 6.15, SD = .85, t (158) = -3.49, p = .001.

Bicultural identity integration. Bicultural Identity Integration was measured with the Bicultural Identity Integration Scale: Version 1(BIIS-1; Benet-Martinez & Haritatos 2005). This scale has two subscales: the cultural distance scale and the cultural conflict scale. The cultural distance scale had an extremely low reliability for this sample ($\alpha = .37$), thus was excluded from the analysis. Therefore, for this study, the participants' level of bicultural identity integration was measured by the cultural conflict scale ($\alpha = .85$). The cultural conflict scale includes four items that measure an individuals' affective state about hosting two cultural identities: "I am conflicted between the American and the ethnic way of doing things;" "I feel caught between the ethnic and American cultures;" and "I don't feel trapped between American and ethnic cultures"

(reverse coded). Participants rated each item on the scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Individual scores for four items were averaged to form a composite score of the cultural conflict scale. BII conflict scale was scored so that the higher number represented less conflict, or higher integration. Three Asian American participants did not complete this measure, therefore were excluded from the analysis in Chapter 4. Asian American and Hispanic American participants did not differ on their BII cultural conflict scale, $M_{Asian\ American} = 4.35$, $SD = 1.53$, $M_{Hispanic\ American} = 4.79$, $SD = 1.64$, $t\ (159) = -1.66$, $p = .10$. All of the means and standard deviations on relevant variables are listed in Table 1.

Table 1. Means and Standard Deviations by Ethnicity

	Asian American (N = 116)	Hispanic American (N = 47)
Age	20.84	21.83
	(.26)	(.84)
Years in US	16.97	20.09
	(.57)	(1.03)
Number of correct items (12 items)	4.03_a	2.96_b
	(.17)	(.25)
Number of items attempted	10.89	10.52
	(.18)	(.36)
Math test accuracy (%)	38.11_a	28.77_b
	(1.72)	(2.18)
Talent and interest in math (1-7)	3.73	3.47
	(.15)	(.25)
Importance of doing well on test (1-7)	4.08	3.73
	(.16)	(.28)
Ethnic identity (1-7)	5.54_a	6.15_b
	(.10)	(.12)
BII (1-7)	4.35	4.79
	(.14)	(.24)

Note: Means not sharing a subscript are different at $p < .00$

CHAPTER 2
Social Category and Stereotypes Associated with Social Category: Are All Asian American and Hispanic American Females Susceptible to Stereotype Effects?

This chapter explores the effect of ethnic identity on Asian American and Hispanic American women's susceptibility toward or against stereotypes (see Figure 2.1). Ethnic identity priming in this study refers to the increased accessibility to people's ethnic identity due to experimental manipulation. In this chapter, half of the participants were asked about their ethnic background before taking a challenging math test, and the other half of the participants were asked about non-ethnically salient questions, such as the number of hours they watch TV during the week.

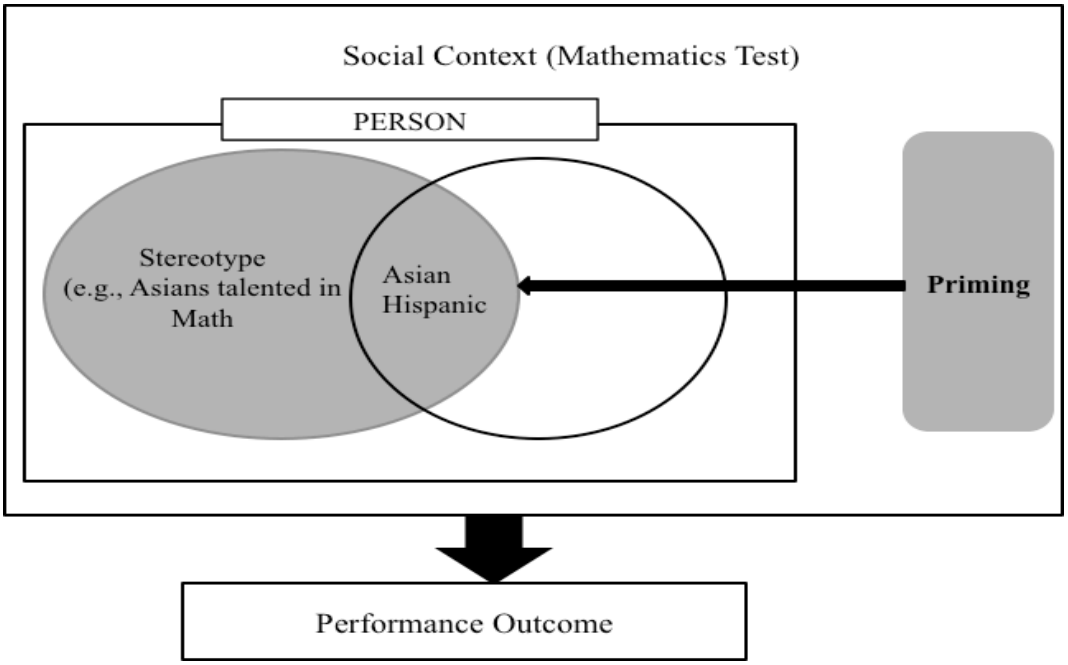

Figure 2. Conceptual Framework Examining the Role of Ethnicity Priming, Adapted from Shih (2000)

Theoretical Explanations for Stereotype Effects

Typically, the effect of stereotype is examined by comparing the test performance of people who were reminded about their group's stereotype and people who were not. So far,

several explanations have been proposed as to why reminding people of these stereotypes would change their test performance.

Stereotype effect as a priming effect. One such explanation understands stereotype effect fundamentally as a priming effect, where people assimilate their behavior to the prime they receive (Dijksterhuis, Spears, & Lépinasse, 2001). For example, when members of stereotyped groups are cued immediately before the assessment to think about their groups, the stereotype becomes the most readily accessible information and dictates how they perform on the assessment. When individuals are cued to think about stereotyped groups that they are not members of, this stereotype is still the most readily accessible information, and yet this information does not dictate proceeding action. From this perspective, when people are presented with stereotypes that are applicable to their social group, members are subconsciously primed to act and think in the direction of the stereotypes.

Cognitive dissonance. Another possible explanation for stereotype effect is through cognitive dissonance theory (CDT), theorized by Festinger (1957). CDT explains that individuals are motivated to resolve inconsistencies within themselves. That is, individuals may have certain ideas about themselves (e.g., I am good at math), but they also know that other people regard them through their membership in social groups (e.g., women) that are associated with an opposing idea (e.g., women are not good at math). These competing concepts (e.g., "I am good at math," vs. "women, including myself, are bad at math") could create dissonance, or psychological discomfort, that people are motivated to resolve. Resolving dissonance can be done in several ways. One way is to de-identify with the social group; using the same example, if a person does not identify with, or has low identification as a woman, the idea of women being bad at math should not compete with their idea of being good at math. Alternatively, individuals

can consciously or unconsciously change their behaviors (e.g., studying less), so that the idea of women being bad at math, and the idea of being a woman, does not conflict.

Automatic mental association. Alternatively, Galdi, Cadinu, & Tomasetto (2013) argued that automatic mental association between concepts (e.g., "me," and "girl"), or between a concept and its attributes (e.g., "girl," and "math"), to be the underlying mechanism behind stereotype effect for young children. In their study, they defined automatic association as the mental association (mentioned above) that unintentionally comes to mind, and measured it using the Implicit Association Test. They found that first and second grade girls who showed weaker mental association between "girls" and "math" had significantly lower math test scores after engaging in the stereotype-inducing activity. In one of the study's conditions, participants were asked to color a picture of a boy and a girl. In the picture, the boy was writing the correct answer to the math problem on the board while the girl in the picture wrote an incorrect answer. They argued that young children do not necessarily know or endorse stereotypes, yet the coloring activity led the girls in this condition to subconsciously distance the concepts "girls" and "math." They argued that the lack of automatic association between such concepts (e.g., "girls" and "math") resulted in decreased math test scores among the first and second grade girls. Nosek, Banaji, & Greenwald (2002) explored the same question for university students, and found that female students who endorsed the mental association between "math" and "male" had more negative attitudes toward mathematics. Viewed from this perspective, when people are reminded of their social identity, not only is group identity activated, but the attributes associated with group identity are activated as well. Because this association is an automatic process, people do not even realize that they have been affected.

Multiple Identities and People's Susceptibility

Shih, Pittinsky, & Ambady (1999) argued that people often see themselves as more than one single identity. For example, they argued that ethnic American females can identify themselves as being ethnic (e.g., Asian), but can also identify themselves as being female. They examined the stereotype effect among Asian American female students. Similar to the idea of automatic association, they argued that inquiry about one's social group makes the group more salient. More specifically, they reasoned that asking Asian American women about their ethnic background would make their ethnic identity salient, while asking Asian American women about their gender would make their gender identity salient. They hypothesized that salient Asian identity should boost Asian American participants' test performance, whereas salient female identity should hinder Asian American participants' test performance. In order to test their hypotheses, they compared the performance of participants on a challenging math test (a standardized norm-referenced test comparable to the GRE) in one of three conditions: (1) those with Asian identity salience condition; (2) those with female identity salience condition; and (3) a control group. Participants in each condition were asked to answer a few questions before taking the challenging math test. In the Asian identity salience condition, participants were asked about their ethnicity, the language used at home, and food preferences before taking the test. In the female identity salience condition, participants were asked to answer questions about their gender and their preference for co-ed versus single sex dormitories. The control group was asked to answer questions that would not make any identity salient (e.g., hours of TV watching). The results showed that the Asian identity salience enhanced performance on the math test, while female identity salience decreased performance on the math test. These findings suggest that stereotyped group identity can be activated by social cues simply by asking about the preference of food. The key point here is that Shih et al.'s (1999) Asian American participants' test scores

increased when they were asked about their ethnicity right before taking a test, and their test scores decreased when asked about their gender.

Cheryan and Bodenhausen (2000) attempted to replicate Shih et al.'s (1999) experiment, with a different activation (or ethnic identity salience) cue. They argued that Shih et al.'s (1999) identity salience had made the personal ethnic identity salient. Activating the collective ethnic identity, they argued, would create the psychological burden of living up to the higher standard, thus decreasing their performance. To test this hypothesis, they replicated Shih et al.'s (1999) study but altered the ethnic identity salience question so that the questions would activate people's collective identity. Results showed that Asian American females in the Asian salience condition had significantly lower scores than those in the control condition. Participants in the female identity condition did not differ on their scores with those in control condition. Therefore, the data only showed significant effect of stereotype effect on ethnic identity salience condition, but not in the female identity condition.

Cheryan et al. (2000) argued that the Asian identity salience manipulation in their study created a psychological burden for participants in the Asian identity condition because the participants in the female identity condition performed in the same way as their counterparts in the control condition. Given these results, they claimed that positive stereotypes can become a psychological burden because members feel pressured to meet the high expectations of others. In short, Shih et al. (1999) and Cheryan et al. (2000) both examined the effects of math-related stereotypes on Asian American females and showed contradictory results. Participants in both studies consisted of Asian American females who were attending highly selective colleges and studying math-related subjects, thus the similar sample population does not seem to explain why the two studies yielded strikingly different results. Cheryan et al. (2000) would argue that this

difference was due to the different kind of ethnic identity (private vs. collective) that was made salient by the experimental manipulation. However, this finding may also be attributed to a potentially confounding factor. Although Cheryan et al. (2000) aimed only to alter the activation of the Asian collective identity as opposed to personal identity, they also activated the stereotype by presenting a challenging math test as a diagnostic of a stereotyped ability (p. 2). Introducing the test as a diagnostic of ability is one frequently used method to induce stereotype threat (Steele, 1997). That is, Cheryan et al.'s (2000) results could be a result of stereotype threat salience, rather than the collective identity salience that the authors proposed. Alternatively, their results could be the product of an additive effect between collective identity salience and stereotype salience. Either way, with a potential confounding factor in their study, it is difficult to evaluate their claim. Furthermore, in response to Cheryan et al.'s (2000) findings, Shih (2001) compared the effect of stereotype salience, and that of ethnic identity salience, among Asian American female participants. She found that stereotype salience induced the lower performance outcome, compared to the identity salience, and thus concluded that it is not the type (collective vs. privately held ethnic identity) that caused lower performance, but rather the salience of stereotype that induced the low performance.

This chapter attempts to replicate Shih et al.'s (1999) experiment using exactly the same research materials and design. In addition, this chapter extends Shih et al.'s (1999) research to a different ethnic group associated with an opposite stereotype (e.g., Chun & Dickson, 2011; Nieman, Jennings, Rozelle, & Baxter, 1994: Steele, Spencer, & Aronson, 2002; U.S. Department of Education, 2011).

Stereotype Effects on Asian American and Hispanic American Females

Being the largest and fastest growing minority groups in the United States, both Asian and Hispanic Americans have increased their enrollment in American schools. Both groups are similar in that they include children born in the U.S as well as foreign-born children, and have a high percentage of children who grew up as bilingual and/or bicultural (Feliciano, 2001). However, the groups are very different in terms of their academic achievement and achievement-related stereotypes. Being Asian is associated with high academic achievement (Lee, 1996; Kim & Chun, 1994), whereas being Hispanic is associated with low academic achievement (Schmader & Johns, 2003). The stereotype effects for Asian and Hispanic Americans therefore lie in opposite directions. Armenta (2010) examined the stereotype boost for Asian Americans and the stereotype threat for Hispanic Americans, and found that Asian American participants in a stereotype salience condition performed better than those in the control condition or than their Hispanic American counterparts. Thus, Armenta's (2010) findings directly contradict the findings of Shih (2001) and that of Cheryan (2000). In summary, findings of Shih et al. (1999), Cheryan et al. (2000), and Armenta (2010) show that the effect of stereotypes seems to differ from study to study. Although all three studies involve Asian Americans and math ability stereotypes, results clearly seem to show different outcomes.

Present Study

Various theories suggest that stereotypes influence our behavior by (1) creating the need to resolve discomfort by changing cognition and behavior, or (2) activating the automatic mental associations that cause behavioral and cognitive change. To put it in another way, stereotype effect is our reaction to situational cues. Thus, based on this perspective, the hypotheses were as follows:

H1: Asian American females will score higher when they are reminded about their ethnicity before taking a challenging math test.

H2: Hispanic Americans will score lower when they are reminded about their ethnicity before taking a challenging math test.

Method

This chapter examines the effect of stereotyped identity activation on test performance between Asian American females (a group associated with a positive stereotype regarding math performance) and Hispanic Americans (a group associated with a negative stereotype regarding math performance). It was hypothesized that Asian American female participants would score higher when their ethnic identity was activated, and Hispanic American participants would score lower when their ethnic identity was activated.

Participants. 116 Asian American females and 48 Hispanic American females participated in the study in an exchange for a coffee shop certificate ($5 value).

Design and manipulation. Participants were randomly assigned to one of two conditions; ethnic identity priming condition, and no identity priming condition (control condition). The identity priming mirrored manipulation method of Shih et al. (1999; Shih, 2001).

Procedure. Participants were run individually in the laboratory settings. Undergraduate research assistants were selected so that their ethnicity matched that of the participants. The research assistants were also blind to the experimental condition and the objective of the study. When participants arrived for the study, they were greeted by the female undergraduate research assistants, who then gave the participants a study information sheet and a survey booklet entitled "Student Life Survey." The booklet had two versions. Each booklet contained one of the two

manipulation items: ethnic identity priming or no identity priming (control condition). Detailed information of manipulation items, along with all other measurements, was listed in the first chapter. Except for the manipulation items, both versions of the booklet had the challenging math test, follow-up questions, BII measure, and MEIM measure. When participants completed the booklet, a research assistant thanked them and gave them a debriefing statement and the coffee certificate.

Analysis

Shih et al. (1999) used planned contrast one-way ANOVA. Thus, the current study also used ANOVA, but added ethnicity (Asian American vs. Hispanic American) as additional factors. Thus, the first analysis was 2 (ethnicity) × 2 (condition) ANOVA for math test accuracy as an outcome. Power analysis using G*Power 3.1.9 indicated that this analysis requires at least 158 total samples to have power (.80) to detect a medium effect (f = .25). Conducting one-way ANCOVA (detail described below) requires at least 128 samples to have power (.80) to detect a medium to effect (f = .25), and 90 samples to have power to detect a medium to large effect (f =.30).

Results and Discussion

The first hypothesis asked if Asian American and Hispanic American female students enrolled in various majors would be susceptible to stereotype boost or threat. In order to test this hypothesis, a 2 (Asian American vs. Hispanic American) × 2 (Ethnic identity activation vs. Control) ANOVA was conducted with math test accuracy (i.e., number of correct items divided by number of items attempted) as an outcome. This analysis violated the assumption of equal variance across different conditions, Levene's test of equality of error turned out to be significant, $F(3, 156) = 3.33$, $p < .03$. Thus, the results need to be interpreted with caution.

This analysis showed a main effect for ethnicity, $F(1, 156) = 5.39$, $p < .02$. Regardless of the condition, Asian American participants had significantly higher math test accuracy ($M_{Asian\ American} = 37.66$, $SD = 1.58$) than Hispanic Americans ($M_{Hispanic\ American} = 30.73$, $SD = 2.53$). Because math talent and interest was positively related to math test accuracy, $r(158) = .27$, $p < .01$, a 2 × 2 ANCOVA, with talent and interest in math as covariates, was also conducted. This analysis satisfied the assumption of ANCOVA. There was a significant main effect for ethnicity, $F(1, 155) = 4.65$, $p < .03$. After controlling for math talent and interest, the Asian American participants had higher mean scores for math test accuracy, $M_{Asian\ American} = 37.47$, $SD = 1.53$ than the Hispanic American participants, $M_{Hispanic\ American} = 31.23$, $SD = 2.45$. Thus, whether or not math talent and interest were controlled for, there was no main effect of condition, $F(1,155) = .263$, $p = n.s.$

Researchers argue that the stereotype effect is most likely relevant only for people who care about the outcome of a test and for people who are actually good at math (Steele, 1997), thus people who scored two or fewer items correctly ($n = 7$) were excluded. This cut-off was based on the theory, and not based on the outliers. Results show that the main effects for ethnicity and condition were significant, $F_{ethnicity}(1, 113) = .05$, $\eta_p^2 = .04$, $F_{condition}(1, 113) = .03$, $\eta_p^2 = .04$. Although interaction effects between ethnicity and condition did not reach a conventional level of significance, Hispanic Americans in the identity activation condition scored significantly lower than those in the control group. Analyzing each ethnicity separately, the main effect for condition was significant for Hispanic Americans, $F(1, 27) = 5.84$, $p = .02$, $\eta_p^2 = .18$, whereas the main effect for condition did not reach conventional statistical significance for Asian Americans, $F(1, 85) = .16$, $p = .69$, $\eta_p^2 = .00$. Thus, above average performing Asian

Americans in this sample did not show stereotype boost or stereotype threat, while their Hispanic American counterparts showed stereotype threat (Figure 3).

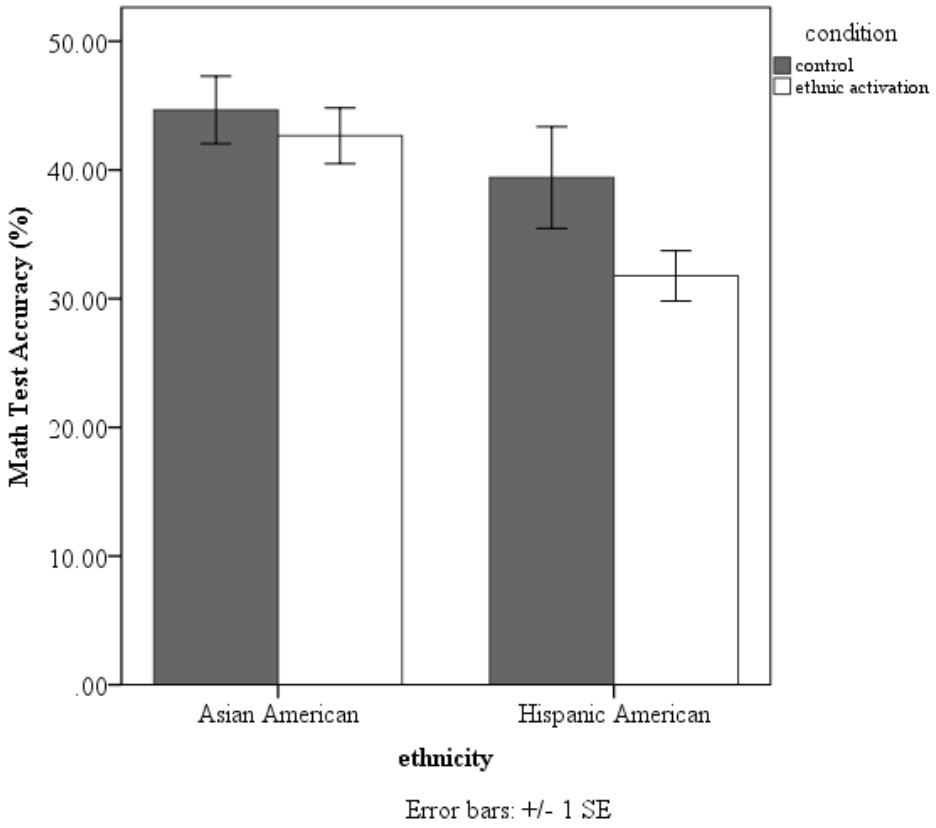

Figure 3. Math Test Accuracy (%) by Ethnicity and Condition

Discussion

Hypothesis 1 asked whether Asian American and Hispanic American females' math test scores differed as a function of activated ethnic identity. More specifically, Hypothesis 1 asked whether Asian American participants scored higher when their ethnic identity was made salient. Hypothesis 2 asked whether Hispanic Americans scored lower when their ethnic identity was made salient. Results were not consistent with either of the hypotheses.

However, when the analysis only included people who had more than two items correct, there was a marginal main effect for the condition among Hispanic Americans, replicating a previous study by Schmader & Johns (2003). That is, among Hispanic Americans who

performed above average (relative to this study's sample), people in the ethnic identity priming condition had significantly lower scores than those in the control condition. Asian Americans, on the other hand, did not show any significant effect of identity priming. Given that I used the same instrument and procedure of Shih et al. (1999), it can be concluded that not all Asian American females in this study experienced stereotype boost.

Hispanic Americans in this sample seemed to experience stereotype threat, especially those who performed above average. This is consistent with Steele's (1997) argument, in which stereotype threat is experienced by people who are members of negatively stereotyped groups, and by people who care about and are good at math. Analysis of this chapter could be interpreted in two ways: (1) Asian American participants in this study experienced neither stereotype boost nor stereotype threat, or (2) there may be an additional factor that moderated the effect of ethnic identity activation.

This study manipulated the priming of ethnicity by making people to think about themselves as Asian or Hispanic. Ethier & Deaux (1994) argued that increased salience of ethnicity in naturalistic settings (e.g., a Hispanic student growing up in a Hispanic neighborhood and attending a college where the majority of students are White) increases and strengthens one's ethnic identity over time. Following this logic, making ethnicity salient might have temporarily increased some participants' ethnic identity, while it may have decreased or failed to change anything for others. If this was the case, Shih et al.'s (1999) results of Asian salience and superior performance can be interpreted as a result of increased sense of ethnic identity, rather than the salience of Asian identity per se.

Alternatively, some people may be more sensitive to the manipulation while others are not. One's level of ethnic identity may have something to do with it. Therefore, Chapter 3

explores (a) if participants in the ethnic identity activation condition show heightened ethnic identity, and (b) how participants' level of identification changes the way they are affected by identity activation cues.

CHAPTER 3
Ethnic Identification as a Moderator: What is the Effect of Having Strong or Weak Ethnic Identity on Stereotype Threat/Boost?

The previous chapter examined the effect of identity priming on Asian American and Hispanic American females by replicating an existing study (Cheryan, et al., 2000 & Shih et al., 1999). The result was not consistent with previous studies, possibly because the ethnicity priming might have resulted in an increased sense of ethnic identity, which in turn moderated the effect of stereotype susceptibility. Thus, the aim of this chapter is to address the role of ethnic identity as a moderator for identity priming on stereotype susceptibility. The conceptual framework is depicted in Figure 4.

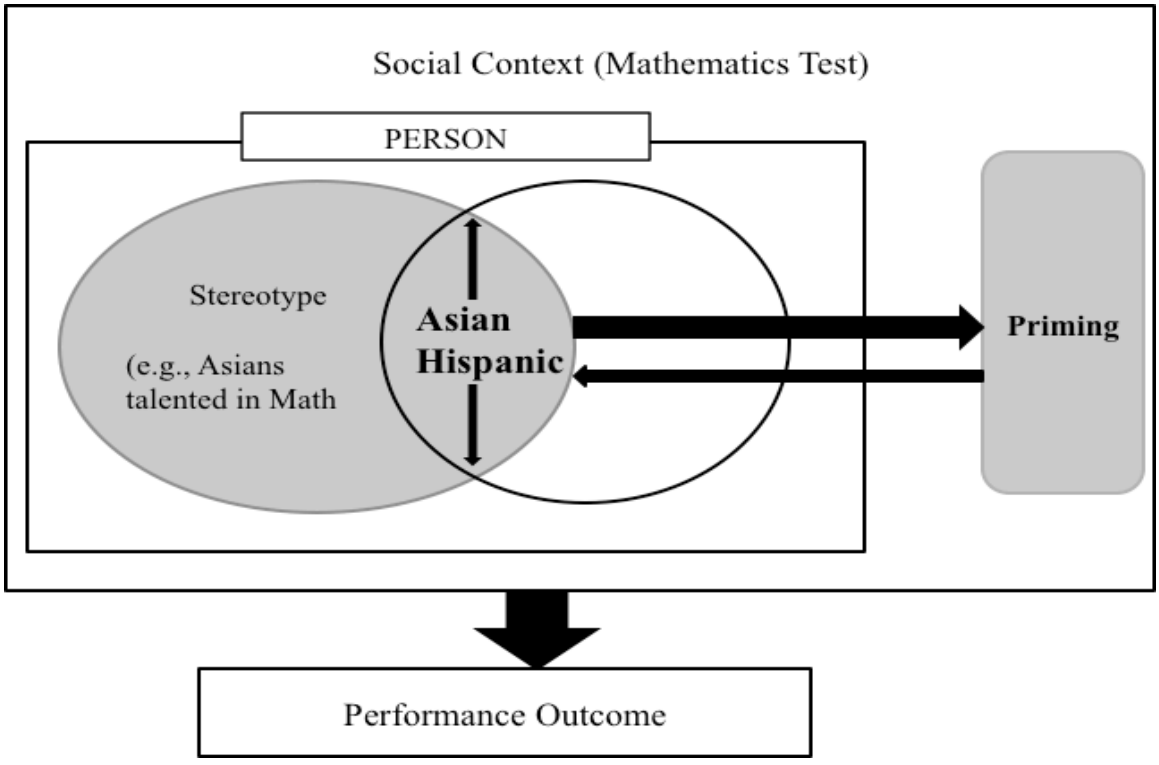

Figure 4. Conceptual Framework Examining the Role of Ethnic Identity as a Moderator for Identity Priming and Stereotype Susceptibility

A meta-analysis of stereotype effect indicated that the magnitude of stereotype effect is moderated by several factors (Nguyen & Ryan, 2008). Domain identification is one such well-known moderator. Research showed that students' identification with an academic subject (e.g., math identity) enhanced their academic achievement through strengthening their self-efficacy (e.g., Eccles, 1994; Marsh, 1992). Knowing stereotypes about a group member's academic performance seems to interact with this process. For example, Smith & Johnson (2006) demonstrated that low math-identifying males underperformed on a challenging math test when they were reminded about the stereotype, while high math-identifying males outperformed the same test. Another study found that high math-identifying females underperformed on a challenging math test when they were reminded about stereotypes (Keller, 2007). Thus, existing empirical research seems to indicate that positive stereotypes undermine the performance of low-identifying people, whereas negative stereotypes undermine the performance of high-identifying people. This means that the level of one's identification does not necessarily predict one's susceptibility. Rather, valence of the stereotypes (positive vs. negative) interacting with one's social or domain identity, determines who becomes susceptible to stereotypes. Does the same process explain other group identities and their effect on stereotype susceptibility?

Group identification, or the degree to which individuals identify with and value membership in a particular group, is another factor that is known to moderate the effect of stereotype. Social categorization theory posits that people with strong group identity are more likely to conform to a prototype including a widely known stereotype about the particular group. For instance, Schmader (2001) found that female college students with high female identity underperformed compared to those with low female identity when they were told that the testing showed intellectual differences between men and women. Armenta (2010) found a similar

relationship between the strength of ethnic identity and test performance. His study showed that Asian American participants with high ethnic identity scored higher, and Hispanic American participants with high ethnic identity scored lower when they were told that the test was known to exhibit a difference of intellectual ability by ethnicity. These studies suggest that individuals with high ethnic identity are more susceptible to the effect of the stereotype, regardless of its direction (positive or negative).

Armenta's (2010) study provided great insight as to how a challenging math test and stereotypes led to a boosting versus a threatening effect on Asian Americans and Hispanic Americans. However, his findings seem to have confounding factors. He ran his participants in groups, where he did not control the gender or ethnic composition of the testing groups. This means that participants sat in the same room with people who were stereotypically more or less capable in math. To put it differently, his study participants might have received a stereotype cue by simply sitting in the same room with other highly stereotyped group members, in addition to his proposed condition.

These social cues can induce a comparison between the self and other more or less able people. Such a social comparison is known to influence people's performance (Izlicht & Ben Zeeb, 2000; Walton & Cohen, 2003), and this effect is independent of the stereotype threat/boost effect that Armenta (2010) investigated. Furthermore, his experimental manipulation contains an explicit activation of the stereotype. Different stereotype manipulations have a different effect on target populations (Shih, 2000; Shih, Ambady, Richeson, Fujita, & Gray, 2002). This makes it difficult for us to evaluate if the resulting performance was due to the stereotype cues given directly before testing, or was due to the taking of a math test with people who are stereotyped to be more or less talented in math. Thus, Chapter 3 will address this limitation by administering a

test individually and by employing the implicit identity activation (Shih, et al., 1999). Chapter 3 examined the following hypotheses:

H1(a) High ethnic identity Asian Americans will score higher on challenging math test when their ethnic identity is made salient.

H1(b) Low ethnic identity Asian Americans will score lower on a challenging math test when their ethnic identity is made salient.

H2(a) Low ethnic identity Hispanic Americans will score lower on a challenging math test when their ethnic identity is made salient.

H2(b) Low ethnic identity Hispanic Americans will not score in the same way with | people in the control group.

Method and Procedure

Participants and procedures were described in Chapters 1 and 2 and this is the re-analysis of the same data. Because the current chapter asked about the role of ethnic identity as a moderator on the effect of identity priming, multiple regression analysis examining the interaction between ethnic identity and experimental conditions was employed. This analysis plan was adapted from Armenta (2000). This modification was made because this study did not include gender. Power analysis using G* Power 3.1.9 suggested that a total sample of 154 was required to have a power (.80) to detect an interaction with medium effect size (f^2= .15), and a sample size of 55 was required to have a power to detect an interaction with medium effect when analysis was conducted separately for each ethnic group.

Results

This chapter asked if people's levels of ethnic identity would determine their stereotype susceptibility. It was hypothesized that people with high ethnic identity would be more

susceptible to the stereotypes. Thus, it was expected that high ethnic identity Asian American participants in the ethnic priming condition would score higher than their counterparts in control conditions. Low ethnic identity Asian Americans, on the other hand, would score lower than those in the control group. This pattern would be the same for Hispanic Americans, thus high ethnic identity Hispanic Americans would score lower in an ethnic priming condition than those in the control condition. Low ethnic identity Hispanic Americans would score the same as those in the control group.

Preliminary analysis. A 2 (ethnic identity priming vs. control) × 2 (Asian Americans vs. Hispanic Americans) ANOVA was conducted to examine if ethnic identity priming would result in higher ethnic identity for students in the ethnic identity priming condition. The only significant effect was ethnicity, F (1, 156) = 12.12, p = .001, $\eta_p^2 = .07$. Hispanic Americans held significantly higher ethnic identity than Asian Americans, $M_{Hispanic\ Americans}$ = 6.15, SE = .10, $M_{Asian\ Americans}$ = 5.54, SE = .15. There was no significant effect of condition, F (1, 156) = .81, p = .37, $\eta_p^2 = .01$, or an interaction effect between condition and ethnicity, F (1, 156) = .63, p = .43, $\eta_p^2 = .00$, suggesting that ethnic identity priming did not increase or decrease students' ethnic identity. Salience, therefore, would most likely make ethnic group membership cognitively accessible, but not necessarily change the way they identify with the group.

Because only female participants were recruited, gender was not considered in this study. Ethnicity and condition were dummy coded (Asian American = 0, Hispanic American = 1 and Control = 0, Ethnic identity activation = 1). As was done in Armenta's (2010) study, hierarchical multiple regression was conducted with the first model including all of the variables (dummy coded ethnicity, dummy coded condition, and ethnic identity). The second model included two-way interactions between ethnicity and condition, ethnicity and ethnic identity, and

ethnic identity and condition. The third model examined three-way interactions among condition, ethnicity, and ethnic identity.

Math test accuracy. When all participants were included, the first model was significant, F (3, 155) = 4.05, p = .01. Ethnicity was the only significant predictor, β = -.201, p =.01. Adding two-way interactions and three-way interactions did not significantly increase the explained variance. The challenging math test should not be so difficult that it is impossible to solve, or the stereotype effect exerts its influence on those with sufficient skill to solve the problems (Steele, 1997). Therefore I eliminated people who had two or fewer correct items. This cut-off score was determined based on the theory and not based on the outlier. After eliminating those who scored less than two items (n = 11), different patterns emerged (see Table 2). The first model was significant, (R^2 = .13), F (3, 111) = 5.32, p = 0.00. Adding two-way interactions resulted in a significant increase in the explained variance (ΔR^2 = .08), Δ F (3, 108) = 3.83, p = .02. Two of the interactions, interaction between ethnicity and condition (β = .30, p = .05), and interaction between ethnic identity and condition (β = 1.20, p = .02), were also significant. The interaction between ethnicity and ethnic identity did not reach the conventional level of significance, although it came close to the significance (β = - 1.26, p = .06).

Table 2. Hierarchical Regression Analysis Predicting Math Accuracy (Both Group Combined and Low Performers Excluded)

	Math performance				
Model	b	SE	β	t	p
Model 1 (main effects)					
Condition	-3.42	2.73	-.11	-1.25	.21
Ethnicity	-6.48	3.21	-.19	-2.02	.05
Ethnic identity (MEIM)	-3.29	1.29	-.24	-2.56	.01
Model 2 (interaction effects)					
Ethnicity × condition	-12.81	6.38	-.30	-2.01	.05
Ethnic identity × condition	6.29	2.54	1.21	2.48	.02
Ethnicity × Ethnic identity	-7.01	3.72	-1.26	-1.89	.06
Model 3 (moderation model)					
Ethnicity× Condition × Ethnic identification	9.26	7.98	1.32	1.16	.25

Note. Ethnicity was coded 0 (Asian) and 1 (Hispanic American), Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

In order to understand if and how the role of ethnic identity is different for each ethnicity, a separate analysis was conducted for each ethnic group. Results show a different trend for each ethnic group. The regression of math test accuracy on ethnic identity priming (condition), ethnic identity, and interaction term showed no significant effect of ethnic identity, or interaction effect of ethnic identity and condition for Asian Americans (see Table 3 and Figure 5), but showed significant main effect of ethnic identity (β = -. 5.75, p = .00), condition (β = -.43, p = .00), and interaction (β = *3.90*, p = .00) for Hispanic Americans (see Table 4 and Figure 6). Each regression analysis was followed up with a simple slope analysis. As shown in the figures below, both Asian Americans and Hispanic Americans with low ethnic identity scored higher on math accuracy under the control condition. When their ethnic identity was made salient, however, low ethnic identity Asian Americans and Hispanic Americans scored lower, while high ethnic identity Asian Americans and Hispanic Americans did not seem to be influenced by the ethnic salience. Average ethnic identity Hispanic American participants scored significantly

lower when their ethnic identity was made salient, whereas average ethnic identity Asian Americans were not influenced by the ethnicity priming.

Table 3. Muptiple Regression Analysis Predicting Math Accuracy, Asian Americans Only

	Math performance				
Model	b	SE	β	t	p
Model 1 (main effects)					
Condition	- 1.63	3.44	-.05	-.47	.64
Ethnic identity (MEIM)	- 2.57	1.50	-.19	-1.71	.09
Model 2 (interaction effect)					
Ethnic identity × condition	5.24	2.98	.96	1.76	.08

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

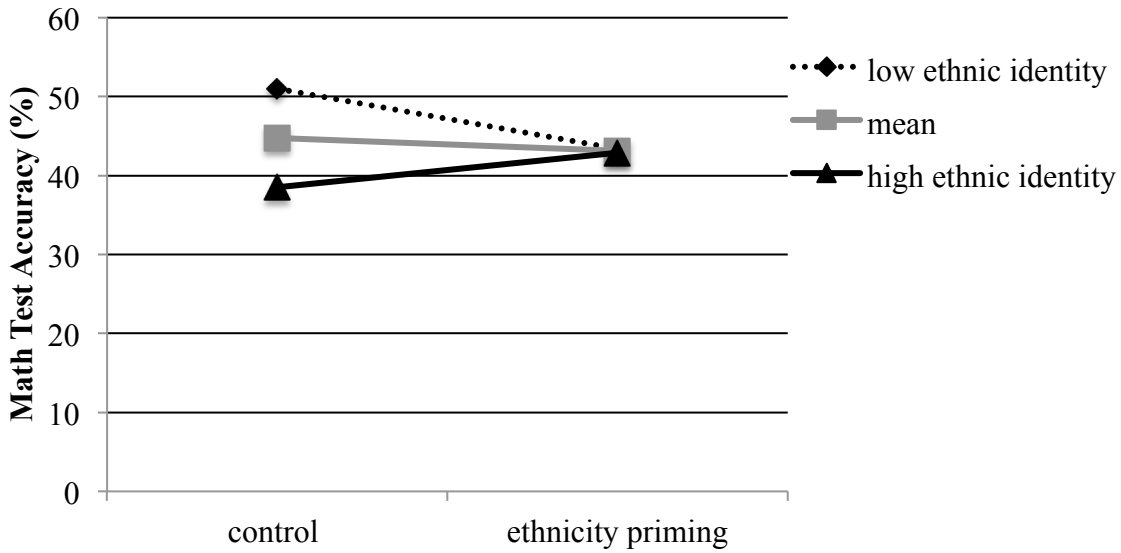

Figure 5. Asian Americans' Conditional Effect of Ethnic Identity at Various Levels on Math Test Accuracy (%)

Table 4. Multiple Regression Analysis Predicting Math Test Accuracy(%), Hispanic Americans Only

	Math performance				
Model	b	SE	β	t	P
Model 1 (main effects)					
Condition	-10.00	3.40	-.43	-2.94	.00
Ethnic identity (MEIM)	- 8.64	2.22	-5.75	-3.90	.00
Model 2 (interaction effect)					
Ethnic identity × condition	14.50	4.02	3.90	3.61	.00

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

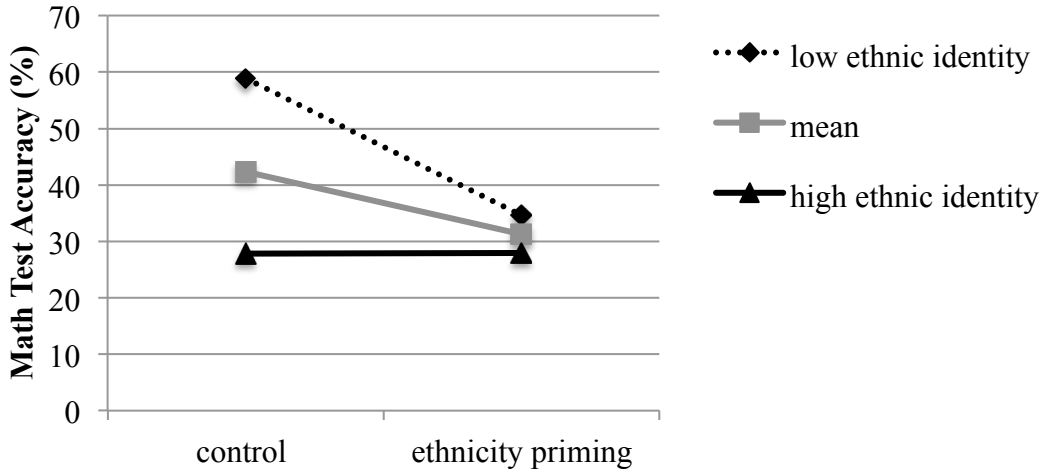

Figure 6. Hispanic Americans' Conditional Effect of Ethnic Identity at Various Scores on Math Test Accuracy (%)

Self-reported talent in math. Furthermore, when the same analysis was conducted with self-reported talent in math as an outcome, there was a significant interaction effect between condition and ethnic identity only for Hispanic Americans (Table 5). Much like the trend with math accuracy, Hispanic Americans with low identity reported higher degrees of talent in math under the control condition, while their counterparts reported a significantly lower perceived talent in math when their ethnicity was primed (Figure 7). This pattern was not observed for Asian American participants.

Table 5. Multiple Regression Analysis Predicting Talent in Math, Hispanic Americans only

	Math performance				
Model	b	SE	β	T	p
Model 1 (main effects)					
Condition	.51	.53	.17	.97	.34
Ethnic identity (MEIM)	-.85	.34	-.43	-2.47	.02
Model 2 (interaction effect)					
Ethnic identity × condition	1.55	.70	3.12	2.21	.04

Note. Condition was coded as 0 (control condition), and 1 (ethnic identity salient condition)

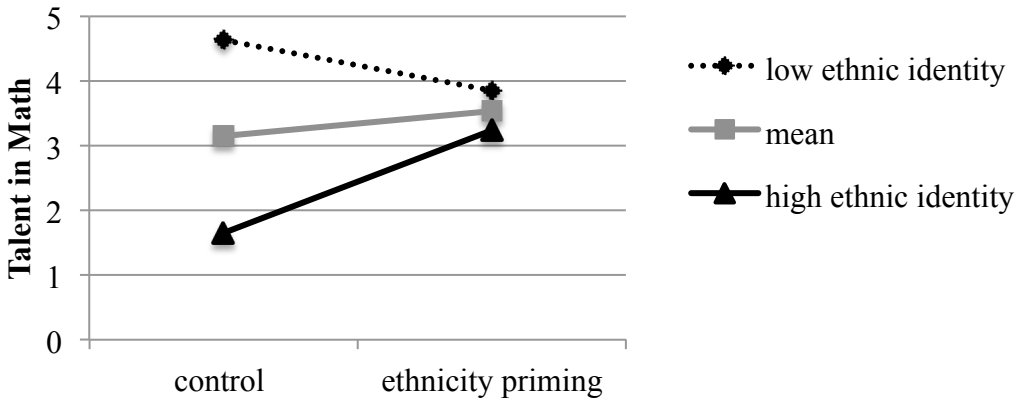

Figure 7. Hispanic Americans' Conditional Effect of Ethnic Identity At Various Levels on Talent in Math

Discussion

Analysis, including all participants and both ethnicities did not show a significant mediator role of ethnic identity on students' susceptibility toward ethnic identity priming. I excluded people who scored less than average (two or less correct items out of 12 math items), because stereotype exerts its influence on people when they care about their performance (Steele, 1997) and some of the participants may have simply given up and not tried harder. Tracking students' response time for each math problem might have provided more accurate criteria for excluding those who did not take the math test seriously. After excluding some these students, the results showed significant effects of ethnicity, ethnicity condition interaction, and condition ethnic identity interaction. To better understand the nature of this interaction, a separate analysis was conducted by ethnicity.

Low ethnic identifying Hispanic Americans scored significantly higher on math accuracy in the control condition, but scored significantly lower in the ethnic priming condition. High ethnic identity Hispanic Americans appeared to be uninfluenced by the condition. Although none of the predictors reached a conventional level of significance, Asian American participants also followed similar patterns. Recall that Armenta (2010) argued that high ethnic identity predicted one's susceptibility to stereotype. He found highly Asian-identified Asian Americans scored higher under the stereotype-salient condition, whereas highly Hispanic-identified Hispanic American students scored lower under the same condition. The current study was not consistent with his findings, but revealed the opposite trend.

Because the method employed for this chapter addressed the possible confounds of Armenta (2010), the results from this chapter may show a more plausible role of ethnic identity on one's susceptibility toward stereotypes. Significance of interaction effect suggests that the

effect of the stereotype is moderated by the ethnic identity for Hispanic Americans, but this moderating role was different from what Armenta (2010) explained. High ethnic identity did not increase students' susceptibility toward the stereotype, but might have eased the negative influence of the stereotypes. In addition, valence of the stereotype did not seem to create much impact on the moderating role of ethnic identity. For both Asian Americans and Hispanic Americans, people in the ethnic identity priming condition had slightly lower scores than those in the control condition. That is, regardless of the valence of the stereotype, ethnic identity priming had somehow lowered students' performance. What is notable here is that for both ethnic groups, students in the control condition had generally higher scores than those in ethnic identity priming condition in almost all outcome measures. This was particularly true for low ethnic identifying Hispanic Americans. Simple slope analysis showed that low ethnic identity Hispanic Americans had significantly lower math accuracy, as well as a perceived talent in math, in the ethnic priming condition. That is, high ethnic identity does not necessarily promote one's academic achievement, but seems to work as a protective factor *only when* the ethnicity is made salient. On the other hand, people with low ethnic identity scored higher when their ethnic identity was not made salient (e.g., taking a test in an isolated room). Ethnic identity is one of the most salient social identities for American minority students (Fuligni, Witkow, & Garcia, 2005). If this is true, unless they are tested individually in an isolated environment, their performance may always be influenced by stereotype. Promoting students' ethnic identity may mitigate this aversive effect, but does not necessary promote, or decrease one's academic achievement.

Furthermore, the role of ethnic identity on student's academic achievement has been inconclusive in literature. This could be because researchers define ethnic identity in a variety of

ways and use different measures of ethnic identity. For example, some examined the role of ethnic identity on student achievement given their identity label (Lee, 1994, Matute-Bianchi, 1986). Others defined ethnic identity as the positive feeling toward their ethnic group (Fuligni, Witkow, & Garcia, 2005). That is, the label itself may not be a useful measure of the role of ethnic identity and we need to examine its role in the context of academic achievement at different levels of ethnic identity. The data from this study may shed some light on these inconsistent findings regarding ethnic identity and academic performance.

Ethnic identity may offset the potentially negative effects of the academic stereotypes, particularly when the ethnic group is associated with negative academic stereotypes. However, this is not to say that ethnic identity would promote student academic achievement. In fact, when people are allowed to take a challenging math test without the presence of other group members, they may perform better. This is important because many of the tests were given in the classroom, and not in an isolated setting.

Asian Americans and Hispanic Americans as people with bicultural identity. In this study sample, Hispanic American participants showed a significantly higher ethnic identity than Asian American participants. An ethnic group and its members' strength of ethnic identity seems to differ from study to study. In some studies, Asian (Chinese) Americans and Hispanic (Mexican) Americans did not differ in their strength of ethnic identity (e.g., Fuligni, Witkow, & Garcia, 2005), but other studies found that Hispanic Americans had slightly a higher ethnic identity than Asian Americans (e.g., Armenta, 2010). Some ethnic identity scholars, however, argue that the quality of ethnic identity matters more than the quantity of the ethnic identity (i.e., strength of identity). For example, researchers argue that when people's racial and ethnic identity includes their bicultural identity (i.e., identity as an ethnic person and identity as a

member of larger society), they are protected against the adverse effect of negative stereotypes (Oyserman, Kemelmeiyer, Fryberg, Brosh & Hart-Johnson, 2002).

Both Asian Americans and Hispanic Americans are members of the American society. Berry (1997), as well as Phinney (1992), argued that integration of ethnic and American societies was the most effective adaptation strategy for immigrant families. For example, Benet-Martinez and colleagues (2002) found that well-integrated immigrant families developed a cognitive system (i.e., schemata) where they stored social, cognitive, and behavioral repertoires for ethnic and American culture. Some people recognized them to be overlapping and others recognized them as being distant from each other. For some people, handling two cultures takes a toll, while it can be an automatic and effortless process for others. Benet-Martinez and colleagues (2002; 2005) called this individual difference as Bicultural Identity Integration (BII).

Moreover, they also showed that people's levels of BII determine how they respond to cultural and social cues (Benet-Martinez, Leu, Lee, & Morris, 2002). People with high BII assimilated to given cues, whereas people with low BII responded in contrast to given cues. Studies of stereotype effect are fundamentally a study of priming effect, where researchers examine people's reaction to social cues. Preliminary evidence showed that BII determines people's response to positive versus negative images, including stereotypes of Asian and American people among bicultural Asian American participants (Cheng, 2005; Cheng, Lee, & Benet-Martinez, 2006). No study, thus far, has examined the role of BII as a determinant of stereotype susceptibility. The next chapter examines the role of BII as a moderator of stereotype susceptibility among Asian Americans and Hispanic Americans.

CHAPTER 4
How Does Biculturality of Asian Americans and Hispanic Americans Influence Their Susceptibility Toward Stereotype?

Chapter 2 examined the effect of identity priming on Asian American and Hispanic American females. After excluding people who scored fewer than average, a significant main effect emerged for Hispanic Americans. Hispanic American female participants scored significantly lower on math test accuracy when their ethnicity was made salient. In contrast to previous studies (Shih et al., 1999; Shih, 2000), ethnicity priming did not seem to affect Asian American participants in this study.

The absence of ethnic priming can be explained by several factors, such as population differences between Shih et al. (1999) and the current study. Shih et al.'s (1999) participants had significantly higher average math accuracy scores (%), $M_{ethnicity\ salience}$ (n = 16) = 54, SD = 17, $M_{control}$ (n = 16) = 43 , SD = 16, and $M_{female\ salience}$ (n = 12) = 43, SD = 16 on the same challenging math test. In this study, average scores for Asian American participants were 37%, which is lower than the experimentally induced low scores of female identity priming.

Alternatively, the lack of a significant effect of ethnic priming can also be explained by additional factors. Chapter 3 explored the role of ethnic identity as a determinant of who became susceptible to the stereotype when ethnic priming was used as a stereotype cue. As was the case in Chapter 2, there was a significant main effect for ethnicity, but no main effect for the condition or interaction effect. However, when analyzing people who scored equal to average or above on math accuracy, a significant interaction effect was observed between ethnic identity and the condition for Hispanic American participants. In order to understand the nature of these interactions, a simple slope analysis was conducted. It showed that low ethnic identity Hispanic

American females scored significantly lower when their ethnicity was primed, whereas high ethnic identity Hispanic American females scored the same regardless of the condition.

In addition, high ethnic identity Hispanic Americans showed more interest in math and perceived more talent in math when their ethnicity was primed. Low ethnic identity Hispanic Americans, on the other hand, showed less interest in math and perceived less talent in math when their ethnicity was primed. Such patterns were not found among Asian American participants, although it showed a similar pattern for math test accuracy.

Asian Americans and Hispanic Americans as Bicultural Americans

Identity researchers argue that ethnic minorities such as Asian Americans develop their identity as Asian, but also develop their identity as American. Research shows that Asian Americans focus more on their membership to American society when they are asked, "Where are you *really* from?" as if they should have come from somewhere else (Cheryan & Monin, 2005). Cheryan et al.(2005) also found that Asian Americans diminish their Asian identity by showing more interest in mainstream TV programs and showing a preference for mainstream food including hamburgers and pizzas, as opposed to their ethnic programs and ethnic food.

Benet-Martinez and colleagues (2002) also found that some Asian American participants showed characteristics that were typical to the Asian culture after watching Asian cultural icons, while other Asian American participants showed characteristics that were typical to Western culture after watching the same Asian cultural icons. They argued that Bicultural Identity Integration (BII) could explain how and when bicultural people (e.g., Asian Americans) respond in the same way as, or opposed to, social or cultural cues. Benet-Martinez and colleagues (2002; 2005) defined BII as one's mental representations of two cultures in terms of their distance (distant vs. overlap), and affective response to such distance (conflicted vs. in harmony).

BII as a determinant of contrasting versus assimilation to social cues

Recent studies shows that BII predicted people's response to positive versus negative cultural primes when using general images about American and Chinese culture among Chinese American bicultural participants (Cheng, Lee, & Benet-Martinez, 2006). Stereotype effect studies use stereotype as a social cue to signal identity threat to the members of stereotyped group (Steele, 1997). Although much of the stereotype threat research examines people's assimilation to the stereotypes, evidence shows that stereotypical social cues can produce a contrasting effect. For example, Dijksterhuis, Spears, and Lépinasse (2000) found that when participants perceived social priming as an extreme example, they responded in contrast to the priming cues. Moreover, Cheng et al., (2006), as well as Sacharin, Lee, & Gonzalez (2009) also found that BII predicted whether their participants responded toward, or away from, social cues. The proposed framework is depicted in Figure 8. In this chapter, bicultural identity of Asian Americans and Hispanic Americans is examined as a factor that predicts people's susceptibility to the stereotype. More specifically, the current chapter asked following hypotheses:

H1 (a): Because of the assimilation to the prime effect, high BII Asian American females would score higher on a challenging math test when their ethnicity was primed.

H1 (b): Because of the contrasting to the prime effect, low BII Asian American females would score lower on a challenging math test when their ethnicity was primed.

H2 (a): Because of the contrasting to the prime effect, high BII Hispanic American females would score higher on a challenging math test when their ethnicity was primed.

H2 (b): Because of the assimilation to the prime effect, low BII Hispanic American females would score higher on a challenging math test when their ethnicity was

primed.

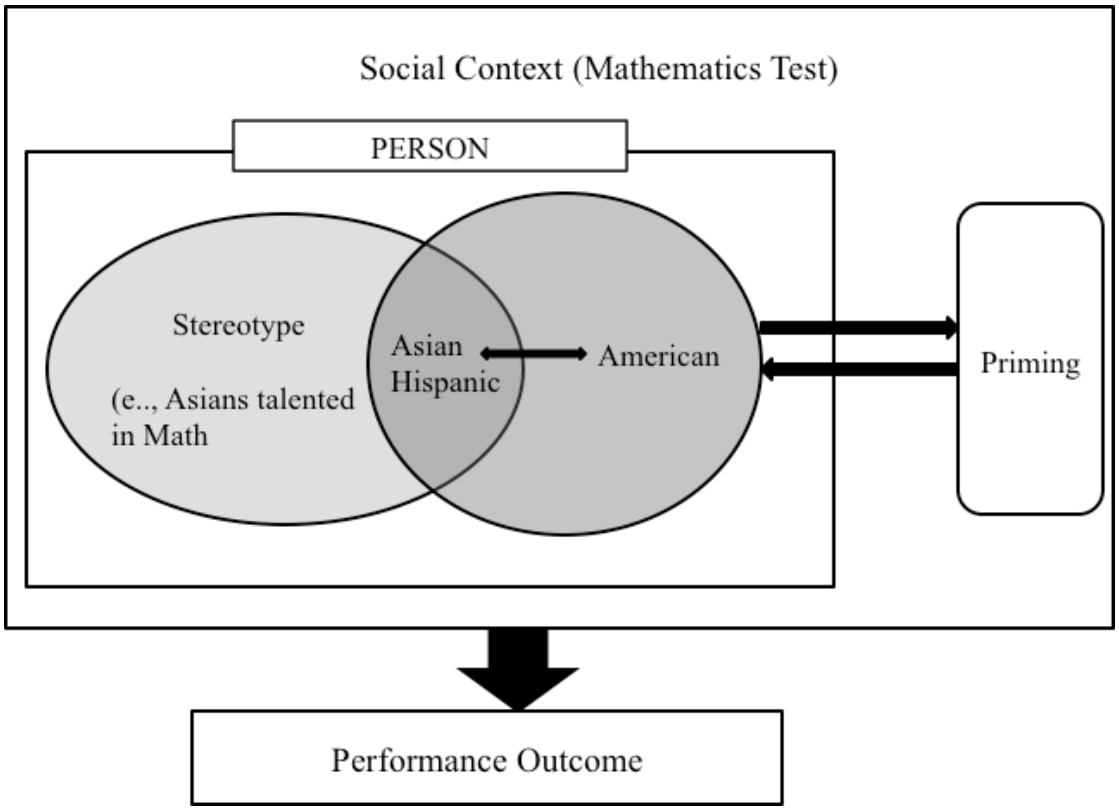

Figure 8. Framework Examining the Role of BII as a Moderator for Identity Priming and Stereotype Susceptibility

Given the previous research findings regarding Asian American bicultural people and their response to social cues, it was expected that positive academic stereotypes would lead high BII (less conflicted) Asian American participants to assimilate to stereotype when their ethnicity was made salient. It was also expected that low BII (more conflicted) Asian American participants to contrast to stereotype when their ethnicity was made salient. BII has been used and validated among Asian Americans in America (Cheng, 2005; Cheng, Lee, & Benet-Martinez, 2006) and bilingual/bicultural Chinese in Hong Kong (Benet-Martinez, Leu, Lee, & Morris, 2002; Hong, Morris, Chiu & Benet-Martinez, 2000). BII was also examined among Hispanic Americans (Miramontez, Benet-Martinez, & Nguyen, 2008; Ramirez-Esparza, Gosling,

Benet-Martinez, Potter & Pennebaker, 2006). Furthermore, because Hispanic American students were associated with negative academic stereotypes (Altschul, Oyserman, & Bybee, 2006; Owens & Lynch, 2012), it was expected that high BII Hispanic Americans would respond in contrast to a negative academic stereotype. It was also expected that low BII Hispanic Americans would respond in assimilation to a negative academic stereotype.

Method and Procedure

Participants, methods, and procedures were described in Chapters 1 and 2, and the same data was reanalyzed using the framework for this chapter.

Hypothesis Testing

Because this chapter asked the role of BII as a moderator on the effect of identity priming, the analysis plan was modeled after Cheng (2006). A separate multiple linear regression was conducted to see if students' level of BII would interact with the ethnic priming on (a) math accuracy; (b) self-reported talent and interest in math; and (c) importance of doing well on the test. For multiple linear regressions, the sample size required to have power (.80) to detect a medium effect ($f^2 = .15$) was 55 for each ethnic group.

The hypotheses asked whether high versus low BII students would respond to ethnic priming differently. More specifically, it was expected that high BII Asian Americans would exhibit assimilation to the positive stereotype and score higher on a challenging math test when their ethnicity was made salient. Low BII Asian Americans, on the other hand, would exhibit contrast to the positive stereotype and score lower on a challenging math test when their ethnicity was made salient. It was expected that high BII would lead Hispanic Americans to contrast with the negative stereotype and score higher on a challenging math test when their ethnicity was made salient. Low BII would lead Hispanic Americans to assimilate to a negative

stereotype and score lower on a challenging math test. As in Shih et al.'s (1999) and Cheryan et al.'s (2000) studies, math performance was assessed by computing the ratio of the number of correct answers to the number of items that participants attempted to answer. The importance of doing well was measured by a single item; "How important was it for you to do well on the test?" and perceived talent and interest in math was assessed by averaging the answers for two questions; "How talented are you in math?" and "How interested are you in math?"

Preliminary Analysis

A 2 (condition) × 2 (ethnicity) ANOVA was conducted to check if ethnic priming increased or decreased Asian American and Hispanic American participants' level of BII. Results showed no effect of condition (F (1, 141) = .02, p =.90, η_p^2 = .00) ethnicity (F (1, 141) = 1.35, p = .25, η_p^2 = .01), and interaction between condition and ethnicity (F (1, 141) = .08, p =.78, η_p^2 = .00), indicating that the identity priming did not increase or decrease the participants' levels of BII.

Results

Stereotype effect is more robust when people have the academic knowledge and skills necessary to solve challenging test. Stereotype effect is also more robust when the test is intellectually challenging. Thus, people who scored 90% and above (n = 1), and people who did not try, or did not have the skill sets necessary to solve the problems ($n_{Asian\ American}$ = 6, $n_{Hispanic\ American}$ = 10), were excluded from the analysis. This cut-off score were based on the theory, and not based on the outliers within the data.

Math test accuracy. Hierarchical multiple linear regression models predicting math accuracy as an outcome were conducted for each ethnic group. The first model included the conditions (dummy coded) BII and ethnic identity and the second model added an interaction

term between the condition and BII. The results for these models for Asian American participants are reported in Table 6. None of the predictors in the first model were significant. Adding a two-way interaction significantly increased the explained variance, $\Delta R^2 = .04$, ΔF (1, 100) = 3.97, $p = .05$. In order to understand the nature of this interaction, the interaction between the condition and BII were deconstructed into simple slopes. The association between BII and the condition was negative for low BII Asian Americans, and the association between BII and the condition was positive for high BII Asian Americans (Figure 9). Therefore, the data were consistent with the hypotheses for Asian American females.

Table 6. Regression Analysis Predicting Math Test Accuracy (%), Asian American Only

	Math performance				
Model	b	SE	β	t	P
Model 1 (main effects)					
Condition	-2.82	3.41	-.08	-.83	.41
Ethnic identity (MEIM)	-2.55	1.60	-.16	-1.60	.11
BII	.18	1.12	.02	.16	.88
Model 2 (interaction effect)					
BII × condition	4.43	2.22	.62	2.00	.05

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

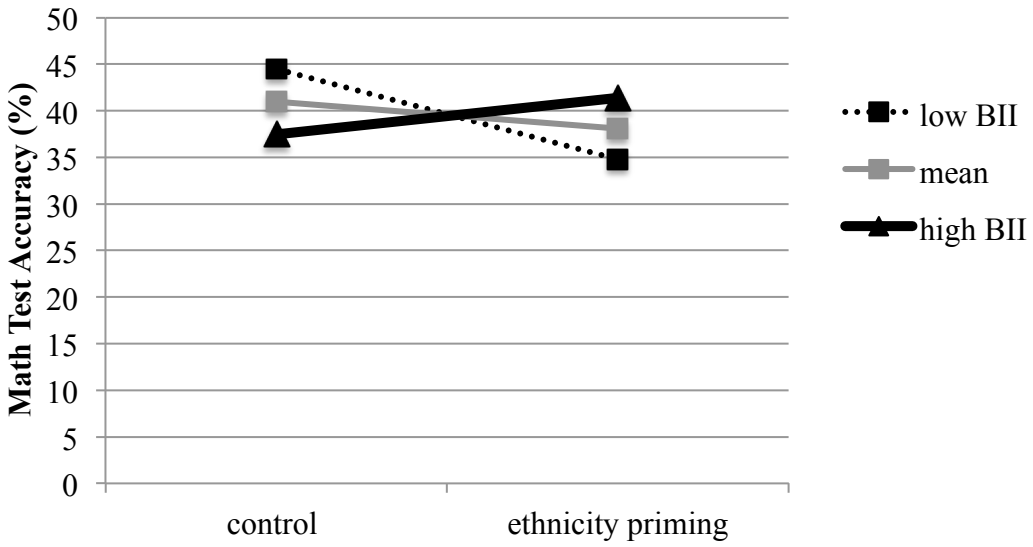

Figure 9. Conditional Effect of Ethnic Priming at Various Levels of BII for Asian Americans

As for Hispanic Americans, the only significant predictor was an ethnic identity, b = -5.46, SE = 2.61, β = -.34, p = .04. Adding a two-way interaction between the condition × BII did not increase the explained variance, ΔR^2 = .04, ΔF (1, 34) = 3.97, p = .23. The results of these models are provided in Table 7. Although the interaction between the condition and BII did not reach the conventional level of significance, the interaction was deconstructed into simple slopes (Figure 10). Simple slopes for low BII Hispanic Americans showed a positive line, indicating that low BII Hispanic Americans scored higher on a challenging math test when their ethnicity was made salient. For high BII Hispanic Americans, the slope was a negative line, indicating that high BII Hispanic Americans scored lower on a challenging math test when their ethnicity was made salient. Therefore, the data were not consistent with the hypotheses for Hispanic Americans.

Table 7. Regression Analysis Predicting Math Test Accuracy (%), Hispanic Americans Only

	Math performance				
Model	b	SE	β	t	P
Model 1 (main effects)					
Condition	-2.39	3.86	-.10	-.62	.54
Ethnic identity (MEIM)	-5.46	2.61	-.34	-2.09	.05
BII	-1.07	1.22	-.14	-.87	.39
Model 2 (interaction effect)					
BII × condition	-3.13	2.53	-.70	-1.24	.22

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

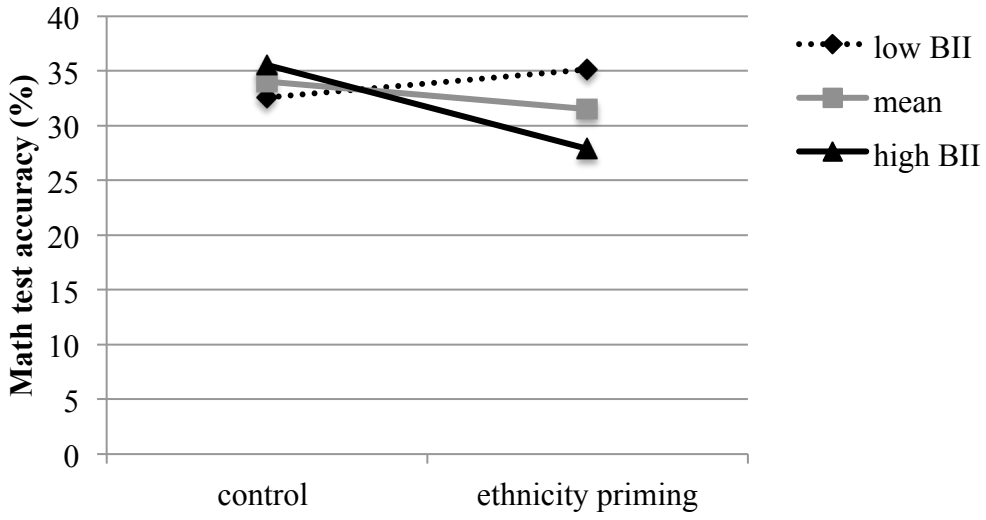

Figure 10. Conditional Effect of Ethnic Priming at Various Levels of BII for Hispanic Americans

Importance of doing well on the test. The same analysis was conducted with the importance of doing well on the test as an outcome. For Asian Americans, the model that predicted the importance of doing well on the test was not significant, nor was the two-way interaction between the condition and BII significant, even though it came close to conventional levels of significance, $\Delta R^2 = .03$, $\Delta F\ (1, 100) = 2.95$, $p = .09$. The result of the model is provided in Table 8. Deconstructing this interaction into simple slopes, high BII Asian Americans had a positive line, whereas low BII Asian Americans had a negative line (Figure 11). Therefore, the data show a predicted trend for Asian Americans.

Table 8. Regression Analysis Predicting Importance of Doing Well on the Test, Asian Americans Only

	Importance of Doing Well				
Model	b	SE	β	t	P
Model 1 (main effects)					
Condition	-.15	.34	-.04	-.45	.66
Ethnic identity (MEIM)	-.05	.16	-.03	-.30	.76
BII	-.06	.11	-.05	-.52	.60
Model 2 (interaction effect)					
BII × condition	.38	.22	.54	1.72	.09

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

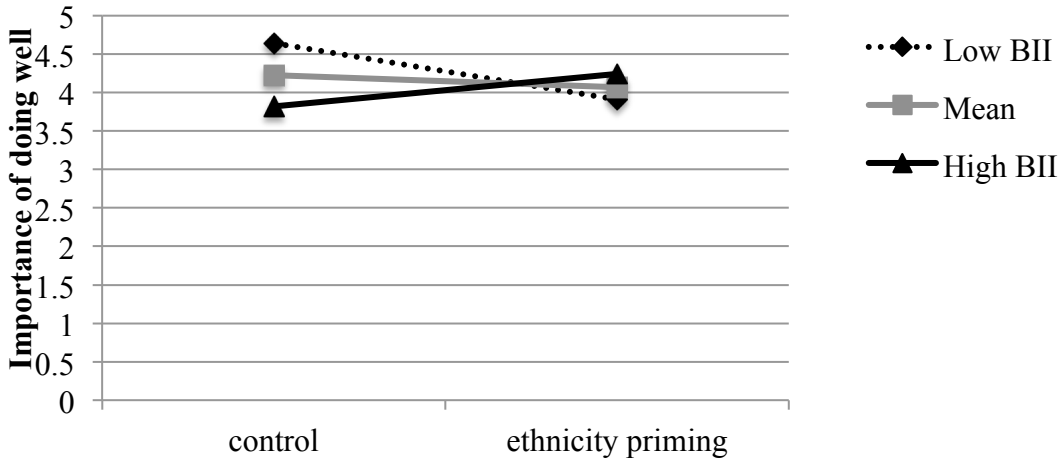

Figure 11. Conditional Effect of Ethnic Priming at Various Levels of BII for Asian Americans

Among Hispanic Americans, none of the models, or predictors, were significant. Simple slopes showed parallel lines for low, mean, and high BII Hispanic Americans, thus the data were not consistent with the hypothesis.

Self-reported talent and interest in math. Among Asian American participants, models predicting self-reported talent and interest in math were significant. The results of these models are provided in Table 9. Adding a two-way interaction between the condition and BII significantly increased the explained variance, $\Delta R^2 = .06$, $\Delta F\ (1, 100) = 7.07$, $p = .01$. The simple slope for high BII Asian Americans showed a positive line, indicating that high BII Asian Americans reported higher talent and interest in math when their ethnicity was made salient. Among low BII Asian Americans, the simple slope showed a negative line, indicating that low BII Asian Americans reported lower talent and interest in math when their ethnicity was made salient (Figure 12). Thus, the data were consistent with the hypothesis.

Table 9. Regression Analysis Predicting Talent and Interest in Math, Asian Americans Only

	Talent and Interest in Math				
Model	b	SE	β	t	P
Model 1 (main effects)					
Condition	-.15	.29	-.05	-.51	.61
Ethnic identity (MEIM)	-.41	.14	-.29	-3.05	.00
BII	.20	.10	.20	2.06	.04
Model 2 (interaction effect)					
BII × condition	.49	.19	.78	2.66	.01

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

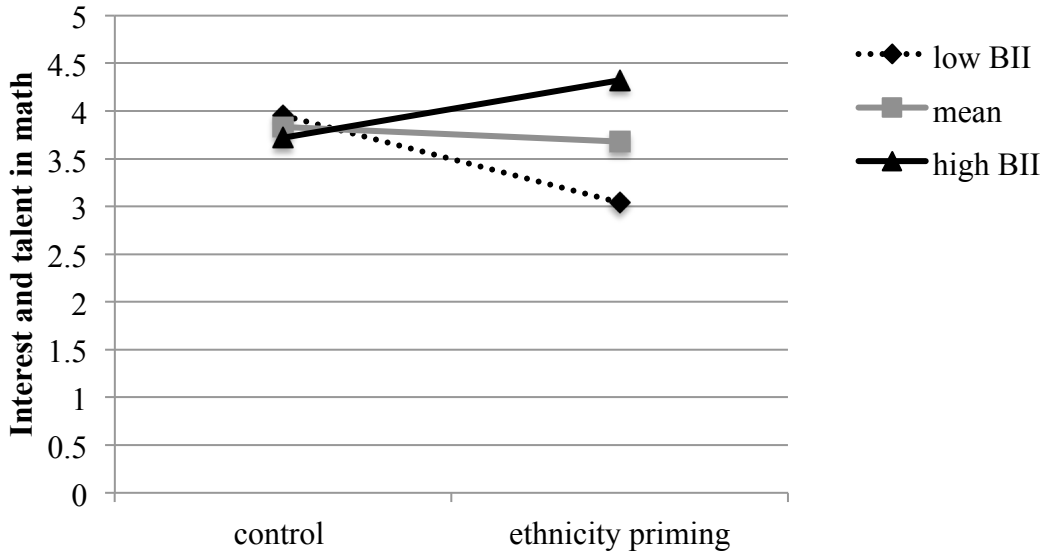

Figure 12. Conditional Effect of Ethnicity Priming at Various Levels of BII for Asian Americans

Among Hispanic American participants, the first model predicting the self-reported talent and interest in math was close to the conventional level of significance, $R^2 = .18$, $F(3,35) = 2.63$, $p = .07$ (Table 10). Ethnic identity was the only significant predictor, $\beta = -.88$, $SE = .34$, $b = -.41$, $p = .01$. Although a two-way interaction between the condition and BII was not significant, a simple slope showed a negative line for low BII, suggesting that low BII Hispanic Americans reported lower talent and interest in math when their ethnicity was made salient. On the other hand, a simple slope for high BII Hispanic Americans showed a flat line, indicating ethnicity priming did not change the way high BII Hispanic Americans reported their talent and interest in math (Figure 13). Therefore, the data show the expected trend only for low BII Hispanic Americans.

Table 10. Regression Analysis Predicting Talent and Interest in Math, Hispanic Americans Only

	Talent and Interest in Math				
Model	b	SE	β	t	P
Model 1 (main effects)					
Condition	-.32	.51	-.10	-.64	.53
Ethnic identity (MEIM)	-.88	.34	-.41	-2.58	.01
BII	.06	.16	.07	.42	.68
Model 2 (interaction effect)					
BII × condition	.13	.34	.22	.39	.70

Note. Condition was coded 0 (control group) and 1 (ethnic identity activation condition)

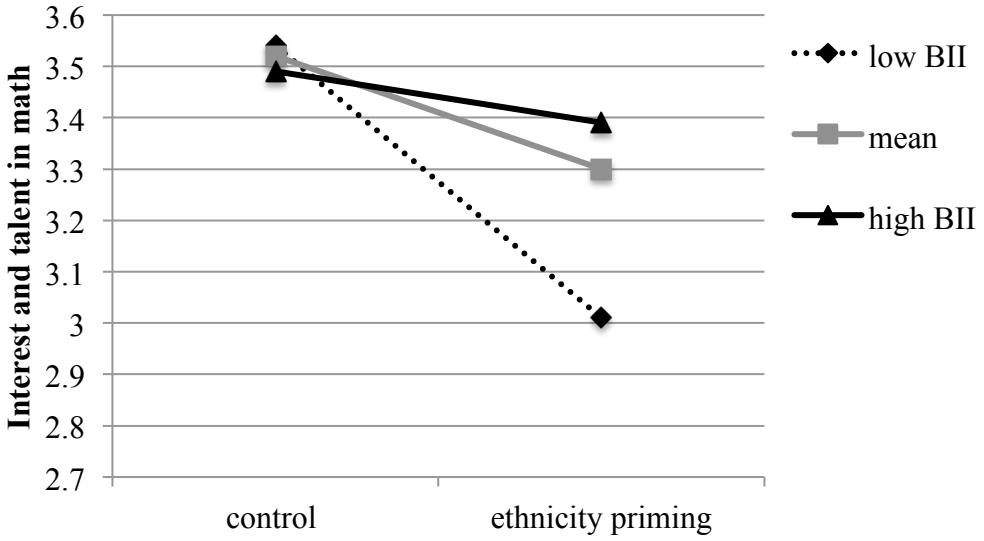

Figure 13. Conditional Effect of Ethnicity Priming at Various Levels of BII for Hispanic Americans

Discussion

The current chapter asked if BII predicted an assimilation or contrasting effect toward ethnic priming in the context of a math-related stereotype. Based on the previous research of the cultural frame switching associated with BII, it was expected that high BII Asian Americans would score higher on a challenging math test when their ethnicity was made salient. Low BII Asian Americans, on the other hand would score lower on a challenging math test when their ethnicity was made salient. Based on the cultural frame switching of BII and the valence of the social cues, the opposite was expected for Hispanic Americans. That is, high BII Hispanic Americans would score higher when their ethnicity was made salient, whereas low BII Hispanic Americans would score lower when their ethnicity was salient.

Overall, the data from Asian American females were consistent with the hypotheses. Results from the Asian American female participants in this chapter were also consistent with the existing studies (Benet-Martinez et al., 2002; Cheng et al., 2006; Sacharin, et al., 2008) on BII and its role of cultural framework switching among Asian American females. Recall that in

Chapter 3, none of the interactions between ethnic identity and the condition were significant for Asian Americans. Therefore BII, at least for Asian American female participants, appears to have a predictive function on their response toward and against ethnicity priming.

Reflecting on the current study findings of Shih et al. (1999) and of Cheryan et al. (2000), the data from high BII Asian Americans in this study are consistent with Shih et al.'s (1999) findings on Asian identity priming and the stereotype boost effect. The data from low BII Asian Americans in this study, on the other hand, are consistent with Cheryan et al.'s (2000) result.

The role of ethnic identity on Asian American participants and their susceptibility to stereotype boost (Armenta, 2010), however, was not observed in the current study. However, his findings may have been influenced by a social comparison; people with high ethnic identity might have been more aware of, and paid attention to, the group members in the testing classroom. Thus, stereotype priming might have given a boost to high ethnic identity Asian American participants. It is also possible that his Asian American participants included a large percentage of males, which could also boost their susceptibility to the stereotype (stereotype associated with male, and stereotype associated with Asian).

Among Hispanic American participants, the only significant main effect was ethnic identity. No main effect for BII, or interactions, was significant. In Chapter 3, ethnic identity was a significant predictor of Hispanic American participants' math performance. There was also a significant main two-way interaction between ethnic identity and the condition. Armenta (2010) also found a two-way interaction between ethnic identity and the condition, but the nature of this interaction was different between the two studies. While Armenta (2010) found ethnic identity increased Hispanic Americans' susceptibility to negative stereotypes, results from this study showed an opposite trend. The data from low ethnic identity Hispanic Americans exhibit a

profound susceptibility to the negative stereotype; they performed lower on a challenging math test when their ethnic identity was made salient. High ethnic identity Hispanic Americans, on the other hand, did not differ on their math test accuracy score regardless of their ethnicity priming. Nevertheless, it seems that the ethnic identity had a critical role on Hispanic American participants in this study.

Put together, among participants in current study, BII predicted stereotype susceptibility for Asian American participants, while ethnic identity predicted stereotype susceptibility for Hispanic American participants. This point will be discussed further in the next chapter.

CHAPTER 5
General Discussion and Conclusion

The present dissertation study was informed by two lines of research on multiple identities and their effect on people's susceptibility to stereotypes. The first line of research came from the examination of people's multiple social identities (e.g., Asian identity and female identity) and their effect on people's stereotype susceptibility. The second line of research came from the examination of a particular social identity that includes multiple cultural identities (e.g., Asian American identity). The first line of research posited that social group members were susceptible to their stereotypes when a stereotyped identity was made salient. The second line adds a more nuanced approach of multiple identity, focusing on the individual differences that account for who becomes susceptible, and when.

Based on past research, the role of Bicultural Identity Integration (BII) and its function of cultural framework switching (Hong, Morris, Chiu, & Benet-Martinez, 2002; Cheng, Lee, & Benet-Martinez, 2006) was examined in the context of a challenging math test and ethnicity priming of Asian American and Hispanic American female participants. It was reasoned that high BII individuals would engage in the framework switch in a way that is congruent with a positive stereotype, whereas low BII individuals would engage in the framework switch in a way that is in contrast to a positive stereotype. Therefore, it was expected that only the high BII Asian Americans would experience a "stereotype boost" (Shih et al., 1999), while low BII Asian Americans may either (a) not be affected by the ethnic identity priming, or (b) would experience a "stereotype threat" because they may face the fear of failing to meet the high expectations of others (e.g., Cheryan et al., 2000). Because of the valence of the stereotype, it was expected that the opposite would be true for Hispanic Americans. High BII Hispanic Americans would either

(a) not be affected by the ethnic identity priming, or (b) be buffered against a negative stereotype because they may focus on some other mental resource. Low BII Hispanic Americans, on the other hand, would perform poorly on a challenging math test, showing assimilation to the negative stereotypes.

General findings

Chapter 1 replicated Shih et al.'s (1999) ethnicity priming and stereotype boost among Asian American females. Chapter 1 also extended ethnicity priming and people's susceptibility to stereotype threat among Hispanic Americans, who are generally associated with lower academic achievement. When the analysis excluded people who had extremely high scores, or people who had extremely low scores, results showed a stereotype threat among Hispanic American participants, but did not show a stereotype boost.

Lack of evidence of the stereotype boost might have been explained by an additional factor in this particular sample. In fact, Armenta (2010) found one's level of ethnic identity increased or decreased people's susceptibility toward stereotypes among Asian Americans and Hispanic Americans. Chapter 3, therefore, examined the role of ethnic identity on ethnicity priming and stereotype susceptibility among Asian American females and Hispanic American females. Results showed that ethnic identity moderated the stereotype susceptibility among Hispanic Americans. Hispanic Americans with low ethnic identity were more susceptible toward their stereotype when their ethnicity was made salient. Hispanic Americans with high ethnic identity, on the other hand, were less susceptible to this effect. However, the results did not show a plausible moderation effect of ethnic identity for Asian American participants.

Benet-Martinez and colleagues (2002; Cheng, et al., 2006) found that the ethnic identity of Asian Americans includes their identity as American as well as their identity as Asian. They

found that people vary in the degree to which they perceive their two cultural identities are in conflict and in separation. These individual differences were represented as Bicultural Identity Integration (BII). Chapter 4 examined the role of BII as a moderator of the effect of ethnicity priming on stereotype susceptibility. Results showed significant two-way interactions between BII and ethnicity priming. Simple slopes for high and low BII showed that high BII Asian Americans scored higher on a challenging math test when their ethnicity was made salient. On the other hand, low BII Asian Americans scored lower on a challenging math test when their ethnicity was made salient. Therefore, data from high BII Asian American participants replicated the research findings of Shih et al.'s (1999). Data from low BII Asian American participants, on the other hand, replicated the research findings of Cheryan et al., (2000). BII did not appear to explain the stereotype susceptibility among Hispanic American participants in this study.

Overall, this dissertation study found evidence that BII interacted with the Asian American participants' reactions to cues that subtly activated their ethnic identity, and possibly found evidence that ethnic identity interacted that the Hispanic American participants' reaction to such cues. This dissertation study also found a trend, although these findings needs to be interpreted with caution due to the limited sample size and lack of statistical significance, that BII may not play an important role in Hispanic Americans' response to stereotyped identity priming. For Hispanic Americans, ethnic identity, and not BII, appeared to play a big role in math performance, as well as in the motivation to do well on the test.

Remaining questions

The present dissertation brings up several issues and questions that need to be examined in future research. First, this study needs to be replicated with a larger sample size of Hispanic

American participants. The findings, particularly those pertaining to Hispanic Americans, are inconclusive as the findings and analysis were largely constrained by the limited sample size for this study. Hispanic Americans constitute only small portion of Michigan State University, and perhaps it was too naive to expect to recruit 200 Hispanic Americans out of a possible 800 or less in the entire student body. Perhaps recruiting from different locations, including community colleges, would have been more appropriate.

Second, this dissertation study added to the rich body of knowledge contained in stereotype boost literature, as well as to the Bicultural Identity Integration (BII) research literature, but also raised the question of whether the concept of BII can be reliably extended to any ethnic group other than Asian Americans. The majority of BII research was conducted (including the original study done by Benet-Martinez et al., 2002, 2005, 2006) mainly among Asian American individuals. Although there were few studies that employed Hispanic Americans (Miramontez, et al., 2008; Ramirez-Esparza, Gosling, Benet-Martinez, Potter & Pennebaker, 2004), the majority of BII research was conducted using Asian Americans as their study sample (Hong, et al., 2000; Benet-Martinez et al., 2002; Haritatos & Benet-Martinez, 2002; Cheng, et al., 2006; Zou, et al., 2008). Thus, the lack of significant findings for the Hispanic American participants in the current study could be explained by the lack of validity of BII measures for Hispanic American participants.

Cheng's unpublished dissertation work may shed light on this point. BII, in its original version, included two subscales: a cultural distance scale and a cultural conflict scale. While cultural distance is related to the psychological distance between two cultures, it is also often related to language use and cultural differences. Cultural conflict, on the other hand, concerns the way people feel about being from two cultures, thus is often related to the experience of

discrimination and psychological adjustments such as depression. However, the reliability of the items for each of the subscales appeared to be different from sample to sample, and researchers often ended up dropping one of the subscales (Cheng, et al., 2006; Cheng, Sanchez-Burks & Lee, 2008; Miramontez et al., 2008; Zou, et al., 2008) due to the low reliability. In this study, the cultural conflict subscale was reliable (α = .85) while cultural distance was not (α = .35). Cheng's dissertation (2005) compared how the two subscales performed for first generation Asian Americans (i.e., people who were born in another country) versus second generation Asian Americans. The cultural distance subscale appeared to work reliably for first generation Asian Americans, but not for second generation, and the cultural conflict subscale appeared to work reliably for second generation Asian Americans, but not for first generation. Based on limited but available data from the Hispanic American samples, it appears that the cultural distance subscale yielded reliable results.

Participants of the current study were largely American-born 2nd generation individuals, with the exception of a few (n = less than 5) who were born in another country and immigrated at a young age. The high reliability of the cultural conflict scale is consistent with previous research. When the scale reliability was measured separately for each ethnic group, the cultural conflict scale had an acceptable level of alpha for both ethnicities (α = .84 for Asian Americans, α = .85 for Hispanic Americans). However, reliability for the cultural distance scale showed striking differences. While this scale had an extremely low reliability for Asian Americans (α = .29), it showed relatively higher reliability for Hispanic Americans (α = .57). This may represent the different experience associated with growing up bicultural for Asian Americans as well as for Latinas. If cultural distance was indeed an important element of the bicultural experience for Latinas, the cultural conflict scale alone might not have reflected that nuanced experience.

Further research may look into the inconsistent use and fluctuating reliabilities of subscales across studies, and develop a better measurement or analytical framework that could appropriately address this inconsistency.

Third, the current study found assimilation and contrast toward and against stereotyped identity priming among Asian American female participants. Based on past research, it was argued that people's level of BII determined the direction of cognitive framework switching. However, this study does not suggest under what mechanism the cognitive framework switching occurs. That is, the low performance of low BII Asian Americans could be explained by the pressure of meeting the high expectations of others (Cheryan, et al., 2000). Alternatively, low BII Asian American participants can emphasize their American identity and de-identify from their Asian identity (Cheryan & Monin, 2005). However, regression analysis examining the effect of ethnicity priming and BII did not show significant interaction between the condition and BII (β = .12, *SE* = .14, *b* =.28, *t* = .91, *p* = .37). This indicated that contrasting versus assimilation to ethnicity priming was not explained by the reduced importance of identity. Using a cognitive association test (i.e., Implicit Association Test) may help us to understand if high BII and low BII Asian Americans differ in their mental association of stereotype and ethnicity in response to ethnicity priming.

Lastly, although it is believed that the current study design is better suited for the purpose of comparing the moderating effect of ethnic identity on activation cues, the results and findings cannot be directly compared to that of Armenta's, or that of Cheryan et al.'s (2000). To do so, it would be necessary to examine the effect of an explicitly activating stereotype (e.g., telling participants that the test is a diagnostic of stereotyped ability that is known to show ethnic differences) as an additional condition to the current study. Shih, Ambady, Richeson, Fujita, &

Gray (2002) directly compared the type of activation (implicit vs. explicit activation of stereotypes), and found that implicit activation (such as the activation employed in the current study) yielded a stronger than expected stereotype boost effect among Asian Americans. Because testing is generally done in a group setting in actual classrooms, adding a test setting (individual vs. group testing with or without a comparison group) condition may add more information to the real-life application of the study findings.

Remaining questions about replication study on priming effect

This dissertation study was inspired by the fascinating findings of the past research studies, and contained the attempt replication of Shih et al. (1999) and conceptual replication of Armenta (2010), and Cheng et al., (2006). First analysis (Chapter 2) replicated Shih et al. (1999) using the same materials and procedure. The result did not replicate when all participants were included. I discussed possible explanations (e.g., participants coming from different populations due to selectiveness of the university admissions process). However, recent debate on the effect of priming (Casario, 2014; Simmons, Nelson, & Simonsohn, 2011), and replication studies that involve priming (Doyen, Klein, Pichon & Cleermans, 2012) shed light on other possibilities. For example, Casario (2014) argued that priming effect is extremely sensitive to experimental settings and the populations that the samples are drawn. He discussed that a change in procedure adds different variables and moderators that researchers did not necessarily intend to address. He also explained that the participant's, as well as the experimenters', awareness of the intended outcome of the research could influence the results of the study. In fact, Doyen, Klein, Pichon & Cleermans (2012) attempted to replicate their previous study, and demonstrated that the replication was successful only when the experimenter knew the expected outcome of the study. That is, Doyen et al., (2012) showed that participants in the experiments often received more

than one priming cue (i.e., manipulation cue, experimenter cue, and environmental cues that were not a part of the manipulation). In the current study, experimenters were not notified about the research hypothesis; however, some of the experimenters became aware of the hypothesis and expected outcomes over the course of three semesters.

This study employed implicit priming cues of one's ethnicity. The underlying assumption here is that ethnicity was not in the mind of the participants until they were asked about their ethnic background at the time of the experiment. In reality, anything can become a priming cue. For instance, in the current study, participants met the experimenter first and walked to the laboratory setting. Although it was unlikely, it was possible that the conversation the participants had with the experimenter introduced additional variables. Casario (2014) also argued that the room settings (e.g., size of the room, or table settings) could also influence the way participants behave in addition to, or in combination with, priming manipulation. Future studies should include an experiment log (e.g., detailing the time, location, experimenter, anything that happened prior to, or after, the experiment session).

Lastly, stereotype threat has become an extremely popular topic of research, as well as an extremely popular topic of intervention efforts in recent years (Inzlicht & Schmader, 2011). Study findings, including Johns, Schmader, & Martens (2005), demonstrated that informing female test takers about the stereotype threat diminished the detrimental effect of the stereotype about "women" and "math." This means that the participants might have been well informed about the concept of stereotype threat/boost prior to participating in the current research, a naturally occurring intervention, which might have influenced the way participants responded to the experiment that was designed a decade ago.

Theoretical implications

Bodenhausen (2010) called for the attention to more complex views of self in social cognition research. He criticized that social cognition research assumes social identity to be distinct and expects that identity priming invokes the targeted identity for all people in the same way. Instead, he argued that a person's self, or selves, are much more fluid in nature, and such fluidity needs to be addressed and considered in social cognition research, including stereotype threat studies. The current study addressed this call and demonstrated that the response to social identity priming varied as a function of the cognitive structure of self.

Amiot, Sablonnière, Terry, & Smith (2007) outlined the developmental trajectory of how people integrate different aspects of social identity and its attributes. According to Amiot et al., (2007), susceptibility toward stereotype threat increases for people at the early stage of identity integration. In their stage-wise developmental theory, the early stage of social identity integration is characterized by ill-structured social identities that are isolated and fragmented. Priming a specific identity, therefore, can trigger a single and static identity as assumed by current social psychology. Recall that the cognitive explanation of stereotype threat was either a function of a cognitive imbalance between the concepts (Schmader et al., 2008), or of an automatic association between concepts and attributes (Galdi, et al., 2013). That is, the explained mechanism of stereotype threat assumes that all people experience susceptibility at the early stages of their social identity integration.

Advanced stages of social identities, on the other hand, are characterized as well developed and interconnected social identities. Amiot et al., (2007) claimed that integrated social identities are more ambiguously defined, and can easily be re-organized in response to immediate social needs. People at advanced stages of social identity also regard their self as an

overarching umbrella, where different and even opposite identities can coexist, much like the concept of BII. The current study provided the evidence that the developmental trend delineated by Amiot et al., (2007) does not necessarily happen in a linear manner. People at a similar cognitive development (by age) can also be at varying stages of social identity integration.

Implication for practices

Previous studies of stereotype threat provided some suggestions as to what teachers can do to reduce the effects of stereotype for their students. Some suggestions include telling students that the stereotype is not true (Schmader, 2001), and/or increasing the presence of the stereotyped group in the classroom (Murphy, Steele & Gross, 2007). Both suggestions assume that the situation affects the performance of individuals (Steele, 1997). In this study, it was found that the situational factor itself (e.g., stereotype, demographic composition of the classroom) does not exert a strong effect on everyday classroom settings. Rather, individual factors (e.g., multiple social identities, identity flexibility, schema types) interact with situational cues to create vulnerability or resilience toward a stereotype threat. In fact, Gresky, Ten Eyck, Lord, & McLintyre (2005) found that identity mapping activities, in which women are reminded of their multiple social identities, reduced the influence of stereotype threat in a laboratory experiment. Shih, Bonam, Sanchez, & Peck (2007) also found that biracial individuals who believe that race is socially constructed, rather than biologically determined, are more resilient against stereotype threat.

Findings of this study should also inform current teaching practice. Teachers should emphasize not only ethnic pride and heritage, but also emphasize students' belongingness to the larger American culture. Such practice may lead students to find a healthy balance of their

multiple ethnic and cultural identities, which in turn protects them from being vulnerable to stereotype threat.

APPENDICES

Appendix A. Study advertisement for Asian American

Asian American Female Students Needed!

Are you of Asian Descent?

SPARTY'S EXPRESS
SPARTY'S REFRESH
SPARTY'S CAFÉ

Do you enjoy FREE Sparty's Drinks?

Would you like the chance to win a $50 gift certificate of your choice?

If this describes you, please help participate in my 30 minutes study of everyday life and students' achievements.

For more information, please scan the QR code below, or email me at: chikato@msu.edu.

Figure 14. Flyer used for soliciting participation for Asian Americans

Appendix B. Study advertisement for Hispanic American

Hispanic American Female Students Needed!

Are you of Hispanic Descent?

SPARTY'S EXPRESS
SPARTY'S REFRESH
SPARTY'S CAFÉ

Do you enjoy FREE Sparty's Drinks?

Would you like the chance to win a $50 gift certificate of your choice?

If this describes you, please help participate in my 30 minutes study of everyday life and students' achievements.

For more information, please scan the QR code below, or email me at: chikato@msu.edu.

Figure 15. Flyer used for soliciting participation for Hispanic Americans

Appendix C. Recruitment email

Welcome back returning students, and welcome to all new students!

I am sending this email to encourage you to participate in a research project. This study examines the relationships between your everyday life activities and academic achievement (more specifically math). All you need to do is to schedule an appointment with me, and take a short achievement assessment, along with short questionnaires about your everyday life. The whole assessment will take about 30-40 minutes. As a token of appreciation for your participation, you will be entered into a drawing of $ 50 gift card of your choice (i.e. amazon, itune).

Your participation will help us to think about the ways to help college and graduate students. Please contact me if you would like to participate.

Appendix D. Recruitment email

Dear (potential participant name)

My name is Chiharu Kato, and I am a doctoral student in the Educational Psychology & Educational Technology program in the College of Education. Today I am writing this message to ask you to participate in my dissertation study.

My study examines female college/graduate students' everyday activity/habits and its relationship to academic achievement. You will be asked to answer simple questionnaires about your everyday life, and work on challenging Math test for 20 minutes.

As a token of appreciation, participants will be provided with Sparty drink certificate, and also entered into drawings of 10 $50 gift certificate of your choice.

I only require one session and the session is for about 30 minutes. I am desperately needing study participants and I would appreciate if you could help.

If you would, please provide me with 3-4 your possible appointment time in January (Anytime between 9am-5 pm from Monday to Friday). You can contact me via msu email (chikato@msu.edu).

Thank you for your help and I look forward to hearing from you soon.

Chiharu Kato, M.A.
Doctoral student
Educational Psychology & Educational Technology Program
Department of Counseling, Educational Psychology & Special Education
College of Education
Michigan State University

Appendix E. Participants information sheet

Research Participant Information Sheet

You are being asked to participate in a research study. Researchers are required to provide a consent form to inform you about the research study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researcher any questions you may have.

Study Title: Student Life and Academic Achievement

Researcher and Title: Dr. Kelly Mix, Professor and Chiharu Kato, M.A., Doctoral Student

Addresses and Contact Information:

Chiharu Kato, M.A.	Dr. Kelly Mix
Erickson Hall	Department of Counseling, Educational Psychology and
620 Farm Lane, room247	Special Education
(517) 648-1649	(517) 432-1817
chikato@msu.edu	kmix@msu.edu

1. PURPOSE OF RESEARCH:
You are being asked to participate in a research study titled Student Life and Academic Achievement. You have been selected as a possible participant in this study because you are enrolled as a full-time student. From this study, the researcher hopes to learn how your everyday life as a student may promote academic achievement. Participation in this study will take about 30-45 minutes.

2. WHAT YOU WILL DO:
You will be asked to respond to a simple questionnaire about yourself, and a short assessment of your Math ability. After the test, you will answer a short questionnaire about how you felt about your test performance.

3. POTENTIAL BENEFITS:
While you may not directly benefit from your participation in this study, this study may contribute to the understanding of how certain aspects of student life relate to academic achievement.

4. POTENTIAL RISKS:
There are no foreseeable risks associated with participation in this study.

5. PRIVACY AND CONFIDENTIALITY:
The data for this project will be kept confidential. The data for this project will be collected anonymously. Neither the researcher nor anyone else will be able to link data to you. Only the researcher will have access to the data. The results of this study may be published or presented at professional meetings, but the identity of all research participants will remain anonymous.

6. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW:
Your participation is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may change your mind at anytime and withdraw. You may choose not to answer specific questions or to stop participating at any time.

7. COSTS AND COMPENSATION FOR BEING IN THE STUDY:
As a token of appreciation, you will be entered in a drawing for one of ten $ 50 gift cards from either Amazon.com or from itune.com. Your chance of winning the gift card may vary depending on the number of participants, but you will have an approximately 1/40 chance of receiving the gift card. If you wish to enter the drawings, you will be asked to provide your email address of your choice in a separate piece of paper. Your email will be kept separate from the rest of the data, and will be discarded after the drawings. The gift card will be sent to the winners electronically using the email address you provided. There are no costs to participate. It is expected that you will be notified about your winning in about six to seven months.

8. CONTACT INFORMATION FOR QUESTIONS AND CONCERNS:
If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researcher (Chiharu Kato, 247 Erickson Hall, chikato@msu.edu , 517-648-1649).

Submitting the completed survey is your consent to voluntarily participate in this research study and to use the data for research purposes.

Appendix F. No-salience manipulation item

We are interested in your opinions and experiences about certain aspects of young adult life.
Age:

Grade/Year:

How often do you watch television?

_____every day _____ a few times a year

_____ 4/5 times a week _____ rarely if ever

_____ 2/3 times a week _____ never

_____ a few times a month

Do you have a cable television? _____ yes _____ no

How often do you eat out?

_____every day _____ a few times a year

_____ 4/5 times a week _____ rarely if ever

_____ 2/3 times a week _____ never

_____ a few times a month

How often do you attend movies?

_____every day _____ a few times a year

_____ 4/5 times a week _____ rarely if ever

_____ 2/3 times a week _____ never

_____ a few times a month

Appendix G. Ethnicity salience manipulation items

We are interested in your opinions and experiences about certain aspects of young adult life.
1. Age:
2. Grade/Year:
3. Ethnicity: _____ African _____Asian _____ European _____

Hispanic _____ Native _____ other : _____

4. How many generations has your family lived in America? _____

5. How much was food from your ethnic background a part of your upbringing?

Not at all	1	2	3	4	5	6	7	Very much

6. Are you involved in any student organizations? _____ yes _____ no
7. If yes, which one?

_____
_____

Appendix H. Challenging math test

You have 20 minutes to work on all of the questions. Scratch paper will be provided for your convenience. Please try to finish all problems. Keep working until you are told to stop. If you finished early, you can let researcher know, but please stop when you are told to do so even if you are not finished all the problems.

1. If $f(x) = 4x^2 - 2x - 1$, then $f(1/2)$ equals

a. 1 b. -1 c. 0 d. $^1/_2$ e. 2

2. A car is purchased for $ 10,000. At the end of each year, its value is 30% less than its value at the beginning of the year. The minimum number of years for its value to be less than $ 4200 is

a. 1 b. 2 c. 3 d. 4 e. 5

3. Six distinctive points are located on a circle. The maximum number of line segments joining these points such that no two line segments intersect inside the circle is

a. 18 b. 15 c. 11 d. 9 e. 8

4. The value of $\frac{42^2+2(22)(42)+22^2}{32^2}$ is

a. 2 b. 4 c. 8 d. $24\ ^5/_{32}$ e. $96\ ^5/_8$

5. If n ! is defined as the product of the positive integers from 1 to n inclusive, the final digit in the sum $1! + 2! + 3! + 4! \ldots + 12!$ is

a. 0 b. 1 c. 2 d. 3 e. 8

6. A whole number is called an ascending number if each digit in the number is greater than the digit on its left. An example of an ascending number 2478. The number of ascending numbers between 4000 and 5000 is

a. 7 b. 8 c. 9 d. 10 e. 11

7. If $(3x - 1)(x - 2) = 0$, then the value of $3x - 1$ must be

a. $^1/_3$ only b. 0 only c. $^1/_3$ *or* 0 d. $^1/_3$ *or* 2 e. 0 *or* 5

8.A trapezoid has three equal sides and the base is two units less than the sum of these three sides. If the distance between the parallel side is 5 units, then the area of the trapezoid in square units is

a. 13 b. 35 c. 65 d. 125 e. 185

9. The line with equation $y = 3x + 1$ is reflected on the line $y = 4$. The equation of the reflected line is

a. $y = {}^{1}/_{3}\,x + 1$ b. $y = -{}^{1}/_{3}\,x + 7$ c. $y = -{}^{1}/_{3}\,x + 6$

d. $y = -3x + 6$ e. $y = -3x + 7$

10. In a sequence of six numbers, the first number is 4 and the last number is 47. Each number after the second equals the sum of the previous two numbers. If S is the sum of the six numbers in this sequence, then S lies in the interval

a. $51\ to\ 90$ b. $91\ to\ 100$ c. $101\ to\ 110$

d. $111\ to\ 120$ e. $121\ to\ 160$

11. The sum of the positive integer divisors of 2^{10} is

a. $2^{12} + 1$ b. $2^{12} - 1$ c. $2^{11} + 1$ d. $2^{10} + 1$ e. $2^{11} - 1$

12. If $x,\ y\ and\ z$ are any non-zero real numbers and $w = \frac{x}{|x|} + \frac{y}{|y|} + \frac{z}{|z|} + \frac{xyz}{|xyz|}$, then the number of possible values for w is

a. 1 b. 2 c. 3 d. 4 e. $more\ than\ 4$

Appendix I. Math test follow-up questionnaire

Sex: M F
Age: _____
Number of years you have lived in the U.S. _____
School: _____
Year: _____
Major: _____

1. How much did you like the test?

Not at all	1	2	3	4	5	6	7	Very much

2. How well do you think you did on the test?

Very poorly	1	2	3	4	5	6	7	Extremely well

3. How much did you enjoy the experiment?

Not at all	1	2	3	4	5	6	7	Very much

4. How interested would you be in participating in a similar experiment in the near future?

Not at all	1	2	3	4	5	6	7	Very much

5. How difficult was the test?

Not at all	1	2	3	4	5	6	7	Very difficult

6. What do you think this experiment is measuring?

_____

7. How interested are you in math?

Not at all	1	2	3	4	5	6	7	Very interested

8. How important was it for you to do well in the test?

Not at all	1	2	3	4	5	6	7	Very important

9. How talented are you in math?

Not at all	1	2	3	4	5	6	7	Very talented

10. Please indicate your math SAT (or ACT) score? _____

11. Did you guess on any of the questions? _____ yes _____no
    if so, how many? _____

Appendix J. Bicultural Identity Integration scale

Ways of negotiating cultures
As someone who has been exposed to two cultures, ethnic culture and American culture, you are bicultural or multicultural person. The experience of being a bicultural or a multicultural differs from person to person. We are interested in YOUR particular experience. Please rate the following statement in terms of how well it describes your own experience in general.

1. I am simply an ethnic person who lives in the United States.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

2. I am conflicted between the American and the ethnic way of doing things.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

3. I feel like I am someone moving between two cultures.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

4. I keep my ethnic and American culture separate.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

5. I feel caught between the ethnic and American cultures.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

6. I feel ethnic American (i.e., Asian American, Mexican American)

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

7. I don't feel trapped between American and ethnic cultures.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

8. I feel that I am a part of a combined culture.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

Appendix K. Ethnic identity scale

In this country, people come from many different countries and cultures, and there are many different words to describe the different backgrounds or ethnic groups that people come from. Some examples of the names of ethnic groups are Hispanic or Latino, Black or African American, Asian American, Chinese, Filipino, American Indian, Mexican American, Caucasian or White, Italian American, and many others. These questions are about your ethnicity or your ethnic group and how you feel about it or react to it.

Please fill in: In terms of ethnic group, I consider myself to be _____

Read the following statement and indicate how much you agree or disagree with each statement.

1. I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

2. I am active in organizations or social groups that include mostly members of my own ethnic group.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

3. I have a clear sense of my ethnic background and what it means for me.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

4. I think a lot about how my life will be affected by my ethnic group membership.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

5. I am happy that I am a member of the group I belong to.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

6. I have a strong sense of belonging to my own ethnic group.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

7. I understand pretty well what my ethnic group membership means to me.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

8. In order to learn more about my ethnic background, I have often talked to other people about my ethnic group.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

9. I have a lot of pride in my ethnic group.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

10. I participate in cultural practices of my own group, such as special food, music, or customs.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

11. I feel a strong attachment towards my own ethnic group.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

12. I feel good about my cultural or ethnic background.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

The end of the study. Please give us your email contact (and desired gift card venue) on a memo if you wish to enter drawings for $50 certificate. Researcher will now give you a debriefing form.

Appendix L. Debriefing statement

DEBRIEFING STATEMENT

Thank you for participating. Do you have an idea of what I was examining? First off, I want to alleviate any concerns you might have: this test was not a measure of your ability. Therefore, if you felt you did not do very well on this test or felt concerned about any difficulty you had with specific questions, please do not leave this experiment feeling less intelligent. Stereotypes about ethnicity and academic achievement are known to influence test performance of stereotyped ethnic individuals. More specifically, when you are aware of the stereotype about ethnicity and academic achievement (i.e. Asian are good at Math) and if you identify yourself with the stereotyped group, your test performance is likely to be influenced in the direction of the stereotype.

You were asked to participate in this study because you are a member of an ethnic group, but you are also an active member of mainstream American culture. In other words, you are potentially a person of bicultural origin. Past studies of bicultural individuals suggested that ethnic identities of bicultural individuals are malleable, in that they can flexibly adapt to the immediate social situations (i.e. conversation topic and questions asked). You may identify yourself as American and less Asian in certain situation, but you may be Asian and less American in another situation. Identity orientation, called Bicultural Identity Integration (BII) is known to influence the process of identity switch.

Our goal was to examine how one's levels of BII interact with the way people are influenced by the stereotype. You are randomly assigned to one of the two conditions: ethnic identity activation condition or control condition. If you were assigned to ethnic identity condition, you were asked to complete the short questionnaire about your ethnicity and generational status. If you were assigned to control condition, you were asked to complete a short questionnaire about certain aspects of young adult life. My goal is to examine how people with different level of BII differ in each condition. I hope that the information that we gained from this study can be used to find a better way to help students, who may be disadvantaged in testing situation because of the stereotypes.

Again, thank you for your participation. Please do not share the details of this study with anyone else, as they may later participate in my study. Do you have any additional questions at this time? Please feel free to contact me with any future questions or concerns. I care about your feelings and am interested in any impressions you had of this study. Please email me at chikato@msu.edu, or call me at 517-648-1649.

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