

Biculturalism, Mental Health, and the Cultural Environment: A Longitudinal Approach
to Examining the Person-Environment Fit Hypothesis

by

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ABSTRACT

Twenty-five percent of Americans are first- or second-generation immigrants (US Census, 2012). Thus, it is likely that many Americans identify with at least two cultures, that of the mainstream United States culture, and their ethnic culture from which they came, making them bicultural. However, current understanding of the impact of biculturalism on psychological functioning is quite limited in scope, as few studies have examined this association longitudinally or considered the moderating role of the cultural environment. The present study proposed to take a more comprehensive approach in understanding the consequences of biculturalism on psychological outcomes (i.e., depression, anxiety, and substance abuse symptoms) among Mexican American adolescents, as they belong to one of largest and fastest growing ethnic groups in the United States (US Census, 2013). The present study had two major goals. The first was to examine the influence of biculturalism on depression, anxiety, and substance abuse symptoms longitudinally over the course of two years. It was hypothesized that overall, biculturalism will lead to less depression, anxiety, and substance abuse symptoms. The results partially supported these predictions. For males, biculturalism was related to significantly fewer anxiety symptoms, but not for females. Further, no main effects of biculturalism were found for depression and substance abuse for males or females. The second goal of the study was to examine the potential moderating role of the cultural environment on the influence of biculturalism on mental health symptoms. It was hypothesized that bicultural individuals will exhibit less mental health symptoms in bicultural environments (person-environment fit) compared to more monocultural individuals (person-environment misfit). However, no differences are expected to

emerge between bicultural and monocultural individuals in monocultural environments, as both groups should be well adapted in these settings. The results did not fully support these predictions. Though, biculturalism for male adolescents was related to significantly fewer anxiety symptoms in home environments where parents reported moderate degrees of biculturalism, and females' biculturalism was related to significantly fewer depression symptoms in neighborhood environments that were relatively bicultural; no effects of biculturalism were found in environments that were the most bicultural. The implications of the findings are discussed.

DEDICATION

This project is dedicated to my family and friends who have provided support and encouragement throughout this journey.

First and foremost, this project is dedicated to my mom. Thank you for giving me an ounce of your grace, humility, and quiet bravery – characteristics that proved to be vital to succeeding on this journey, while preserving who I am. Thank you for everything you have done for me (and the many, many care packages)! You are forever my hero!

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Introduction

The cultural diversity of the United States was captured in the statement given by the acting director of the US Census Bureau: “The next half century marks key points in continuing trends - the U.S. will become a plurality nation, where the non-Hispanic European American population remains the largest single group, but no group is in the majority” (Thomas L. Mesenbourg, US Census, 2012). This statement is substantiated by the statistic that of the over 300 million people living within the United States, 13% are foreign born, and 11% have at least one foreign-born parent (US Census, 2012). This means that almost 1 in 4 Americans are either first- or second-generation immigrants. Thus, it is possible that many of these Americans identify with at least two cultures, that of the mainstream United States culture, and the ethnic culture from which they came, making them bicultural. The number of bicultural individuals can be even larger if one considers later-generation immigrants who may also identify with two cultures. However, our current understanding of the consequences of being bicultural on psychological functioning is quite limited in the strength of causal inferences that can be made, and are simplistic in explaining these associations. Given the high numbers of ethnic minority youth that are vulnerable to mental health problems (CDC, 2011), a more complete understanding and comprehensive examination of how biculturalism can impact psychological outcomes is essential if it can help reduce the incidence of negative mental health.

The present study will take a comprehensive examination of the impact of biculturalism on mental health symptoms by: (a) using a longitudinal design, which will allow for stronger inferences regarding the causal pathways between biculturalism and

mental health symptoms; (b) examining these associations with consideration of the potential moderating role of the cultural environment in which individuals live. The first section of this paper offers an in-depth review of the empirical literature on biculturalism, which provides definitions, features, and types of this construct. The second section provides the empirical work that has linked biculturalism to an array of outcomes, and outlines the inconsistencies, and some potential resolutions. The third section explores the possible moderating role of the cultural environment, drawing support from related literature, and highlights its potential application in the domain of biculturalism. Finally, I address how the present study can begin to resolve the limitations that currently exist in the literature.

Defining Biculturalism

Biculturalism involves dual cultural involvement and adaptation, and because of the complexity of the construct, it has been a challenge to try to define exactly who is bicultural and what it means to be bicultural. Definitions of biculturalism cover a wide spectrum, with some researchers relying on demographic information (e.g., nativity; Feliciano; 2001) to stricter definitions that require dual cultural involvement and adaptation. However, most researchers in this field would agree that theoretically, a bicultural individual is one who has internalized two cultures (Berry 1980; Benet-Martinez, Leu, Lee, & Morris, 2002), most commonly the ethnic culture from which they came, and the mainstream culture in which they live. Additionally, the concept of biculturalism has evolved over the decades, emerging from earlier works on acculturation typologies (Berry, 1980), to more current conceptualizations of the construct. There are also distinct characteristics of bicultural individuals that have been recognized in the

literature. Current researchers have also stepped away from defining bicultural individuals as a homogenous group, and have proposed different types of biculturalism.

Biculturalism was defined in the acculturation literature, where it was originally derived, as one of the four acculturation typologies, namely integration (Berry, 1980,1995; Berry & Kim, 1988; Sam and Berry, 2006). In this literature, an integrated individual is involved in, and identifies with, both the ethnic and mainstream cultures (Berry, 1984). Because earlier research used typological approaches in categorizing bicultural individuals, it implied that bicultural individuals comprise a homogenous group. As a result, they were expected to function similarly and have comparable outcomes with each other across situations. Additionally, it was initially conceived that the mainstream and ethnic cultures had a unilinear relationship. That is, degree of identification with one culture depended on the degree of identification with the other (e.g., Berry, Kim, Power, Young, & Bujaki, 1984).

More current theoretical constructs of biculturalism have become more nuanced and characterize it as the internalization of two cultures, which involve feeling a sense of belonging in, endorsing the values and beliefs associated with, engaging in behaviors prescribed by, and having interpersonal connections with members of both cultures (Benet-Martinez, et al., 2002; Berry, 1980; David, Okazaki, and Saw, 2009; Nguyen & Benet-Martinez, 2007). It is also assumed that the mainstream and ethnic cultures have a bidirectional, orthogonal, and non-hierarchical relationship (LaFromboise, Coleman, & Gerton, 1993). This means that identification with one culture is independent of identification with the other and allows the individual to maintain a positive view of, and assign equal status to both cultures. One framework of biculturalism takes a dynamic

constructivist approach to culture and cognition (Hong, Morris, Chiu & Benet-Martinez, 2000). This framework proposes that the acquisition of culturally related knowledge is domain-specific, as opposed to a general structure or the value-system approach. That is, individuals do not learn “worldviews,” but instead learn domain-specific knowledge about each culture. In addition, a premise of this model is that individuals can acquire more than one cultural meaning system, however oppositional these two systems may be. This framework suggests that biculturalism can occur through a combination of domain-specific knowledge from each culture. For example, an individual who can only speak English but celebrates Mexican American holidays may be considered bicultural. A potential contrasting framework then would suggest that it is necessary to be knowledgeable about both cultures across all domains (e.g., speak both languages and celebrate both cultures’ holidays) to be considered bicultural, though the degree and depth of knowledge may vary. To date, there has been no research that has tried to examine which framework is more accurate, or if both are equally effective in representing the dual cultural involvement of bicultural individuals.

Characteristics of Bicultural Individuals

Bicultural competence. The above definitions of biculturalism entail that bicultural individuals must possess certain characteristics in order to manage and navigate two cultural worlds. Indeed, a defining characteristic of being bicultural is possessing bicultural competence. Bicultural competence is the ability of an individual to behave and function successfully in both the mainstream and ethnic cultures, as well as having interpersonal relationships with members of both cultures (LaFromboise et al., 1993; David , Okazaki, & Saw, 2009). Bicultural competence can be achieved by (a)

being knowledgeable about cultural beliefs and values; (b) having positive attitudes toward both cultural groups; (c) having bicultural efficacy, which is the belief that one can effectively function in both cultures; (d) being able to communicate with members of both cultural groups, including language competence and nonverbal communication; (e) possessing a repertoire of culturally-situated roles; and (f) being grounded in both cultures through social networks (LaFromboise et al., 1993; David et al., 2009). Each of the skills associated with bicultural competence allows the individual be able to successfully live in dual cultural worlds by being aware of the specific demands, expectations, and normative behavior that each culture requires.

Frame-switching. Though frame-switching is a skill related to bicultural competence, it deserves special attention. Frame-switching is the ability to switch interpretative cultural frames as a response to cues in the environment. Because bicultural individuals have internalized two cultures that guide their emotions, behaviors, and cognitions, they must rely on current situational cues to interpret their environment. This means that responses are malleable and culture does not rigidly dictate behavioral responses. What it does, however, is provide individuals with interpretative frames from which they can construe their environment (Lehman, Chiu, Schaller, 2004). A driving motivating force in learning the ability to frame-switch is accountability to the audience of both the mainstream and ethnic cultures (Tadmor & Tetlock, 2006). These accountability pressures can result from internal or external pressures. External pressures can come from actual pressure from individuals who can evaluate one's behavior and may result in either positive or negative consequences. Internal pressure can result from

one's own internalized values and evaluation of one's action in response to a given situation.

A critical component in frame-switching is accessibility of information. The more accessible a particular piece of information is, the more likely it is to guide interpretation and consequently, behavior. For example, an individual who is constantly exposed to both mainstream and ethnic cultures may have the knowledge associated with both cultures readily accessible. In contrast, an individual who is only exposed to one culture consistently may only have the knowledge associated with that particular culture readily accessible. Research on frame-switching has typically used cultural priming methodologies used in the social psychological literature (Benet-Martinez et al., 2002; Hong et al., 2000; Verkuyten & Pouliasi, 2002). In these studies, participants are primed with cultural symbols (e.g., Statue of Liberty or a Chinese dragon) and measured on an outcome variable that has been shown to have cross-cultural variation (e.g., attribution styles). Results have shown that bicultural individuals generally respond in culturally consistent ways (see Benet-Martinez et al., 2002 for moderated effects). For example, bicultural individuals primed with American symbols provide more internal attributions, and when primed with Chinese symbols provide more external attributions. These findings show that even brief exposures to cultural primes affect individuals' interpretations. However, it does not inform us about the effects of prolonged exposures to varying cultural environments, which are more representative of the daily lives of bicultural individuals. Bicultural individuals may vary greatly in their degree of exposure to the ethnic and mainstream cultures. If momentary exposure to cultural cues is

sufficient to guide interpretation, then it follows that chronic exposure to particular cultural environments may have a dramatic impact on individuals.

Integrative complexity. Integrative complexity is another defining characteristic of bicultural individuals. Rooted in Kelly's (1955) personal construct theory, integrative complexity is an information processing style that provides the individual the ability to recognize and acknowledge the legitimacy of competing perspectives, identify their differences, and integrate these perspectives to form a solution or generate creative ideas (Tadmor, Galinsky, & Maddux, 2012; Tadmor & Tetlock, 2006). Research on integrative complexity has typically utilized content coding for the presence of multiple perspectives and the differentiation and integration of those perspectives in participants' open-ended responses. As it relates to biculturalism, integrative complexity allows individuals to acknowledge different cultural perspectives on an issue and to be able to integrate them in their daily lives. There is some evidence that bicultural individuals exhibit greater integrative complexity, resulting in enhanced creativity, more innovations, and more professional success (Saad, Damian, Benet-Martinez, Moons, & Robins, 2013; Tadmor et al., 2012). Integrative complexity should also manifest in a variety of other behavioral domains, though this is a research area that is yet to be explored. Integrative complexity may result in a wider behavioral repertoire for bicultural individuals to utilize because they have knowledge from two cultural systems and its associated behavioral responses. Thus, their experience in engaging in both mainstream and ethnic behaviors should lead them to recognize the unique advantages of these behavioral patterns, and allow them to integrate these varying behavioral patterns into adaptive solutions in their daily lives.

Heterogeneity of Bicultural Individuals

As noted previously, earlier works on biculturalism viewed bicultural individuals as a homogenous group. More recent work, however, has recognized that there is variability among bicultural individuals and researchers have tried to identify *types* of biculturalism to explain the variability within this population.

Alternation and fusion. LaFromboise et al.'s (1993) models of second culture acquisition recognized the variability in bicultural individuals. In this seminal work, the authors proposed five models of second culture acquisition (i.e., assimilation, acculturation, alternation, multicultural, and fusion) traditionally applied to group level phenomena to understand individual processes. Two of these most closely resemble the theoretical construct of biculturalism. The alternation model proposes that individuals can simultaneously acquire and be knowledgeable about two cultures and can alter their behavior for the specific environment. This model posits an orthogonal, bidirectional, and non-hierarchical relationship between the two cultures. The fusion model of second culture acquisition posits that the two cultures will fuse to form a new distinct culture. This new culture will take the strengths and weaknesses from both cultures to form the new culture. Similar to the alternation model, this model does not assume a hierarchical relationship between the two cultures. Though these models have advanced the theoretical construct of biculturalism, there has been no empirical work to date to try to distinguish the differences between these two models and how they may impact outcomes. Furthermore, it is possible that bicultural individuals represent both models. For example, the alternation model process can occur in bicultural individuals' bilingualism, speaking a specific language in a particular environment. On the other

hand, the fusion model process can occur in problem-solving settings, where bicultural individuals may take effective strategies from both cultures to create a novel solution, akin to integrative complexity.

Blended versus alternating. An extension of the work on second culture acquisition is the notion of blended versus alternating bicultural individuals (Phinney & Devich-Navarro, 1997). Blended bicultural individuals view both cultures positively and both cultures can simultaneously guide behavior. In this type of biculturalism, individuals may activate aspects of both cultures simultaneously, which may result in a compromise between the two. Evidence that has been offered to support the existence of blended bicultural individuals are studies that have shown that Asian Americans' performance on a variety of psychological tasks fall in between the performance of European Americans and Asians in Asia (e.g., Heine & Hamamura, 2007; Iyengar, Lepper, & Ross, 1999; Tsai, Simeonova & Watanabe, 2004). These finding suggests that they may be utilizing aspects of both cultures to create a middle ground between the two cultures.

In contrast, alternating bicultural individuals view the two cultures as conflicting with each other (Phinney & Devich-Navarro, 1997). Alternating bicultural individuals activate only a single cultural self-concept and this is primarily triggered by the situation (Hong et al., 2000). In this type of biculturalism, individuals rely on only one culture, activated by the situation, in guiding their behavior. However, it has been argued that this approach confounds the identity (e.g., Mexican American) and behavioral (e.g., frame-switching) markers of biculturalism (Nguyen & Benet-Martinez, 2007) making it difficult to distinguish between the two.

Bicultural identity integration. Another way researchers have tried to examine variability in biculturalism is through specifying individual differences in Bicultural Identity Integration (BII; Benet-Martinez & Haritatos, 2005; Benet-Martinez, Leu, & Lee, 2006). BII is a framework used to understand how bicultural individuals organize their dual cultural identities. It is a measure of an individual's subjective perception of how much their two cultural identities overlap. BII is measured via perceived cultural conflict, which is the degree of compatibility between the two cultures, and cultural distance, which is the degree of separation between two cultures (Benet-Martinez & Haritatos, 2005). The premise is that some bicultural individuals view the two cultures as compatible and complementary, while others view them as oppositional and contradictory. Additionally, some bicultural individuals view the two cultures as dissociated, while others view them as fused (Benet-Martinez & Haritatos, 2005). Researchers have shown that type of BII classification has impact on outcomes. Some of the frame-switching studies have shown that individuals who viewed their cultures to be oppositional (low BII) responded in culturally inconsistent ways. For example, when primed with a Chinese symbol, the Chinese immigrant participants made more internal attributions, and with American symbols, more external attributions. On the other hand, high BII individuals responded in culturally appropriate ways (Benet-Martinez et al., 2002). The rationale researchers have given for these results is that for individuals who are low in BII, there is a chronic polarization of cultures (i.e., viewing them as oppositional), and this should lead to a linking of cognitive systems. As a consequence, activation of one culture leads to the activation of the other and results in the reverse priming effect (Benet-Martinez et al., 2002). However, it is unclear why low BII

individuals would choose to respond in culturally inappropriate ways when both cultures are activated. It is possible that individuals who view the two cultures as oppositional (e.g., agreement with the statement “*I am conflicted between the American and Chinese ways of doing things*”) and distant (e.g., agreement with the statement “*I am simply Chinese who lives in North America*”) (Benet Martinez & Haritatos, 2005, p. 1028) are in fact, not bicultural at all. This may explain why they are not responding in culturally consistent ways.

Though the above characterizations of biculturalism are insightful and has advanced research in this area, there may be other ways to operationalize biculturalism that approximate its theoretical definitions. One such approach is to view biculturalism as multidimensional. Considering the experience of bicultural individuals more wholly may better represent the bicultural experience and may be more effective in predicting outcomes. Research has shown that culture has implications for emotion, cognition, and motivation (e.g., Chua, Leu, & Nisbett; 2005; Heine et al, 1999; Henrich et al., 2005; Kim, 2002; Lee, Aaker, & Gardner, 2000; Markus & Kitayama, 1991). Thus, it may be useful to conceptualize dual cultural identification as being multidimensional, reflecting the different domains in which biculturalism impacts the individual. Such an approach may effectively capture how dual cultural identification impacts the ways in which individuals manage the demands of both the ethnic and mainstream cultures. For example, it may be useful to consider how comfortable bicultural individuals are navigating the ethnic and mainstream cultural environments, and how easy they find it to do so. Further, researchers have yet to examine how perceptions of the advantages of being bicultural may impact outcomes. It may be also useful to measure *degrees* of

biculturalism, rather than *types*, and how incremental changes can impact psychological outcomes. The present study employs this multidimensional approach.

Biculturalism and Outcomes

The characteristics associated with being bicultural suggest that it should be quite beneficial for ethnic minorities. Indeed, there have been numerous research studies that have tried to answer this question by examining how biculturalism is associated with psychological (e.g., psychological and emotional well-being) and sociocultural (i.e., behavioral competence) adjustment. However, the history of empirical work on biculturalism has been fraught with inconclusive results (Nguyen & Benet-Martinez, 2007; Rogler, Cortes, & Maglady, 1991; Vivero & Jenkins, 1999). Some studies have shown that biculturalism is related to negative outcomes, most likely stemming from bicultural stress. This stress results from everyday life stressors, specifically pressures to adapt both to the majority and minority cultures, which may put individuals at risk. This may be particularly pronounced for individuals who are still in the process of acculturating to the mainstream culture. A study has shown that higher bicultural stress was associated with lower optimism, and greater depressive symptoms for girls (Romero, Carvajal, Volle, F., & Orduña, 2007). For ethnic minorities, acculturation to the mainstream culture has also been linked to greater smoking frequency and eating disorders (Epstein, Botvin, & Diaz, 1998; Gowen, Hayward, Killen, Robinson, & Taylor, 1999).

In contrast, other researchers have suggested that bicultural stress may not necessarily lead to negative psychological outcomes and may instead lead to personal and emotional growth (LaFromboise et al., 1995). There is empirical evidence that support

this claim, showing that bicultural individuals have better outcomes than their assimilated and separated counterparts. For example, bicultural individuals have been found to exhibit greater cognitive complexity in culturally related domains (Benet-Martinez et al., 2006). Biculturalism has also been linked to greater academic competence, less problem behavior, and lower dropout rates in adolescents (Coatsworth, Maldonado-Molina, Pantin, & Szapocznik, 2005; Feliciano, 2001). Other studies have found that biculturalism in Latinos was negatively associated with internalizing problems, positively associated with higher self-esteem, and negatively associated with depression (Smokowski & Bacallao, 2007; Miranda & Umhoefer, 1998). These desirable outcomes may be partly attributable to the benefits bicultural individuals reap from their participation in the mainstream culture, while also being able to preserve the protective factors their ethnic culture has to offer (Gonzales, Fabrett, & Knight, 2009). In addition bicultural individuals may have the benefit of having a wider behavioral repertoire that may lead to better coping mechanisms or goal achievement strategies. Some support for this has been shown in a study that examined achieving style orientations (i.e., direct, instrumental, and relational) of Latinas, which found that bicultural individuals had a wider repertoire of achieving styles (Gomez & Fassinger, 1994), allowing them to employ multiple strategies to achieve a goal. Bicultural individuals may also feel highly competent to engage in both the mainstream and ethnic cultures (LaFromboise et al., 1993) and feel confident in their abilities to manage challenges and attain goals.

A recent and very informative meta-analysis reconciled these inconsistent findings. The study showed that inconsistencies are perhaps largely due to how biculturalism is measured and the specific domains being examined (Nguyen & Benet-

Martinez, 2013). Out of the 83 studies that focused on biculturalism that were included in the meta-analysis, 33 studies measured biculturalism bilinearly (i.e., two separate scales that measure acculturation and enculturation), 27 studies unilinearly (i.e., one scale with low scores indicating separation, high scores indicating assimilation, and middle scores indicating biculturalism), 23 studies typologically (i.e., four subscales that assess each of the acculturation typologies), and 9 studies relied on ethnic labels (e.g., “Mexican American”; Nguyen & Benet-Martinez, 2013). The results of this meta-analysis provide support that biculturalism is strongly and positively associated with psychological and sociocultural adjustment. It also highlighted that the way biculturalism is measured plays an important role in capturing its association with psychological outcomes. Another potential contributing factor to the inconsistent findings that was not mentioned in the study is the potential moderating role of the cultural environment. In these studies, the cultural environment in which the participants lived was not considered. It is possible that the strength of the association is also dependent upon whether the individual lives in a monocultural or bicultural environment. Additionally none of the studies used a multidimensional approach to measuring biculturalism; it is possible that certain dimensions of biculturalism may be more related to certain outcomes than others.

There were also some notable gaps in the literature that became glaringly apparent in this meta-analysis. The authors noted that all of the studies that were included in their analyses were cross-sectional or correlational, and they called for longitudinal studies to be conducted. A more recent search of the literature yielded only one study that used a longitudinal approach (Chen, Benet-Martinez, Wu, Lam, & Bond, 2013). However, it is important to note that this longitudinal study took place over a four-week time period,

which may not be sufficient time for cultural processes to exert influence on outcomes. The goal of the proposed study was to examine the effect of biculturalism on mental health symptoms (i.e., depression, anxiety, substance abuse) longitudinally over the course of two years. This would be a significant contribution to the field as it can show the influence of biculturalism on psychological health over a meaningful course of time.

Mental health. Of particular interest to the proposed study are mental health outcomes. Research has shown that members of ethnic groups experience minority stress above and beyond general life stressors, which may put them at risk for negative mental health symptoms. For example, minority stress has been linked to psychological distress (Liang, Li, & Kim, 2004). For monocultural Mexican American adolescents, those who only identify with either the mainstream or ethnic culture, minority stress may be exacerbated if they live in a diverse cultural environment that exerts divergent demands on them.

Depression, anxiety disorders, and substance abuse have relatively high rates among Latino adolescents (CDC, 2011). According to the CDC's Youth Risk Behavior Surveillance System Fact Sheet (2011), Latino youth had the highest percentage of reporting feelings of sadness or hopelessness, suicide attempts, alcohol use, cocaine use, and ecstasy use among other risky behaviors compared to their African American and European American counterparts. Mexican American adolescents in particular have also been found to report significantly higher suicide ideation rates as compared to European American adolescents (Tortolero & Roberts, 2001). In addition, depression and anxiety disorders are among the most prevalent mental health conditions affecting Latino youth (Potochnick & Perreira, 2010).

However, if biculturalism is indeed beneficial for ethnic minorities, then perhaps it also leads to lower rates of depression, anxiety disorder, and substance abuse symptoms. If this is the case, then it may be beneficial to encourage minority youth to retain their ethnic culture as they acculturate to the mainstream United States culture, as it may be adaptive.

Depression. One of the main outcomes for this study was depression because the risk for depression dramatically increases in adolescence (Angold, Erkanli, Silber, Eaves, & Costello, 2002; Hankin et al., 1998; Lakdawalla, Hankin, & Mermelstein, 2007). Cognitive theories of depression, such as Beck's Theory of Depression (Beck, 1987), Hopelessness Theory of Depression (Abramson, Metalsky, & Alloy, 1989), and Response Styles Theory of Depression (Nolen-Hoeksema, 1991) all focus on cognitive style vulnerabilities as a precursor to acquiring and maintaining depression. For example, the Hopelessness Theory of Depression states that a proximal and sufficient cause of depression is hopelessness; that is having the belief that desirable outcomes will not occur and aversive outcomes will occur, and one does not have the capacity to change these outcomes (Abramson et al., 1989). For ethnic minorities, risk for depression may be exacerbated if they do not feel efficacious in their cultural environments, leading them to feel hopeless in being able to prevent aversive outcomes. This may also lead to feelings of worthlessness and alienation from those around them. In addition, monocultural individuals lack bicultural competence and there is evidence that perceived bicultural competence is negatively associated with depressive symptoms (David et al., 2009). Research has also shown that stress from bicultural environments (i.e., intergenerational acculturation gaps, within-group discrimination, outgroup

discrimination, and monolingual stress) among Mexican Americans is associated with higher rates of depressive symptoms (Romero & Roberts, 2003).

For bicultural individuals, these cognitive vulnerabilities and stress resulting from bicultural environments may be experienced much less because they should possess greater self-efficacy across the mainstream and ethnic cultural environments.

Additionally, bicultural adolescents should have expectations of desirable outcomes in both cultural environments. In instances where there is potential for aversive outcomes, bicultural adolescents should also feel that they have the capacity to change the outcome. As it relates to minority stress, such as those resulting from intergenerational acculturation gaps related to differential acculturation rates of children and parents, bicultural adolescents should not be expected to experience these as much as their more monocultural counterparts. Bicultural children should be able to switch their cultural frame at home, thereby allowing them to respond appropriately to the demands of their home ethnic environment and this may allow them to better understand their parents' perspectives.

Anxiety. Latino youth are at a higher risk for exhibiting anxiety-related symptoms compared to members of other ethnic groups (DHHS, 2001; Martinez, Polo, & Carter, 2012; Potochnick & Perreira, 2010). Early theories of anxiety stated that it stems from a fear of losing love (e.g., parental love) and results in feelings of insignificance, inferiority, unworthiness, and endangerment (Crosby, 1976; Horney, 1937). Feelings of anxiety then serve as an emotional warning system to alert the individual of threatening environments. Furthermore, this threat has to be something in the core of the individual's personality which he or she holds as essential to existence (May, 1950). Cognitive

perspectives on anxiety also highlight the importance of anticipation of threats, resulting in apprehension and worry (e.g., Eysenck, 1992). As it relates to minority youth, anxiety may stem from expectations of threatening situations rooted in feelings of incompetency in dealing with the demands of either the mainstream (e.g., school) or ethnic (e.g., home) environments. They may also feel pressured to retain their ethnic culture at home, yet are expected to acculturate into the mainstream culture at school. Feelings of anxiety may result from the fear of rejection by their parents if they become too acculturated into the mainstream culture, or fear of rejection by their peers if they are not acculturated enough. Thus it poses a great threat to the individual if one's cultural identity does not match the cultural environment. However, bicultural Latino youth may not experience these threats because their cultural identity is comprised of both their ethnic and American identity. In addition, bicultural youth should feel accepted by both their parents and peers.

Substance abuse. Latino adolescents are at a great risk for developing substance abuse problems (CDC, 2011; SAMHSA, 2011). This may stem from exposure to correlates of substance abuse that have been identified in the literature, such as economic deprivation, neighborhood disorganization, family conflict, peer rejection, low bonding to family, and academic failure among others (Hawkins, Catalon, & Miller, 1992). Conventional commitment and social attachment theories of substance abuse postulate that adolescents with weak attachments and bonds with others will feel less compelled to adhere to conventional norms of behavior (Elliot, Huizinga, & Menard, 1989; Petraitis, Flay, & Miller, 1995). These adolescents lack a sense of commitment to the values of society and also lack conventional role models, making it more possible to form attachments to deviant peers (Petraitis et al., 1995). In addition, the Social-Cognitive

Theory of Substance Abuse (Bandura, 1999) also postulates that a lack of perceived self-efficacy and self-agency might lead to the inability to stop using substances. As such, adolescents who may feel detached from the mainstream cultural norms and do not identify with the American society may be predisposed to initiate substance use. It is also likely that Latino adolescents who do not value the cultural norms at home and do not perceive their family as a source of attachment may be at risk for engaging in substance use. In contrast, bicultural Latino adolescents possessing bicultural competence should have positive feelings towards both groups and be grounded in both groups through social networks (LaFromboise et al., 1993; David et al., 2009). This should result in strong bonds and commitment not only to a single cultural group, but to both ethnic and mainstream societies. Thus, Latino adolescents may feel even more compelled to adhere to the conventional norms of behavior, making them less likely to engage in substance abuse.

If ethnic minority youth are not subjected to the precursors to mental health problems (e.g., feelings of hopelessness, anticipation of constant threats, lack of adherence to conventional norms), which may largely result from the demands of their cultural environments, then they may not experience negative mental health symptoms. This is true not only for bicultural individuals, but also monocultural individuals who live in a cultural environment that matches their cultural identification (e.g., an individual who only identifies with the Mexican culture living in a Mexican enclave).

Person and Cultural Environment Fit

Social psychology is rooted in understanding how the person interacts with his or her environment. This was exemplified in the work of Kurt Lewin, one of the field's

modern pioneers, in his theory which states that behavior is a function of the person and the environment (Lewin, 1943). This person-environment interaction can have significant consequences depending on the fit of the person's characteristics with the environment (e.g., Caplan, 1987; French, Rodgers, & Cobb, 1974). Surprisingly, applying the person-environment fit model has not been fully explored and is a major gap in the biculturalism literature (Schwartz & Unger, 2010) where it is particularly relevant.

Ethnic minority individuals vary greatly in their degree of ethnic and mainstream cultural exposure. Some may live in largely homogenous cultural environment (i.e., either largely ethnic or mainstream) where their home, neighborhood, and school cultural environment may be largely the same with regards to culture. In this instance, the individual needs only to be proficient in one particular culture to function successfully across and within settings.

In contrast, others may live in diverse cultural environments. This may result from diversity across or within settings. Diversity within settings occurs when a cultural environment (e.g., neighborhood) is culturally diverse within itself. However, since most individuals do not live their lives constrained to one setting, they may also experience diverse cultural environments across settings. For example, individuals may live in largely ethnically homogenous neighborhoods, but go to a school comprised largely of European-Americans. This type of situation will also expose the individual to a diverse cultural environment across settings.

In both instances (i.e., diversity within and across settings), the individual must be proficient in navigating both the mainstream and ethnic cultures to function successfully in his or her dual cultural world. Thus, the cultural environment in which one lives may

play a significant role in determining how one's degree of biculturalism influences mental health. This is because any given cultural environment may exert differential pressures and demands on the individual to behave in culturally prescribed ways. If an individual is unable to meet the cultural demands and expectations (i.e., having misfit/incongruence in the degree of biculturalism of self and the cultural environment), he or she may face negative consequences (e.g., discrimination), which may result in negative mental health symptoms. On the other hand, if an individual can successfully respond to these demands (i.e., having fit/congruence in the degree of biculturalism of self and cultural environment), then he or she is likely to receive positive reinforcement, which may result in no or fewer negative mental health symptoms. Thus, studies comparing outcomes of bicultural versus more monocultural individuals must take the cultural environment into consideration to fully understand these associations. For example, in bicultural environments, bicultural individuals may have advantages over monocultural individuals because they can respond to the demands of both the ethnic and mainstream cultures (i.e., self and environment congruence). Here, the monocultural individual is at a disadvantage because there is incongruence between biculturalism of the self and the environment. A bicultural setting requires the individual to respond to the demands of both cultures, when he or she is only capable of responding to one. On the other hand, in monocultural environments, bicultural and monocultural individuals should be equally adept at responding to the demands, and thus no differences in outcomes may be found.

There is some early evidence that suggest that the nature of the cultural environment may play an important role in bicultural individuals. One study of creativity

primed bicultural Chinese Americans with a monocultural (either American or Chinese symbols) or bicultural (symbols from both cultures) context. The authors found that bicultural individuals exhibited greater domain-general creativity. However, this difference was only observed in the bicultural prime condition (Saad et al., 2013). The authors note that bicultural contexts may activate both cultural networks, which may explain the greater creativity (Saad et al., 2013). These findings highlight the important role of the cultural environment. In these settings, priming both cultures in a laboratory setting resulted in greater creativity in bicultural individuals. These effects may even be more magnified in settings where the individual is consistently exposed to either a bicultural or monocultural environment. However, very few studies have considered the impact of the cultural environment on biculturalism, and there are currently no empirical studies that have examined how the actual cultural environment in which the individual lives impact his or her psychological outcomes. This gap in the literature needs to be addressed because the benefits of being bicultural, specifically the ability to adapt to the demands of both the mainstream and ethnic cultures, may only be advantageous in environments where it is required.

Other studies, albeit not examining biculturalism, have shown the significant impact of the cultural environment on adaptation (Caplan, 1987; Roosa et al, 2009). For example, one study examined the Person-Environment Fit Model in the context of family and neighborhood characteristics and its impact on adjustment in adults and children (Roosa et al., 2009). One of the findings of the study showed that low-income Mexican American families reported fewer adaptation problems when they also lived in low-income neighborhoods dominated by immigrants. These findings suggest that it is not

sufficient to compare the effects of income on adjustment alone, but that the environment in which these families lived moderated how well they adapted. Similarly, the home environment has been shown to impact outcomes. Intergenerational conflict resulting from different rates of acculturation has been shown to be associated with negative mental health outcomes (Gil, Wagner, & Vega, 2000; Jensen Arnett, 1999; Szapocznik, & Kurtines, 1993). Furthermore, perceived differences in value orientations of the individual with their family's have a direct relationship to feelings of loneliness and alienation (Suarez, Fowers, Garwood, & Szapocznik, 1997). These studies highlight the need for research on biculturalism to begin considering the impact of the cultural context on psychological outcomes. The proposed study sought to address this current gap in the literature by examining the cultural environments with which individuals were exposed to in their daily lives. Specifically, the focus was on the diversity of the cultural environment of the home, school, and neighborhood as these were likely the most influential environments for the participants in the sample.

Although the focus of the proposed study was to examine cultural environment as a moderator, it is worth acknowledging that the individual's cultural environment can also be a precursor to becoming bicultural. Biculturalism results largely because of the pressures and demands of the cultural environment and accountability pressures exerted on the individual from members of both the ethnic and mainstream cultures (Tadmor & Tetlock, 2006). For example, young children who are chronically exposed to both the ethnic and mainstream cultures may become bicultural much more quickly than children exposed to only one culture. Similarly, adult immigrants, especially those who suddenly become chronically exposed to a dual cultural environment, may become bicultural much

more rapidly than adult immigrants who are not. Of course, individuals can choose to either adapt to their new cultural environment or to reject it. If individuals choose to adapt to the cultural environment, this will lead them to become bicultural; if they reject responding to the new cultural demands, then they will remain monocultural.

Summary

The current state of the literature provides some evidence that biculturalism leads to positive outcomes. In addition, more recent research on biculturalism has moved away from categorizing bicultural individuals as a homogenous group and has recognized that there is variability among bicultural individuals. A novel approach that may provide new insight is to measure degrees of biculturalism using a multidimensional scale, because acquiring two cultures is a process, and this approach may be more sensitive to capturing this phenomenon, which this study hopes to accomplish.

There are also still some critical gaps in this literature. A thorough search on the topic of biculturalism yielded only one longitudinal study (Chen et al., 2013) and that study took place over the course of four weeks. Almost all studies on the topic are cross-sectional and use single-time point assessments. More longitudinal studies are needed to firmly establish the influence of biculturalism on psychological outcomes. The present study employed a longitudinal approach over the course of two years. Furthermore, the majority of studies have been conducted on adults, typically a college population. The study examined the impact of biculturalism among adolescents. Adolescents may be experiencing the pressure of the push and pull of the mainstream and ethnic cultures for the first time as they become more exposed to cultural environments that may be different than their home environment. The moderating role of the cultural environment has also

been largely unexplored. This is a serious gap in the literature because the cultural environment dictates the demands and challenges faced by the individual. The present study sought to address these limitations.

The Present Study

The present study had two major goals and hypotheses. The first is to examine the influence of biculturalism on depression, anxiety, and substance abuse symptoms longitudinally over the course of two years. There is mounting evidence that ethnic minority youth may be at risk for negative mental health outcomes (e.g., CDC, 2011), yet bicultural youth appear to have more positive psychological outcomes (see Nguyen & Benet-Martinez, 2013 for review). However, the exact causal relationship between biculturalism and mental health remains unknown. Most studies that have shown an association between biculturalism and positive mental health outcomes have used single-time point assessments and since there is no temporal precedence in this approach, it is difficult to determine the causal direction. While it is possible that those who have less mental health symptoms are more likely to become more bicultural, the present study proposed that being bicultural is what leads to fewer mental health symptoms. The longitudinal design of the present study will allow for stronger causal inferences about these associations. The first hypothesis of the study predicted that, overall, biculturalism should be negatively related to depression, anxiety, and substance abuse symptoms over time.

The second goal of the study was to examine the potential moderating role of the cultural environment on the influence of biculturalism on mental health symptoms. Some evidence has shown that even short exposures to cultural primes can impact

psychological outcomes for bicultural individuals (Saad et al., 2013). The goal of this research was to extend this examination by testing the effects of consistent or chronic exposure to particular cultural environments that individuals are exposed to in their daily lives. The second hypothesis of the study predicted that a fit between the degree of biculturalism of the individual and the cultural environment should be associated with optimal psychological outcomes. Specifically, bicultural individuals were expected to handle the demands of bicultural or diverse cultural environments better than their more monocultural counterparts. In these environments, bicultural individuals should have significantly fewer mental health symptoms than more monocultural individuals. In contrast, bicultural and monocultural individuals were expected to handle the demands of monocultural or homogenous cultural environments equally well. In these environments, bicultural individuals were not expected to differ in their amount of mental health symptoms compared to more monocultural individuals. In the present study, moderation by gender and nativity were examined. It was unclear whether the combined impact of biculturalism and the cultural environment will be different for males and females, and those born in the United States versus Mexico. Gender and nativity were not expected to moderate any of the hypothesized effects, since biculturalism was expected to function similarly across gender and nativity.

Methods

The proposed study was part of a larger longitudinal study “Culture, Context, and Mexican American Mental Health” at the Prevention Research Center at Arizona State University. The larger study used a combination of random and purposive sampling procedures to include Mexican American families representing diverse backgrounds with

regards to nativity, SES, and the cultural environment of their communities (Roosa et al., 2008). The present study employed a longitudinal design using Wave 3 (i.e., 10th grade) biculturalism scores as predictors of Wave 4 (i.e., 12th grade) mental health symptoms. To examine the moderating role of the cultural environment, the moderating effects of mothers' biculturalism score, fathers' biculturalism score, parents' biculturalism score, school ethnic composition, and neighborhood ethnic composition from Wave 3 were examined.

Participants

The participants in this study were 316 Mexican American adolescents (females $N=154$, males $N=162$) from families living in the greater Phoenix area (see Roosa et al., 2008 for detailed sampling and recruitment information). These participants were part of a larger longitudinal study and data for the present study were collected during their third and fourth wave of participation. At their third and fourth wave of participation, participants were in the 10th ($M = 15.86$ years $SD = .43$) and 12th ($M = 17.37$, $SD = .52$) grade of high school respectively. The majority of participants were born in the United States (78.80%). The participants were compensated with \$55 for their Wave 3 and \$60 for their Wave 4 participation.

Procedure

Participants completed the measures through computer-assisted interviews, a majority of which were conducted in their home. Most of the interviewers were bilingual and participants answered the measures in either English or Spanish, per their preference. All scales used in the study have been shown to be valid and reliable in Spanish. In addition, participants indicated whether they identified as being "Mexican" or "Mexican

American” and this self-selected label was used throughout the interview. The measures in the present study were part of a larger battery of questionnaires.

Measures

Biculturalism. The Mexican American Biculturalism Scale (MABS; Basilio et al., in press) is the first measure of its kind to measure biculturalism specifically in Mexican Americans. The scale used a very different approach to capture a broader range of the bicultural experience, and used a scoring system that better represents the varying levels of biculturalism. The subscales were administered in the following order: Bicultural comfort, bicultural facility, and bicultural advantages. Participants indicated which ethnic group label they identified with (i.e., “Mexican” or “Mexican American”) and this self-selected label was inserted when appropriate throughout the scale. The response scale for bicultural comfort ranged from 1 (e.g., “I am only comfortable when [I need to speak in English/Spanish].”) to 5 (e.g., “I am always comfortable in both of these situations.”) and the mean scores were computed with higher scores indicating higher levels of bicultural comfort. For the bicultural comfort subscale, responses corresponding with only being comfortable in either the mainstream or ethnic contexts, were both recoded to a score of 1, representing being only comfortable in a monocultural setting. The response scale for bicultural facility (e.g., “Needing to speak Spanish sometimes and English other times is”) ranged from 1(very easy) to 5 (very difficult), and items were reverse coded. The mean scores were computed with higher scores indicating higher levels of bicultural facility. The response scale for bicultural advantages (e.g., “For me, being able to speak Spanish sometimes and English other times has”) ranged from 1 (many advantages) to 5 (many disadvantages), and items were reverse coded. The

mean scores were computed with higher scores indicating higher levels of bicultural advantages. Overall biculturalism was calculated by computing the means of all the items.

Mental health. The Diagnostic Interview Schedule for Children (C-DISC; Shaffer, Fisher, Lucas, Dulcan, & Schweab-Stone, 2000) is a measure that provides diagnoses and symptom counts for a variety of mental health problems. This measure has been effectively translated into Spanish and shown to be reliable and valid in each language (Bravo et al., 2001; Ribera, Canino, Rubio-Stipec, & Bravo, 1996). The C-DISC includes diagnosis counts, criteria counts, and symptom counts. This scale measures a variety of mental health problems in children. The present study focused on the following mental health symptoms: major depression, anxiety, and substance abuse (i.e., alcohol, marijuana, nicotine, other substances abuse or dependence) disorders. Since it is infrequent that we find full diagnoses of these mental health problems, symptom counts was used as a continuous variable.

Cultural environment. Several indicators were used as a measure of the cultural environment adolescents were exposed to. These variables represent the home, school, and neighborhood cultural environment. Since adolescents at the time of participation were in their 10th grade in Wave 3 and in 12th grade in Wave 4, they are likely to spend a large proportion of their time socializing with their friends at school and in their neighborhoods.

Mothers' and fathers' biculturalism. To examine the cultural environment of the home, the scores of mothers and fathers on the MABS were calculated. Because there was a sizeable proportion of single-parent homes (i.e., 23.40%) and two-parent homes

where fathers did not participate in the study (i.e., 21.00%), mothers' and fathers' biculturalism score were analyzed separately. For a subset of the sample, with two-parent households and participating fathers, a composite variable of parents' biculturalism was created to examine the joint moderating effects of parents' biculturalism. These variables were treated as continuous variables with higher scores indicating greater biculturalism of mothers, fathers, and parents.

School ethnic composition. To examine the cultural environment of schools, the percentage of Hispanic students at the school level was used as an indicator. This information was retrieved for the United States Department of Education. Though the percentage of European American students were also available, these two variables were highly inversely correlated, $r(271) = -.96, p < .001$. Thus, the percentage of Hispanic students at the school was used as an index of ethnic diversity within the school. As it is measured, higher percentages represent monocultural ethnic environments, lower percentages represent monocultural mainstream environments, and percentages approaching 50% represent relatively bicultural environments.

Neighborhood ethnic composition. To examine the cultural environment of the neighborhood, the percentage of Hispanic residents within neighborhood tracts from the United States Census was used. Census tracts generally have a population of 1,200 to 8,000 people. Though the percentage of non-Hispanic European American residents were also available, these two variables were highly inversely correlated, $r(314) = -.94, p < .001$. Thus, the percentage of Hispanic residents was used as an index of ethnic diversity within the neighborhood. As it is measured, higher percentages represented monocultural ethnic environments, lower percentages represent monocultural mainstream

environments, and percentages approaching 50% represent relatively bicultural neighborhood environments

Economic hardship. To control for the potential effects of socioeconomic status on mental health outcomes, mother reports of economic hardship was used. The economic hardship measure has four scales: Inability to make ends meet, not enough money for necessities, economic adjustments/cutbacks, and financial strain. The items in the scale were from or derived from the Economic Hardship Measurements (Conger, 1994; see Appendix B). A total economic hardship score was computed by standardizing each score and summing all scores, where higher scores indicated higher levels of economic hardship. Mothers' reports were used because data for fathers' reports were not available for all the participants in the sample. Additionally, adolescents' reports on economic hardship were not available. Preliminary analyses have revealed that this scale was not correlated with any of the bicultural components or overall biculturalism.

Analytic Plan

A series of descriptive analyses were conducted to examine the means and variability of the variables of interest. The study employed a longitudinal model to answer the research questions. Overall biculturalism comprising of bicultural comfort, bicultural facility, and bicultural advantages at Wave 3 was the exogenous variable. Symptom counts of depression, anxiety, and substance abuse at Wave 4 were the outcome variables. Additionally, mental health symptoms for depression, anxiety, and substance abuse at Wave 3 were controlled for.

Structural Equation Modeling (SEM) using maximum likelihood estimation was used to test all the models with Mplus 7.11 software. Conventional standards indicate

that model fit is considered good if the Comparative Fit Index (CFI) is greater than or equal to .95 (greater than or equal to .90 for adequate fit), the Root Mean Square Error of Approximation (RMSEA) is less than or equal to .06 (less than or equal to .08 for adequate fit), and the Standardized Root Mean Square Residual (SRMR) is less than or equal to .08 (less than or equal to .10 for adequate fit (Hu & Bentler, 1999)).

Additionally, in all models, multigroup analyses were conducted to examine whether there was moderation by gender and nativity. Moderation by gender and nativity was deemed to be present if the unconstrained model (i.e., allowing paths to vary across gender and nativity) fit significantly better than the constrained model (i.e., constraining paths to be equal across gender and nativity) as indicated by the Chi-square difference test and substantial differences in the practical fit indices. If moderation was present, an examination of the differences in path coefficients from the unconstrained model and modification indices in the constrained model were conducted. Paths that were deemed to vary across gender and nativity were allowed to vary in a partially constrained model and chi-square difference tests between the unconstrained model and partially constrained model were conducted. If this chi-square test was not significant, moderation (by gender or nativity) was deemed to occur only at the paths that were allowed to vary.

The cultural environment moderator variables at Wave 3 were tested in separate models (see Figures 2a – 7d) to examine the impact of each cultural environment on the influence of biculturalism on mental health symptoms. Additionally, to examine the diversity across cultural contexts, a composite variable of diversity across environments was created with school and neighborhood and ethnic composition. This score will represent the diversity across settings. For overall models (across gender and nativity) all

paths were reported in unstandardized and standardized coefficients. For models that represent moderation by gender or nativity, only significant paths were included for simplicity. Additionally, only unstandardized coefficients were reported for equal paths across gender or nativity since model constraints only constrain the paths to be equal in the unstandardized coefficients.

To test the interaction between biculturalism of the person and the environment (where applicable), simple slopes were calculated to examine the influence of biculturalism on mental health symptoms across different degrees of biculturalism in the environment. Tests of significance of each simple slope were examined to test whether they were significantly different from zero.

To address potential dependency in some analyses due to adolescents being clustered within schools and neighborhoods, the “COMPLEX” command in Mplus was used with maximum likelihood estimation with robust standard errors (MLR). This analysis accounts for nonnormality and nonindependence of observations (Muthén & Muthén, 1998–2011). Where appropriate, the Satorra-Bentler scaled chi-square difference test was used.

Additionally, since no previous work has examined how bicultural comfort, facility, and advantages were associated with the specific mental health symptoms of interest, exploratory analyses were conducted to determine if any of these bicultural components are more influential in impacting specific mental health symptoms.

Results

Descriptive analyses were conducted to examine the means, standard deviations, and range of scores on all variables of interest (Table 1). The results showed that there

was a substantial variability across all the variables of interest, except substance abuse disorder symptoms. For substance abuse, 91% (95% females, 86% males) reported having zero substance abuse symptoms. The implications of this will be discussed further. Overall, descriptive analyses showed that participants in the study were relatively bicultural (see Table 1). At Wave 3, participants scored significantly higher in bicultural advantage than bicultural comfort, $t(315) = -12.40, p < .001, d = .84$ and bicultural facility, $t(315) = -7.29, p < .001, d = .43$. Participants also scored significantly higher in bicultural facility than bicultural comfort, $t(315) = -8.34, p < .001, d = .55$. Analyses of the cultural environment moderator variables revealed that mothers and fathers were relatively bicultural (Table 1). Additionally, participants were likely to go to school with a greater number of Hispanics than European Americans. Similarly, they were likely to live in neighborhoods that had a greater percentage of Hispanics than European Americans (Table 1). Descriptive analysis of the control variable of economic hardship showed that mothers reported moderate levels of economic hardship. Economic hardship was also not significantly correlated with overall biculturalism, $r = .07, p = .24$.

Biculturalism

Regression analysis was conducted to examine whether Wave 3 biculturalism scores predicted Wave 4 biculturalism scores for adolescents. The results showed that indeed adolescents' biculturalism at Wave 3 significantly predicted their biculturalism at Wave 4, $b = .55, t(287) = 11.17, p < .001$. Additionally, adolescents' biculturalism significantly increased from Wave 3 ($M = 3.60, SD = .54$) to Wave 4 ($M = 3.87, SD = .56$), $t(289) = -8.51, p < .001, d = .47$. Parents' biculturalism at Wave 3 was also examined to see whether they predicted adolescents' biculturalism scores at Wave 4.

Multiple regression results showed that mothers' biculturalism was not a significant predictor of adolescents' biculturalism, $b = -.14$, $t(164)$, $p = .07$, but fathers' biculturalism was, $b = .21$, $t(164) = 2.23$, $p < .01$.

Gender and nativity. There were no significant differences among female ($n = 154$) and male ($n = 162$) adolescents on biculturalism at Wave 3, $t(314) = .06$, $p = .95$, $d = .01$, or Wave 4, $t(287) = .62$, $p = .54$, $d = .07$. There were also no significant differences among adolescents born in the United States ($n = 246$) and Mexico ($n = 70$) on biculturalism at Wave 3, $t(314) = -.20$, $p = .84$, $d = .03$, or Wave 4, $t(287) = -.51$, $p = .61$, $d = .07$.

Mental Health Symptoms

Correlational analyses of the mental health symptom variables showed that major depression symptoms was significantly correlated with anxiety disorder symptoms, $r(286) = .55$, $p < .001$, and substance abuse symptoms, $r(286) = .30$, $p < .001$. Anxiety symptoms and substance abuse symptoms were also significantly correlated, $r(289) = .31$, $p < .001$.

To examine whether mental health symptoms at Wave 3 significantly predicted mental health symptoms at Wave 4, a series of regression analyses were conducted. The results showed that major depression symptoms at Wave 3 significantly predicted major depression symptoms at Wave 4, $b = .49$, $t(282) = 9.47$, $p < .001$. Anxiety disorder symptoms at Wave 3 also significantly predicted anxiety disorder symptoms at Wave 4, $b = .47$, $t(285) = 8.99$, $p < .001$. Lastly, substance abuse symptoms at Wave 3 also significantly predicted substance abuse symptoms at Wave 4, $b = .48$, $t(285) = 4.48$, $p < .001$.

Paired-samples t-tests were used to examine changes in mental health symptoms from Wave 3 to Wave 4. The results showed that adolescents' major depression symptoms significantly decreased from Wave 3 ($M = 4.50, SD = 4.25$) to Wave 4 ($M = 3.24, SD = 3.53$), $t(283) = 5.38, p < .001, d = .32$. The results also showed that adolescents' anxiety disorder symptoms also decreased from Wave 3 ($M = 8.79, SD = 7.44$) to Wave 4 ($M = 6.00, SD = 5.87$), $t(286) = 6.77, p < .001, d = .42$. However, there was no significant change in substance abuse symptoms from Wave 3 ($M = .25, SD = 1.14$) to Wave 4 ($M = .30, SD = 1.48$), $t(286) = -.61, p = .55, d = .04$.

Gender and nativity. Males ($M = 3.03, SD = 3.47$) and females ($M = 3.50, SD = 3.63$) did not significantly differ on major depression symptoms, $t(284) = 1.12, p = .27, d = 1.3$. However, there were significant gender differences in anxiety symptoms, where females ($M = 6.67, SD = 6.10$) had significantly higher anxiety symptoms than males ($M = 5.30, SD = 5.53$), $t(287) = 2.00, p < .05, d = .24$. Additionally, males ($M = .50, SD = 2.00$) had significantly higher substance abuse symptoms than females ($M = .10, SD = .52$), $t(287) = -2.33, p < .05, d = .29$. Adolescents who were born in the United States versus Mexico did not significantly differ in their depression, $t(284) = .54, p = .59, d = .08$, anxiety, $t(287) = .47, p = .64, d = .16$ and substance abuse symptom counts, $t(287) = .92, p = .36, d = .16$.

Cultural Environment Moderator Variables

Correlational analysis of the cultural environment variables (see Table 2) showed that mothers' and fathers' biculturalism were only marginally correlated, $r(167) = .15, p = .055$. Mothers' biculturalism was significantly correlated with the percentage of European Americans in schools, $r(264) = .13, p < .05$, and negatively correlated with

percentage of Hispanics in schools, $r(264) = -.13, p < .05$. However, mothers' biculturalism was not significantly correlated with the percentage of European Americans, $r(303) = .05, p = .40$, and Hispanics, $r(303) = -.09, p = .11$, in neighborhoods. Fathers' biculturalism was significantly correlated with percentage of European Americans in both schools, $r(150) = .23, p < .01$, and neighborhoods, $r(174) = .20, p < .05$. Fathers' biculturalism was also significantly negatively correlated with percentage of Hispanics in both schools, $r(150) = -.24, p < .01$, and neighborhoods, $r(174) = -.22, p < .01$. As expected, the percentage of European Americans in schools was highly negatively correlated with percentage of Hispanics in schools, $r(271) = -.96, p < .001$. Similarly, the percentage of European Americans in neighborhoods was also highly negatively correlated with percentage of Hispanics in neighborhoods, $r(314) = -.94, p < .001$. The percentage of European Americans in schools was highly correlated with percentage of European Americans in neighborhoods, $r(271) = .73, p < .001$, and highly negatively correlated with percentage of Hispanics in neighborhoods $r(271) = -.71, p < .001$. Similarly, the percentage of Hispanics in schools was highly negatively correlated with the percentage of European Americans in neighborhoods $r(271) = -.72, p < .001$, and highly correlated with percentage of Hispanics in neighborhoods, $r(271) = .73, p < .001$.

Identifying Monocultural Individuals

To examine whether there were participants that were extremely monocultural in the sample who live in monocultural environments that were incongruent with their cultural orientation, scores on overall Biculturalism and Bicultural Comfort scale prior to recoding were used. The Bicultural Comfort subscale is useful because prior to recoding,

participants' responses indicated whether they were only comfortable in the Mexican culture or only the American culture.

The first step was identifying participants that scored low on overall biculturalism and can be characterized as monocultural. Scores on overall Biculturalism ranged from 1 (extremely monocultural) to 5 (extremely bicultural). Because participants in the sample were quite bicultural (Table 1), participants scoring one standard deviation below the mean were still above the midpoint of the scale, as such, participants scoring two standard deviations below the mean were identified (i.e., scores of 2.52 on overall biculturalism). Out of the 316 participants, only 3 met this criterion and all scored a 2.41 on overall biculturalism.

The second step was to examine the pattern of responses on the Bicultural Comfort Scale. Prior to recoding response scores of "1" correspond to being comfortable with the Mexican culture, whereas response scores of "2" corresponds to being comfortable only with the American culture. Prior to recoding, scores ranged from 1 to 6. Out of the 3 participants that scored two standard deviations below the mean on overall biculturalism, none responded with a "1" to all nine bicultural comfort items, and none responded with a "2" to all nine bicultural comfort items. The participants' pattern of responses is shown in Table 3. Additionally, information regarding their corresponding cultural environments was provided. Participant 1 responded with a "1" four times on the scale, but also responded with a "2" four times on the scale. This participant's home cultural environment was quite bicultural with mother and father scoring high on biculturalism. Though the ethnic composition of the school of this participant was predominantly Hispanic, the ethnic composition of the neighborhood was quite bicultural.

Participant 2 only responded with a “1” twice on the scale. This participant had missing data on parents’ biculturalism and school’s ethnic composition. However, the neighborhood’s ethnic composition was quite bicultural as well. Finally, participant 3 responded with a “1” four times on the scale, but also responded with a “4” three times. This participant was also exposed to relatively bicultural environments as well, though mother’s biculturalism was below the mean. Thus, out of all the adolescent participants in the sample, the data showed that none of the more monocultural participants lived in an environment that was incongruent with their cultural orientation (e.g., monocultural Mexican in a largely homogenous European American environment).

Hypothesis One

Model 1. SEM analyses were conducted to examine whether biculturalism at Wave 3 (10th grade) predicted depression, anxiety, and substance abuse symptoms at Wave 4 (12th grade), while controlling for economic hardship and mental health symptoms at Wave 3. The results showed that this model had adequate fit, $\chi^2(13) = 13.83, p < .05, CFI = .98, RMSEA = .07 (.02, .22), SRMR = .04$. Biculturalism was a significant predictor of decreases in anxiety symptoms, but not of depression and substance abuse symptoms (Figure 1a). Higher degrees of biculturalism were associated with fewer anxiety symptoms. However, economic hardship was not a significant predictor of any of the mental health symptoms, thus all subsequent analyses did not include economic hardship in the model.

Gender. To examine whether gender moderated these effects, I compared an unconstrained model that allowed the path coefficients to vary across genders to a model that constrained the path coefficients to be equal across males and females. The

unconstrained model had adequate fit, $\chi^2 (12) = 21.66, p < .05, CFI = .97, RMSEA = .08 (.02, .13),$ and $SRMR = .08$. However, the model constraining the path coefficients to be equal for males and females did not fit the data well and the chi-square difference test between the constrained and unconstrained model was significant (Table 4). The results revealed that allowing the path coefficient from substance abuse at Wave 3 predicting substance abuse at wave 4, and allowing the path coefficient from biculturalism predicting anxiety to vary across genders would improve model fit. Indeed, a partially constrained model allowing only these paths to vary across groups fit the data well, $\chi^2 (22) = 27.95, p < .17, CFI = .98, RMSEA = .04 (.00, .09),$ and $SRMR = .05,$ and did not significantly differ from the unconstrained model, $\Delta \chi^2 (\Delta df = 10) = 6.29, p = .79$. This suggest that moderation by gender occurs only at these two paths, where for males, substance abuse at Wave 4 was a significant predictor of substance abuse at Wave 3 and biculturalism was a significant predictor of decreases in anxiety symptoms (Figure 1b).

Nativity. To examine whether nativity moderated these effects, I compared an unconstrained model that allowed the path coefficients to vary across nativity to a model that constrained the path coefficients to be equal across those born in the United States versus Mexico. The unconstrained model fit the data well, $\chi^2 (12) = 19.96, p = .07, CFI = .98, RMSEA = .07 (.00, .12),$ and $SRMR = .04$. However, the model constraining the path coefficients to be equal for across nativity did not fit the data well, and the chi-square difference test between the constrained and unconstrained model was significant (Table 4). Thus, these results suggest that there was moderation by nativity. Allowing the path coefficient from substance abuse at Wave 3 predicting substance abuse at wave 4 to vary across nativity would improve model fit. Indeed, a partially constrained model

allowing only this path to vary across groups fit the data well, $\chi^2 (23) = 33.85, p = .07$, CFI = .97, RMSEA = .06 (.00, .10), and SRMR = .04, and did not significantly differ from the unconstrained model, $\Delta \chi^2 (\Delta df = 11) = 13.89, p = .24$. This suggests that moderation by nativity occurs only at this path, where for those born in the United States, substance abuse at Wave 4 was a significant predictor of substance abuse at wave 3. However, this was not true for those born in Mexico (Figure 1c).

Hypothesis Two

The effects of the cultural environment variables of biculturalism, and school and neighborhood contexts on mental health were examined to test whether they had any main or interaction effects with adolescents' biculturalism. In all models, Wave 3 mental health symptoms were controlled for.

Model 2: mothers' biculturalism. To examine the effects of the potential moderating role of the home environment on the influence of adolescents' biculturalism on mental health, mothers' biculturalism and its interaction with adolescents' biculturalism were used in the model because a sizable proportion of participants ($n = 149$) did not have fathers' report on biculturalism. The results showed that this model fit the data well, $\chi^2 (6) = 13.69, p < .001$, CFI = .98, RMSEA = .07 (.02, .12), SRMR = .04. Adolescents' and mothers' biculturalism, and their interaction were not significant predictors of depression or substance abuse. However, adolescents' biculturalism was a significant predictor of anxiety symptoms, though mothers' biculturalism was not (Figure 2a).

Gender. The unconstrained model fit the data well, $\chi^2 (12) = 19.47, p = .08$, CFI = .98, RMSEA = .07 (.00, .12), and SRMR = .05. However, the model constraining the

path coefficients to be equal for males and females did not fit the data well, and the chi-square difference test between the constrained and unconstrained model was significant (Table 4). Thus, these results suggest that there was moderation by gender. The results revealed that for males, adolescents' and mothers' biculturalism had a significant effect on anxiety. Additionally, Wave 3 substance abuse symptoms were a significant predictor for wave 4 substance abuse symptoms. None of these paths were significant for the females. Indeed, the partially constrained model (i.e., allowing only the paths described above to vary across groups), had adequate fit, $\chi^2(20) = 24.00, p = .24, CFI = .99, RMSEA = .04 (.00, .09),$ and $SRMR = .05.$ In addition, the chi-square difference test between the unconstrained and partially constrained model was not significant, $\Delta \chi^2 (\Delta df = 8) = 4.53, p = .81.$ These results suggest that moderation occurred in these paths only (Figure 2b). Thus for males, higher degrees of biculturalism were associated with fewer anxiety symptoms. In contrast, higher degrees of biculturalism of their mothers were associated with more anxiety symptoms, while there were no effects for females.

Nativity. The unconstrained model fit the data well, $\chi^2(12) = 23.87, p < .05, CFI = .96, RMSEA = .08 (.03, .13),$ and $SRMR = .04.$ Similarly, the model constraining the paths to be equal among those born in the United States and Mexico had adequate fit, and the chi-square difference test between the constrained and unconstrained model was not significant (Table 4). Thus, there was no moderation by nativity.

Model 3: fathers' biculturalism. The potential moderating role of fathers' biculturalism was examined for the subset of participants who had fathers' reports on biculturalism ($n = 164$) and no significant main or interaction effects were found (Figure 3). See Appendix C for more detailed results.

Model 4: parents' biculturalism. To examine the potential moderating role of joint effects of mothers' and fathers' biculturalism on mental health symptoms, a composite variable of parents' biculturalism was created using mothers' and fathers' biculturalism scores. The results showed that this model fit the data well, $\chi^2(6) = 13.88$, $p < .05$, CFI = .98, RMSEA = .07 (.02, .12), SRMR = .03. In this model, adolescents' biculturalism significantly predicted anxiety symptoms (Figure 4a).

Gender. The unconstrained model fit the data well, $\chi^2(6) = 20.09$, $p = .07$, CFI = .98, RMSEA = .07 (.00, .12), and SRMR = .05. However, the model constraining the path coefficients to be equal for males and females did not fit the data well, and the chi-square difference test between the constrained and unconstrained model was significant (Table 4). Thus, these results suggest that there was moderation by gender. For males, anxiety was significantly predicted by biculturalism and the interaction effect between adolescents' and parents' biculturalism. Additionally, Wave 3 substance abuse symptoms were a significant predictor for wave 4 substance abuse symptoms. None of these paths were significant for the females. Indeed, the partially constrained model fit the data well, $\chi^2(21) = 25.95$, $p = .23$, CFI = .99, RMSEA = .04 (.00, .09), and SRMR = .05. In addition, the chi-square difference test between the unconstrained and partially constrained model was not significant, $\Delta\chi^2(\Delta df = 9) = 5.86$, $p = .75$. These results suggest that moderation occurred in these paths only (Figure 4b). For males, higher degrees of adolescents' biculturalism were associated with fewer anxiety symptoms. Additionally, the interaction of adolescents' and parents' biculturalism was a significant predictor for males.

To probe the significant interaction effect on anxiety for males, all independent variables and covariates were centered and simple slopes were calculated at the mean (centered), one standard deviation above, and one standard deviation below the mean of parents' biculturalism. The results showed that simple slopes were significant at low (2.87) and mean (3.46) levels of parents' biculturalism. However, it was not significant for high levels of parents' biculturalism (Figure 5c). The results showed that when parents are relatively low or at mean levels of biculturalism, biculturalism of the adolescent was negatively associated with anxiety symptoms. However, when parents were high (4.05) on biculturalism, biculturalism of the adolescent did not impact the effect of adolescents' biculturalism on anxiety.

Nativity. The moderating effect of nativity could not be examined because of model non-identification due to problems estimating the regression coefficient of substance abuse at Wave 3 predicting substance abuse at Wave 4 for those born in Mexico.

Model 5: neighborhood ethnic composition. Since adolescents were clustered within neighborhoods, potential data non-independency might exist. To account for both nonnormality of the data and clustering effects in the sample, the "COMPLEX" command in Mplus was used with maximum likelihood estimation with robust standard errors (MLR). This analysis accounts for non-normality and non-independence of observations ((Muthén & Muthén, 1998–2011). The results of this analyses showed that this model had good fit. $\chi^2 (6) = 8.14, p = .22, CFI = .99, RMSEA = .04 (.00, .09), SRMR = .03$. However, the ethnic composition of the neighborhood (i.e., percentage of

Hispanics) had no effects on mental health outcomes (Figure 5a). Again, biculturalism significantly predicted anxiety symptoms.

Gender. Because the chi-square value obtained from MLR cannot be used for chi-square difference test in the traditional way, the Satorra-Bentler scaled chi-square difference test was used. The unconstrained model fit the data well, $\chi^2(12) = 15.07, p = .24, CFI = .99, RMSEA = .04 (.00, .10),$ and SRMR = .04. However, the model constraining the path coefficients to be equal for males did not fit the data well, and the Satorra-Bentler scaled chi-square difference test between the constrained and unconstrained model was significant (Table 4). Thus, there was moderation by gender. The results revealed marked differences between males and females. For males, there were significant main effects of biculturalism and neighborhood ethnic composition on anxiety, wherein both were negatively associated with anxiety. Additionally, substance abuse at Wave 3 significantly predicted substance abuse at Wave 4. For females, there was a significant interaction effect of biculturalism and neighborhood ethnic composition on depression, while this was not true for males. In contrast, the significant interaction effects occurred for anxiety and substance abuse for males. To probe whether the interaction effects were significantly different for males and females, the MODEL CONSTRAINT command was used. The results showed that the interaction effects for depression ($p < .01$) and substance abuse ($p < .05$) were significantly different for males and females. However, the interaction effect for anxiety was not ($p = .09$), thus this significance may be trivial. Because many paths varied across males and females, a partially constrained model was not particularly useful. Therefore, the models are presented separately for females (Figure 5b) and males (Figure 5c) separately.

To probe the significant interaction effect on depression for females, all independent variables and covariates were centered and simple slopes were calculated at the mean (centered), one standard deviation above, and one standard deviation below the mean of neighborhood ethnic composition (i.e., % Hispanics). The results showed that the simple slopes were not significant in environments had high (81.05%) or mean (58.11%) percentage of Hispanics. However, the simple slopes were significant in environments that had low (35.18%) percentage of Hispanics. In these environments, biculturalism had a significant main effect on depression for females (Figure 5d). That is, in environments that are more monocultural European American, biculturalism was associated with fewer depression symptoms.

Though there was a significant interaction effect on substance abuse for males, these results are meaningful or trustworthy. Given the very low occurrence of substance abuse and the very large proportion of participants reporting zero substance abuse symptoms (86.9% for males), interpreting these results is not particularly useful. Thus, the results of these interaction effects are not presented.

Nativity. The unconstrained model had adequate fit, $\chi^2(18) = 27.26, p = .07$, CFI = .97, RMSEA = .06 (.00, .10), and SRMR = .06. Similarly, the model constraining the paths to be equal among across nativity had adequate fit, $\chi^2(27) = 35.87, p = .12$, CFI = .97, RMSEA = .05 (.00, .09), and SRMR = .06. In addition, the Satorra-Bentler scaled chi-square difference test between the constrained and unconstrained model was not significant, $\Delta\chi^2(\Delta df = 9) = 3.34, p = .95$. Thus, there was no moderation by nativity.

Model 6: School ethnic composition. The potential moderating role of school ethnic composition was examined and no interaction effects with biculturalism was found

(Figure 6a). There was a significant moderation by gender, where for males, school ethnic composition significantly decreased anxiety (Figure 6b). See Appendix D for more detailed results.

Model 7: Diversity across settings. The effect of the cultural environment across school and neighborhood settings was examined (Figure 7a – 7d). However, the results provided redundant interaction effect results as neighborhood ethnic composition. However, there was a significant main effect of ethnic composition across settings on anxiety that was moderated by gender. For males, ethnic composition was negatively associated with anxiety symptoms. In contrast, for females ethnic composition was positively associated with anxiety symptoms. See Appendix E for more detailed results.

Exploratory Analyses

Model 8: Bicultural comfort, facility, and advantages. Exploratory analyses were conducted to examine which of the bicultural subscales were predictive of mental health outcomes. Bicultural comfort, facility, and advantages were entered into the model controlling for Wave 3 mental health symptom counts. The results showed that the model fit the data well, $\chi^2(15) = 23.84, p = .07, CFI = .97, RMSEA = .04 (.00, .08),$ and $SRMR = .04$. Bicultural advantages significantly predicted depression symptoms. However, bicultural comfort and facility were not predictive of any of the bicultural outcomes (Figure 8a).

Gender. The unconstrained model fit the data well, $\chi^2(12) = 20.89, p = .05, CFI = .97, RMSEA = .07 (.00, .12),$ and $SRMR = .05$. However, the model constraining the path coefficients to be equal for males and females did not fit the data well, and the chi-square difference test between the constrained and unconstrained model was significant (Table

4). Thus, there was moderation by gender. The results revealed that allowing the paths from bicultural advantage predicting depression, bicultural comfort predicting anxiety, and substance abuse at Wave 3 predicting substance abuse at Wave 4 should improve model fit. Indeed, the partially constrained model fit the data well, $\chi^2(21) = 23.26$, $p = .33$, CFI = .99, RMSEA = .03 (.00, .08), and SRMR = .05. In addition, the chi-square difference test between the constrained and partially constrained model was not significant, $\Delta \chi^2(\Delta df = 9) = 2.37$, $p = .98$. These results suggest that moderation occurred in these three paths only (Figure 8b). For males, substance abuse at Wave 3 was a significant predictor of substance abuse at Wave 4. Additionally, for females, the bicultural advantages subscale was negatively associated with depression but not for males. In contrast, for males, the bicultural comfort subscale was marginally ($p = .051$) and negatively associated with anxiety symptoms.

Nativity. The moderating effect of nativity could not be examined because of model non-identification due to problems estimating the regression coefficient of substance abuse at Wave 3 predicting substance abuse at Wave 4 for those born in Mexico.

Quadratic Trends

To examine whether biculturalism and all moderator variables had any nonlinear relationship to depression, anxiety, and substance abuse, models including the quadratic term of biculturalism and all moderator variables were examined. Additionally, all linear by quadratic interactions (i.e., biculturalism by the quadratic term of the moderator) were tested. Out of all the models, only neighborhood ethnic composition had a nonlinear relationship to substance abuse. However, the results of this test should be interpreted

with great caution. The majority of participants (91%) reported no symptoms for substance abuse disorders. Additionally, there were several extreme outliers in the data set that may be causing the significant quadratic trend. If all participants ($n = 8$) who reported over 4 or more substance abuse disorder symptoms, which is over 12 times the average, are removed from the analyses, the quadratic trend is no longer significant. This small proportion of participants (2.4%) were artificially causing a quadratic trend which may not be representative of the actual relationship of neighborhood ethnic composition and substance use disorders for the majority of the participants. An examination of the neighborhood characteristics for these participants showed that they lived in neighborhoods ranging from relatively monocultural Hispanic (82.32% Hispanic) neighborhoods to relatively monocultural European American (37.26% Hispanics) neighborhoods ($M = 55.17\%$ Hispanics). Additionally 7 out the 8 were males and 7 out of 8 were born in the United States.

Discussion

Previous research on biculturalism has shown that it is associated with positive outcomes and better adjustment (Nguyen & Benet-Martinez, 2013). However, the majority of studies used single time point assessments, making it challenging to make any strong causal inferences about this relationship because there was no temporal precedence of biculturalism over outcomes. Furthermore, no past studies on biculturalism have examined the role of the cultural environment. The present study has begun to address these limitations by taking a longitudinal approach to examining the relationship between biculturalism and mental health. In this study, the association of biculturalism at Wave 3 to mental health symptoms at Wave 4, after controlling for mental health

symptoms at Wave 3, was examined. Additionally, the role of the cultural environment was considered. Moreover, a novel multidimensional approach to measuring biculturalism was employed.

The adolescent participants in the sample identified themselves as bicultural, as evidenced by their scores on bicultural comfort, facility, advantages and overall biculturalism at Wave 3. Though the majority of them were born in the United States, by the time they were in the 10th grade, they have internalized both the mainstream and ethnic cultures. The adolescents' high degree of biculturalism was somewhat surprising given that a substantial proportion of parents in the sample were born in Mexico. However, parents were also relatively bicultural despite their nativity. Thus, overall, adolescents were exposed to bicultural environments, in the home as well as bicultural neighborhoods and schools. Adolescents' exposures to these bicultural environments may have contributed to them becoming bicultural. This is consistent with the theory that accountability pressures due to exposure to members of both the mainstream and ethnic cultures leads to biculturalism (Tadmor & Tetlock, 2006). Accountability pressures pushes individuals to act in accordance with the shared values and practices of that culture. For the adolescents in the sample, being accountable to members of both cultures, as evidenced by the characteristics of their cultural environments, may have led them to become bicultural.

The adolescents in the sample were well adjusted in general. Most participants in the sample reported low depression, anxiety, and substance abuse symptoms. Though depression, anxiety, and substance abuse are some of the most prevalent mental health conditions affecting Latino youth (CDC, 2011; Potochnick & Perreira, 2010; SAMHSA,

2011), this does not seem to be true of participants in the sample. One speculation is that that the low occurrence of mental health symptoms is due to the high degree of biculturalism in the sample, which may have led to better adjustment. Participants in the sample were also quite young, and thus, may not have experienced many of these mental health symptoms at this stage in their lives. For those participants who did report experiencing symptoms of a mental health disorder, they were also likely to report experiencing symptoms for another, as the mental health symptoms for depression, anxiety, and substance abuse were all significantly correlated with each other. Adolescents in the sample also became better adjusted between 10th grade to 12th grade. Their symptoms for depression and anxiety decreased over time.

No changes were found for substance abuse. This is likely due to the very low occurrence of substance abuse symptoms in the sample. An overwhelming percentage (91% total, 95% females, 86% males) of participants reported having zero substance abuse symptoms. This lack of change in substance abuse is likely due to a floor effect. Thus, any of the significant effects found in the study involving substance abuse are neither trustworthy nor meaningful, given the very large proportion of participants who did not even experience and/or report any substance abuse symptoms. There are several potential explanations for the very low occurrence of substance abuse symptoms. One possibility is that though adolescents may engage in recreational *use* of substances (i.e., alcohol, nicotine, marijuana), they may not *abuse* these substances. Substance abuse, as defined by the DISC, involves failure to fulfill roles and obligations, using substances when it is dangerous (e.g., drunk driving), causing problems at school or work, and creating social or interpersonal problems (Shaffer, Fisher, Lucas, Dulcan, & Schweab-

Stone, 2000). Particularly at this young age, when participants are barely entering adulthood, it is unlikely that they have already engaged in any form of substance abuse. Thus, it is possible that participants may have engaged in recreational use of substances but they did not abuse it, leading to the overabundance of zero scores on this variable. It is also possible that participants in the sample may not have engaged in either substance use or abuse at all.

Surprisingly, economic hardship did not significantly predict any of the mental health outcomes in the sample. This is inconsistent with the literature that has shown that family economic hardship is significantly associated with Mexican American adolescents' adjustment (e.g., Delgado, Killoren, & Updegraff, 2013; Gonzales et al., 2011; Umaña-Taylor, Updegraff, & Gonzales-Backen, 2011). However, it is important to note that in the present study, only mothers' reports of economic hardship were used and only direct effects of economic hardship on outcomes were examined which differed from past studies. These differences in methodologies may explain the inconsistent findings of the present study with past research. For example, past studies that have found an association between economic hardship and adjustment using the same economic hardship scale had the same reporters report on economic hardship and outcomes (Delgado et al., 2013; Umaña-Taylor, 2011). It is likely that adolescents' own perceptions of economic hardship, compared to their mothers' reports, are more predictive of their own outcomes. Additionally, past studies that have used mothers' reports on economic hardship found that it exerted its influence through a mediating variable related to parenting, like maternal warmth, and not through direct effects on

adjustment (Gonzales et al., 2011). The different methodology in the present study may explain the non-significant association of economic hardship on mental health symptoms.

Overall, participants were exposed to bicultural environments. On average, neighborhoods and schools had slightly higher percentages of Hispanics than European Americans, though this was only slightly higher than 50%. The schools and neighborhoods that adolescents were exposed to represented similar types of environments with regards to ethnic composition, as they were highly correlated. That is, as the percentage of Hispanics in the neighborhoods increased, so did the percentage of Hispanics in the schools. This is not surprising as the schools' ethnic makeup may reflect the ethnic makeup of the neighborhoods in which they are situated. Additionally, the more bicultural fathers were, the more likely adolescents were to live in neighborhoods and attend schools with greater percentage of European Americans. This is supported by the negative correlation between fathers' biculturalism and percentage of Hispanics in schools and neighborhoods. Moreover, the more bicultural the mothers were, the more likely were adolescents to attend schools with greater percentage of European Americans. Mothers' biculturalism was negatively correlated with percentage of Hispanics in schools, though it was not correlated with percentage of Hispanics in neighborhoods.

Hypothesis 1: Biculturalism and Mental Health

Hypothesis 1 predicted that biculturalism at Wave 3 should be negatively related to depression, anxiety, and substance abuse symptoms at Wave 4, after controlling for Wave 3 symptoms. This hypothesis was partially supported. Biculturalism at 10th grade was related to significantly fewer anxiety symptoms at 12th grade for males. Anxiety is rooted in feelings of threat, anticipation, and worry (Eysenck, 1992). For ethnic

minorities living in the United States, feelings of culturally related threats may arise from having to manage the demands of both the mainstream and ethnic cultures. However, bicultural individuals should experience these culturally related threats less because theoretically, bicultural individuals should possess bicultural competence, are able to frame-switch, and possess integrative complexity (Hong et al., 2000; LaFromboise et al., 1993; Tadmor et al., 2012). These skills should allow them to manage the demands of their environments well. However, as noted earlier, this pattern of results was only observed for males, but not females. It is unclear why biculturalism did not significantly predict fewer anxiety symptoms for females. One potential explanation is that anxiety may have different etiologies for males and females. Some support exist that anxiety sensitivity, which is the fear of arousal or sensations related to anxiety (Reiss & McNally, 1985), may be more rooted in biological factors in females (e.g., heritability, hormones), and environmental factors in males (Jang, Stein, & Taylor, & Livesley, 1999; Pigott, 1999; Taylor, Jang, Stewart, & Stein, 2008). If so, anxiety in males may be more responsive to the advantages provided by the skills associated with being bicultural. These skills should help an individual manage their environment. For males, this may be associated with fewer culturally related anxiety symptoms since biculturalism helps them manage their environment, which is a larger root cause for males. In contrast, the skills associated with being bicultural may not influence any biological predisposition for anxiety in females.

Biculturalism was not found to have any main effects on depression and substance abuse symptoms and this was inconsistent with my predictions. Again, substance abuse symptom reports were very low, thus the non-association of substance abuse with

biculturalism should not be interpreted as evidence that biculturalism has no impact on substance abuse. However, it was unexpected that biculturalism had no main effects on depression. Previous studies have shown that biculturalism is negatively correlated with depression (e.g., David et al., 2009; Wei, Chao, Mallinckrodt, & Botello-Zamarron, 2010). It is important to note, however, that the studies that have found an association between biculturalism and depression used single-time point assessments. Thus, they have measured concurrent reports on biculturalism and depression symptoms. No previous studies have looked at the longitudinal relationship of biculturalism with depression symptoms, so their prospective relationship is unknown. One potential explanation for the findings is the age of participants. At the times of measurement, participants were in the 10th and 12th grades. The studies that have found an association between biculturalism and depression typically used older participants (i.e., college undergraduates and adults in their 20s and 30s). At older ages, individuals have likely faced more difficult challenges and were required to face these challenges alone. These may have subjected them to depression symptoms. However, the autonomy associated with age may have also provided individuals with greater experience in managing the mainstream and ethnic cultures successfully. This greater experience and expertise may then lead to fewer depression symptoms over time. Hence, it is possible that any substantial effects of biculturalism on depression may not be realized until early adulthood or may only manifest in certain environments.

Hypothesis 2: Biculturalism and the Cultural Environment

Hypothesis 2 predicted that that a fit between the degree of biculturalism of the individual and the cultural environment should be associated with optimal psychological

outcomes. That is, when there is a person-environment fit (e.g., bicultural person in a bicultural environment), the individual should have better outcomes, than when there is a person-environment mistfit (e.g., monocultural person in a bicultural environment). The results did not fully support these hypotheses. Due to the complexity of the findings, the discussion of the results for Hypothesis 2 was separated into sections. The first section provides a description of the findings that were consistent with the predictions. The second section provides a description of the findings that were inconsistent with the predictions. Finally, two potential explanations for why the person-environment fit/misfit model was not fully supported are offered.

A few results were somewhat consistent with Hypothesis 2 predictions. For males, the degree of biculturalism in the home (e.g., parents' biculturalism) moderated the association of biculturalism with anxiety (Model 4; Figure 4c). Specifically, higher degrees of biculturalism in males were associated with fewer mental health symptoms in *moderately* bicultural environments. For females, in neighborhoods that were *moderately* bicultural (i.e., 35.18% Hispanics), biculturalism was significantly associated with fewer depression symptoms (Model 5; Figure 5d). Though the ethnic make-up of this environment was comprised of more European Americans, it is still a relatively bicultural environment. These two findings lend support to the person-environment fit hypothesis that in moderately bicultural environments, higher degrees of biculturalism was more advantageous than being more monocultural. Additionally, for females, no effects of biculturalism were found in neighborhoods that were comprised of majority Hispanics (i.e., 81.05% Hispanics) on depression symptoms (Model 5; Figure 5d). This is also consistent with the person-environment hypothesis. That is, monocultural and bicultural

individuals should be equally adept at handling the demands of monocultural environments.

However, there were several findings that were entirely inconsistent with the person-environment fit hypothesis. In particular, the results found that higher degrees of biculturalism were not associated with fewer mental health symptoms in *highly* bicultural environments. For males, no effects of biculturalism on anxiety symptoms were found in home environments where parents were the most bicultural (Model 4: Figure 4c). For females, no effects of biculturalism on depression symptoms were found in neighborhoods that were most bicultural, those that had about equal numbers of Latinos and Hispanics (i.e., 58.11% Hispanics; Model 5; Figure 5d). According to the person-environment fit hypothesis, biculturalism of the adolescents should have had the strongest effects on mental health symptoms in these highly bicultural environments. Additionally, male adolescents' biculturalism predicted fewer anxiety symptoms in home environments where parents had low degrees of biculturalism. Though this finding was inconsistent with Hypothesis 2 predictions, it is important to note that parents in these low bicultural home environments barely scored below the midpoint (2.87 on a 5-point scale). Hence, though these home environments were considered low in biculturalism relative to the overall degree of biculturalism in the homes for the sample, they are not very low in absolute terms.

There are two potential explanations for the lack of support for the person-environment fit/misfit hypothesis. In the present study, degree of biculturalism of adolescents was not associated with fewer mental health symptoms in *highly* bicultural environments, which is inconsistent with the person-environment fit/misfit hypothesis.

One possibility is that high degrees of biculturalism *within* a setting may exert great yet ambiguous demands on adolescents to meet the expectations of both the ethnic and mainstream cultures. That is, responding to the demands of both the mainstream and ethnic cultures simultaneously *within* a highly bicultural environment may be more demanding on adolescents than having to handle these demands separately *across* (e.g. ethnic home and mainstream school) settings. This is because in these highly bicultural environments, accountability pressures from members of both ethnic and mainstream cultures are simultaneously and constantly present. Perhaps at this age, adolescents are still learning how to manage the conflicting demands of the two cultures that may be placed on them simultaneously. Additionally, cues or signals to engage in culturally consistent behavior with either the ethnic or mainstream cultures may also be more ambiguous when they are being received at the same time. Further, skills associated with being bicultural, like frame switching, rely on cues from the environment; if these cues are ambiguous, then bicultural individuals may not be able to employ their skills in these environments as effectively. In contrast, experiences with biculturalism *across* environments may be qualitatively different. Here, the expectations of each environment with regards to culturally appropriate behavior are clear and unambiguous. For example, bicultural adolescents living in home environments that are monocultural ethnic can easily frame-switch to meet the demands of the ethnic culture. Similarly, when they enter the more monocultural mainstream school environment, they can once again frame-switch to meet the demands of the mainstream culture.

Another potential explanation for the lack of support for the person-environment fit/misfit hypothesis may be due to characteristics of the sample. The characteristics of

the participants and environments in the sample made it impossible to fully examine the person-environment fit/misfit hypotheses. Adolescents in the sample were quite bicultural, and there were very few participants who actually scored below the midpoint of the biculturalism scale (13%). Thus, the data from the sample was limited in the spectrum of the degree of biculturalism of the adolescents it represented. Additionally, the environments in which the adolescents lived were quite bicultural as well. Parents in the sample were fairly bicultural, and very few home environments were monocultural. Further, the majority of participants lived in very bicultural neighborhoods (62.5%). Thus, not only were participants very bicultural but they were also clustered in very bicultural homes and neighborhoods. This lack of extreme cases (e.g., very monocultural individuals, very monocultural neighborhoods) limits the ability to fully examine the person-environment fit/misfit hypothesis, and consequently power, and may explain the null effects in highly bicultural environments.

Implications of Gender

One of the most intriguing findings of the study was that the impact of the cultural environment was moderated by gender, though males and females had similar degrees of biculturalism and were exposed to similar cultural environments (Appendix F). I did not predict any gender differences regarding the impact of the cultural environment on mental health symptoms. Though there were no a priori hypotheses regarding how gender may impact outcomes, it is still worthwhile to explore potential explanations. In the present study, male adolescents had better outcomes in environments that were comprised of *majority* Hispanics (Model 5 Figure 5c; Model 7, Figure 7C). Majority Hispanics environments within the neighborhood (and across neighborhoods and schools)

were significantly associated with fewer anxiety symptoms. In contrast, females had better outcomes in environments where Hispanics were the *minority* group (Model 5, Figure 5d;). In neighborhoods where Hispanics comprised the minority, biculturalism was significantly associated with fewer depression symptoms. Additionally for females, percentage of Hispanics across neighborhoods and schools was associated with more anxiety symptoms (Model 7, Figure 7b). I provide some potential explanations for these gender differences, namely neighborhood characteristics, traditional gender roles, and outgroup threat perceptions.

Neighborhood characteristics. One potential explanation is that neighborhood characteristics may differentially impact males and females. Indeed, research has shown that men and women may perceive neighborhood characteristics, such as neighborhood danger differently. Women are more likely to perceive greater neighborhood danger than men (Roosa, White, Zeiders, & Tein, 2009). The percentage of Hispanics within the neighborhood used in the study may also reflect some other underlying neighborhood characteristics. For example, it is possible that the percentage of Hispanics in neighborhoods may reflect neighborhood poverty and danger that might affect males and females differently. An examination of neighborhood characteristics (accessed from the battery of questionnaires from the larger study and Census Data; See Appendix G – I) revealed that indeed, percentage of Hispanics was positively correlated with mother’s report on danger, criminal activities, and percentage of families living below the poverty line (Appendix H). To explore whether there were gender differences in these neighborhood characteristics, mean differences were examined (Appendix I). The only significant effect found was that female adolescents’ mothers reported greater

neighborhood danger than male adolescents' mothers, though there were no significant differences in reported criminal activities. Thus, it is possible that mothers' subjective perception of danger is greater when they have adolescent daughters. Consequently, their daughters may internalize this greater perception of danger and could lead to greater feelings of insecurity and danger in monocultural Hispanic environments. It is also likely that though males and females in the sample were exposed to similar neighborhoods, they may have perceived these characteristics differently. However, it is unclear how biculturalism may affect these perceptions. Perhaps when evaluating danger, gender takes precedence over degree of biculturalism. That is, regardless of degree of biculturalism, females may evaluate predominantly Hispanic environments as more threatening. To be clear, this is not because there are more Hispanics per se, but because neighborhoods that are comprised of predominantly ethnic Hispanics also tend to have greater poverty, be more dangerous, and have more crimes (Appendix H; US Census, 2011). These correlates of neighborhood ethnic composition may explain why biculturalism did not decrease depression in females when they were in neighborhoods that were comprised of predominantly Hispanics (Model 5, Figure 5d).

Traditional gender roles. Another potential explanation might be rooted in traditional gender roles, which may be more pronounced in traditional Mexican families and communities. Traditional gender roles may affect the psychological outcomes of males and females differently (Nolen-Hoeksema & Girgus, 1994). This may be especially true if they contradict expectations in the mainstream American culture, which may have norms against condoning traditional gender roles (Golding & Karno, 1988). However, bicultural individuals should be able to manage gender role expectations, like

other culturally related values, by frame-switching. I outline several ways in which traditional gender roles may affect outcomes for more monocultural Mexican Americans and the rationale for why this is inconsistent with the present study's findings and the theoretical underpinnings of biculturalism.

Traditional gender roles associated with Mexican culture (e.g., “machismo” and “marianismo”) promote positive behaviors, such as honor and nurturance. However, they also promote negative behaviors, such as hypermasculinity and dependence (Gutman, 1996; Kulis, et al, 2008; Neff, 2001). Additionally, environments that promote traditional gender roles may also condone gender inequality. Indeed there is evidence that showed environments that foster traditional gender roles also subject females to benevolent and hostile sexism (Glick & Fiske, 2001). Additionally, there is some supportive evidence to suggest that in traditional Mexican families, daughters and sons are not treated equally. For example, parents socialize daughters to conform to traditional female gender roles (e.g., making tortillas from scratch), be given more household responsibilities (e.g., cleaning), and are expected to care for younger siblings (Rafaelli & Ontai, 2004). Sons, on the other hand, were given more privileges (e.g., allowed to drive family car, or have own car), allowed to stay out later, and were given more freedoms (Rafaelli & Ontai, 2004). Outside of the home, in predominantly Hispanic neighborhoods, these traditional gender roles may also be normative. Adolescents may then internalize these expectations and demands, especially if they witness males and females being treated differently. Thus, in environments that are more monocultural Mexican, male adolescents may experience less pressure and enjoy more freedoms, leading to better adaptation. However, these expectations may begin to shift,

as the environment becomes more bicultural or more monocultural European American. In contrast, in environments that are more bicultural or monocultural European American, female adolescents may experience more gender equality and may not be expected to conform to strict gender roles, leading to better adaptation. Females may benefit in these environments because it is less prohibitive and probably more egalitarian, whereas males may not benefit in these environments because they are no longer granted privileges that they may otherwise receive in more traditional Mexican environments.

However, this explanation should apply more to male and female adolescents whose cultural orientation is mismatched with the gender role expectations of their environment. For example, a male adolescent who only identifies with the ethnic culture and is likely to endorse traditional gender role norms may have poorer adaptation in a monocultural mainstream environment that does not endorse these same gender role norms. In contrast, a male adolescent who is bicultural should be able to frame-switch, and should be able to adopt and accept the gender role norms in both the ethnic and mainstream contexts. Thus, though traditional gender role norms may be useful in explaining gender differences in adaptation for monocultural individuals, it does not fully explain the pattern of results in the study for bicultural individuals. Additionally, there were no adolescents in the study who lived in an environment that entirely mismatched their cultural orientation (Table 3). Thus, traditional gender roles do not seem to be a sufficient explanation for the present study's findings.

Outgroup member threat perception. Another plausible explanation for the gender differences may be linked to ingroup-outgroup dynamics. Mexican American adolescents, as ethnic minorities, may still be considered by European Americans as

outgroup members and may be subjected to stereotypes, prejudice, and discrimination. However, male versus female Mexican American adolescents may be perceived and treated differently by European Americans. Indeed, there is evidence to suggest that outgroup males are more likely to be treated with more hostility and perceived to be dangerous (Maner et al., 2005; Neuberg, Kenrick, & Schaller, 2011; Schaller & Neuberg, 2008). Mexican Americans may also be perceived as posing economic threats (Burns & Gimpel, 2000; Citrin, Green, Muste, & Wong, 1997). Males may be perceived as more threatening, if they are perceived as the primary breadwinners. In contrast, these stereotypes may not be attributed to Mexican American females, or perhaps not to the same degree. Indeed, race bias is moderated by the gender of the outgroup target and perceiver (Maner et al., 2005; Navarette, McDonald, Molina, Sidanius, 2010). Interestingly, men are also more likely to express racism and ethnocentrism than women (Sidanius, Cling, & Pratto, 1991). Thus, not only is it plausible that Mexican males are perceived to be more threatening and treated more negatively, but Mexican males are also more likely to respond aversely to non-Mexican members of the mainstream culture. This explanation is also consistent with the results of the study. Perhaps there is a higher threshold for outgroup males to meet regardless of their degree of biculturalism, before they are fully accepted by European Americans as ingroup members. It may explain why males, seem better adapted in more monocultural Hispanic environments, while females seem better adapted in more monocultural European American environments.

There are likely other potential explanations for the gender differences found in the present study, though a full exploration of them is beyond the scope and focus of the paper. Additionally, the explanations provided above are dynamic forces that may have

different additive or interactive effects on males and females. For example, neighborhood characteristics combined with ingroup-outgroup dynamics may partially explain the findings. Future research in this area can better inform us about how contextual factors may interact with gender and biculturalism and its implications for psychological health.

Bicultural Comfort, Facility and Advantages

One of the contributions of the present study was using a multidimensional measure of biculturalism to assess its relationship to mental health outcomes. The exploratory analyses showed that the bicultural subscales might have unique predictive power. For females, the bicultural advantages subscale was the strongest predictor of outcomes, namely depression symptoms. For males, the bicultural comfort subscale was the strongest predictor for outcomes, namely anxiety symptoms. One possibility of why the bicultural comfort and advantages subscales were negatively associated with anxiety and depression symptoms respectively may be due to the similarity of wording in the Biculturalism subscales and C-DISC scale. It is possible that questions on the comfort subscale were most similar to anxiety questions on the C-DISC. Thus, individuals who were more anxious were also likely to express general discomfort when answering the bicultural comfort subscale. Similarly, it is possible that items on the bicultural advantages subscales were most similar to depression questions on the C-DISC. That is, individuals who experienced more depression symptoms, may be less positive in general, and were likely to express disagreement with items about perceiving advantages when answering the bicultural advantages subscales. Though these are plausible, they are unlikely given the design of the study. The biculturalism subscales (Wave 3) were

measured two years prior to the measurement of mental health symptoms (Wave 4). Additionally, prior mental health symptoms (Wave 3) were controlled for. This explanation also does not justify why there were gender differences in these associations if it was just due to similarity of wording between the biculturalism subscales and C-DISC questions. Thus, it is more likely that these subscales were differentially related to specific mental health symptoms and future research should explore these associations more closely.

Interestingly, the bicultural facility subscale did not predict any outcomes for males and females though this subscale measures skills related to switching between the mainstream and ethnic cultures. The bicultural facility subscale is also the subscale that most closely resembles traditional measures of biculturalism. Thus, it is surprising that it did not predict any of the outcome variables. However, it is possible that in other domains (e.g., maintaining friendships with peers from both cultures) that emphasize being facile in frame switching, bicultural facility may play a bigger role. Overall, these findings provide new evidence that taking a multidimensional approach to biculturalism may provide insight about the mechanisms by which biculturalism affects particular outcomes.

Limitations

One of the main limitations of the study is that the participants may have moved multiple times between Wave 3 and Wave 4 exposing them to different types of environments (i.e., schools and neighborhoods) in the process. Though participants may have moved to similar types of neighborhoods, they could have also moved to a very different one (e.g., from a bicultural neighborhood to a more monocultural one). The

study was only able to examine the cultural environment as reported at Wave 3 and may not have painted a complete picture of the range of environments adolescents were exposed to. The other environments that may not have been represented may have also influenced adolescents' mental health. The study was also limited in the range of biculturalism and cultural environments it represented. The study only had participants that were, overall, quite bicultural, which does not represent the complete spectrum of individuals in the biculturalism continuum. This limited variability in biculturalism scores may have limited the power to detect relationships between degree of biculturalism and mental health symptoms. The same limitations apply to parents' biculturalism scores, which were used as indicators of the home environment. Parents who scored one standard deviation below the mean were just below the midpoint (2.87 on a 5-point scale) and were not terribly low on biculturalism. Hence, though these homes were characterized as low bicultural homes relative to the sample, these are not very low bicultural homes in absolute terms. Similarly, neighborhoods tended to be quite bicultural as well, and most participants lived in bicultural neighborhoods. The lack of variability in the degree of biculturalism of the adolescents and cultural environments limits the ability to fully examine the person-environment fit/misfit hypothesis. This is because there was an overrepresentation of adolescents who were very bicultural, living in bicultural homes and neighborhoods. Participants who were very monocultural or lived in extremely monocultural homes and neighborhoods were not represented well. Thus, the majority of the participants "fit" their environments whereas the data did not fully allow to test the outcomes of those who "misfit" their environments. The study also focused solely on Mexican American adolescents. Though this is one of the largest and

fastest growing ethnic groups in the United States, their experiences only represent a fraction of the experiences of many bicultural individuals from different ethnic backgrounds. The study was also unable to fully examine the impact of biculturalism across environments. In the study, the degree of biculturalism across environments was measured using the percentage of Hispanics in neighborhoods and schools. Using this operationalization provided redundant information because schools and neighborhoods had similar ethnic compositions. Additionally, this approach did not fully capture all of the environments that the adolescents were exposed to. Thus, this may have been an imprecise and incomplete measure of biculturalism across environments. Additionally, exposure to bicultural environments within versus across setting may be qualitatively different, and the current study was unable to examine these differences.

Future Directions

Future studies should attempt to fully examine the person-environment fit/misfit hypothesis for bicultural individuals by ensuring that participants who are monocultural are well represented. Additionally, a wider spectrum of home and neighborhood cultural environments should be included. By doing so, future research can fully examine the person-environment fit/misfit hypothesis as it relates to biculturalism. Future studies on adolescents should also focus on substance use, rather than abuse to better capture how biculturalism may be related to any form of engagement with substances. Substance use may be more relevant for this particular age group. Additionally, an examination of how biculturalism impacts the mental health of other minority group members who may have distinctively different experiences than Mexican Americans is needed. Finally, it will be a fruitful endeavor to examine whether biculturalism of the environment across or within

settings have qualitatively different effects on psychological outcomes. Specifically, future research should examine whether exposure to both the mainstream and ethnic cultures simultaneously have different effects than being exposed to both the mainstream and ethnic cultures separately. There are also numerous exciting avenues for future research on biculturalism. For example, one can examine how other characteristics of the home environment (e.g., family size, birth order) may be associated with both biculturalism and psychological and sociocultural adjustment.

Conclusion

The present study was the first to examine how biculturalism impacts mental health outcomes longitudinally over a meaningful course of time. The study showed that even after controlling for previous symptoms of mental health, biculturalism, in specific instances, was related to fewer anxiety and depression symptoms, though these associations were quite complex. Though past theoretical conceptualizations and empirical evidence supported the notion that biculturalism should always be adaptive, the results of the present study provide evidence that this may not always be case. The present study also examined how the cultural environments in which the individuals live interact with biculturalism of the individual. The significant interaction effects of biculturalism with the environment provide evidence that context matters and that the cultural environment is an important factor that can no longer be ignored in future research. However, the findings provide evidence that the interaction of adolescents' biculturalism with the environment is not straightforward and does not simply fit the person-environment fit/misfit model, and other factors may play important roles. One of the most important factors that should be considered is the role of gender. Male and

female ethnic minorities living in the United States may have qualitatively different experiences that are currently not being considered in the biculturalism literature. Additionally, since biculturalism is a process, an examination of these associations at different developmental stages (e.g., late childhood, early adulthood) is also necessary and should provide insight as to how biculturalism may help manage the unique challenges individuals face at each developmental stage. There may also be important differences in experiences of adolescents who are exposed to the demands of bicultural environments within versus across settings. The study provided early evidence that a multidimensional conceptualization and measurement approach to biculturalism can provide useful insight about the mechanisms that may relate biculturalism to adjustment. Together these findings can inform both theory and practice. Moving forward, it will be useful to begin to conceptualize how the different dimensions of biculturalism may be theoretically related to a host of outcomes. Additionally, the role of other factors, such as gender and age, should begin to inform theory. In research practice, studies should examine aspects of the cultural environment that could interact with biculturalism. In sum, these findings highlight that Mexican American adolescents' biculturalism do indeed interact with the cultural environment, and together, these factors predict mental health.

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Table 1

Means, Standard Deviations, Minimum, Maximum Values for Variables of Interest.

	Mean	SD	Minimum	Maximum
Biculturalism (Wave 3)				
Overall Biculturalism	3.60	.54	2.41	4.96
Bicultural Comfort	3.24	.98	1.00	5.00
Bicultural Facility	3.67	.55	2.33	5.00
Bicultural Advantages	3.91	.55	1.11	5.00
Mental Health Symptoms (Wave 4)				
Major Depression Symptoms	3.24	3.55	.00	18
Anxiety Symptoms	5.99	5.85	.00	34.00
Substance Abuse Symptoms	.30	1.47	.00	20.00
Cultural Environment (Wave 3)				
Mother's Biculturalism Score	3.39	.64	1.85	5.00
Father's Biculturalism Score	3.49	.65	1.78	5.00
% European American in Schools	26.29	23.29	.00	83.54
% Hispanics in Schools	60.19	26.23	9.56	93.40
% European American in Neighborhoods	32.12	21.92	2.49	88.91
% Hispanics in Neighborhoods	57.02	23.44	5.84	93.55
Economic Hardship (Wave 3)				
Mother's report of economic hardship	2.83	1.14	1.00	5.00

Table 2

Intercorrelations Among Control and Moderator Variables.

	1	2	3	4	5	6
1. Mothers' Biculturalism	1.00					
2. Fathers' Biculturalism	.15 ⁺	1.00				
3. % EA in Schools	.13*	.23**	1.00			
4. % Hispanics in Schools	-.13*	-.24**	-.96***	1.00		
5. % EA in neighborhoods	.05	.20*	.73***	-.72***	1.00	
6. % Hispanics in neighborhoods	-.09	-.22**	-.71***	.73***	-.94***	1.00
Economic Hardship	-.22***	-.26**	-.14*	.14*	-.11 ⁺	-.15**

Note. ⁺ $p < .055$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3

Pattern of Responses of participants scoring two standard deviations below the mean on overall biculturalism on the Bicultural Comfort subscale prior to recoding.

	Participant 1	Participant 2	Participant 3
Responses on Bicultural Comfort Subscale			
Bicultural Comfort 1	2	2	4
Bicultural Comfort 2	1	1	1
Bicultural Comfort 3	6	2	4
Bicultural Comfort 4	1	3	1
Bicultural Comfort 5	2	3	1
Bicultural Comfort 6	1	3	4
Bicultural Comfort 7	1	3	1
Bicultural Comfort 8	2	1	2
Bicultural Comfort 9	2	3	6
Cultural Environment			
Mothers' Biculturalism	3.85	-	2.63
Fathers' Biculturalism	4.30	-	-
% of Hispanics in Schools	75.74	-	43.11
% of EA in Schools	7.27	-	40.01
% of Hispanics in Neighborhoods	42.51	45.76	60.85
% of EA in Neighborhoods	49.28	40.59	38.84

Note. EA = European Americans

Table 4

Model fit statistics and chi-squared difference tests for models tested.

	χ^2	df	$\Delta \chi^2$	Δdf	CFI	RMSEA	SRMR
Model 1 (H1: Basic Model)	13.83	6			.98	.07 (.02, .12)	.04
Gender – Unconstrained	21.66*	12			.97	.08 (.02, .13)	.05
Gender – Constrained	74.55***	24	52.89*	12	.85	.12 (.09, .15)	.08
Gender – Partially- Constrained	27.95	22	6.29	10	.98	.04 (.00, .09)	.05
Nativity – Unconstrained	19.96	12			.98	.07 (.00, .12)	.04
Nativity – Constrained	43.44	24	23.48*	12	.94	.08 (.04, .11)	.05
Nativity – Partially- Constrained	33.85	23	13.89	11	.97	.06 (.00, .10)	.04
Model 2 (H2: Mothers Bic)	13.69*	6			.98	.07 (.02, .12)	.04
Gender – Unconstrained	19.47	12			.98	.07 (.00, .12)	.05
Gender – Constrained	76.09***	24	56.62*	12	.84	.13 (.09, .16)	.08
Gender – Partially- constrained	24.00	20	4.53	8	.99	.03 (.00, .08)	.05
Nativity – Unconstrained	23.87*	12			.96	.08 (.03, .13)	.04
Nativity – Constrained	42.63*	24	18.76	12	.94	.08 (.04, .11)	.05
Model 3 (H2: Fathers Bic)	5.82	6			1.00	.00 (.00, .10)	.02
Gender – Unconstrained	5.37	12			1.00	.00 (.00, .02)	.02
Gender – Constrained	17.86	24	12.49	12	1.00	.00 (.00, .06)	.05
Model 4 (H2: Parents' Bic)	13.88*	6			.98	.07 (.02, .12)	.03
Gender – Unconstrained	20.09	12			.98	.07 (.00, .12)	.05
Gender – Constrained	78.20	24	58.11***	12	.84	.13 (.10, .16)	.08

Gender – Partially-constrained	25.95	21	5.86	9	.99	.04 (.00, .09)	.05
Model 5 (H2: neighborhood)	8.14	6			.99	.04 (.00, .09)	.03
Gender – Unconstrained	15.07	12			.99	.04 (.00, .10)	.04
Gender – Constrained	109.23***	24	177.72***	12	.81	.16 (.13, .19)	.08
Females Only	6.19	6			1.00	.02 (.00, .11)	.03
Males Only	8.17	6			.99	.05 (.00, .13)	.06
Nativity – Unconstrained	27.26	18			.97	.06 (.00, .10)	.06
Nativity – Constrained	35.87	27	3.34	9	.97	.05 (.00, .09)	.06
Model 6 (H2: school)	8.43	6			.99	.04 (.00, .10)	.04
Gender – Unconstrained	17.32	12			.99	.06 (.00, .12)	.05
Gender – Constrained	89.69***	24	88.74***	12	.84	.15 (.12, .18)	.08
Gender – Partially-constrained	24.89	20	7.09	8	.99	.04 (.00, .09)	.05
Model 7 (H2: Across Settings)	8.37	6			.99	.04 (.00, .09)	.03
Gender – Unconstrained	15.26	12			.99	.04 (.00, .10)	.04
Gender – Constrained	112.98***	24	180.78***	12	.80	.16 (.13, .19)	.08
Gender – Partially-constrained	31.25	21	17.61	9	.98	.06 (.00, .10)	.05
Females Only	6.25	6			1.00	.02 (.00, .11)	.03
Males Only	8.30	6			.99	.05 (.00, .13)	.06
Model 8 (Exploratory)	23.84	15			.97	.04 (.00, .08)	.04
Gender – Unconstrained	20.89	12			.97	.07 (.00, .12)	.05
Gender – Constrained	77.64***	24	56.75	12	.83	.13 (.09, .16)	.08
Gender – Partially-constrained	23.26	21	2.37	9	.99	.03 (.00, .08)	.05

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

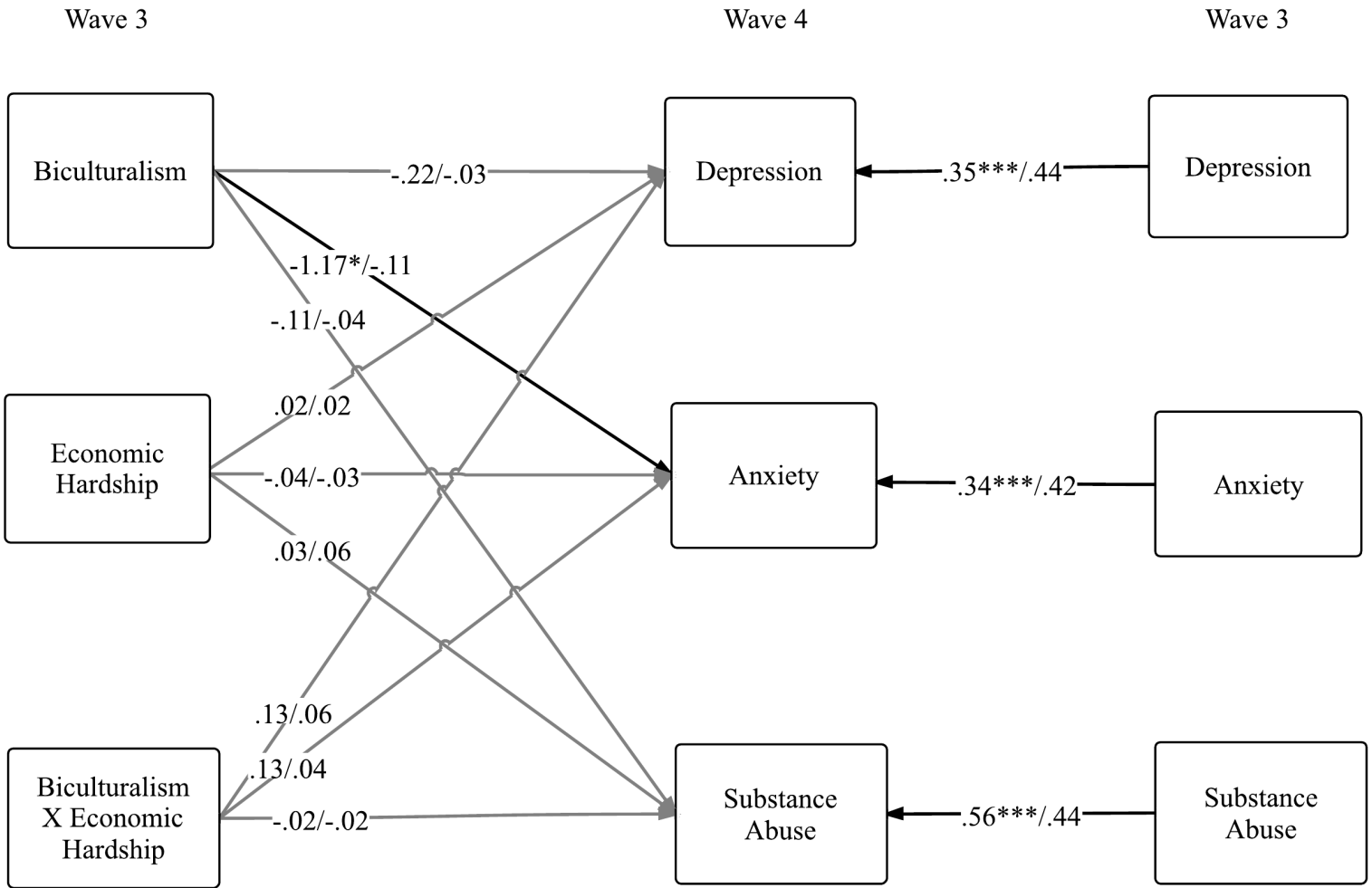


Figure 1a. Model 1 – Biculturalism, economic hardship, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

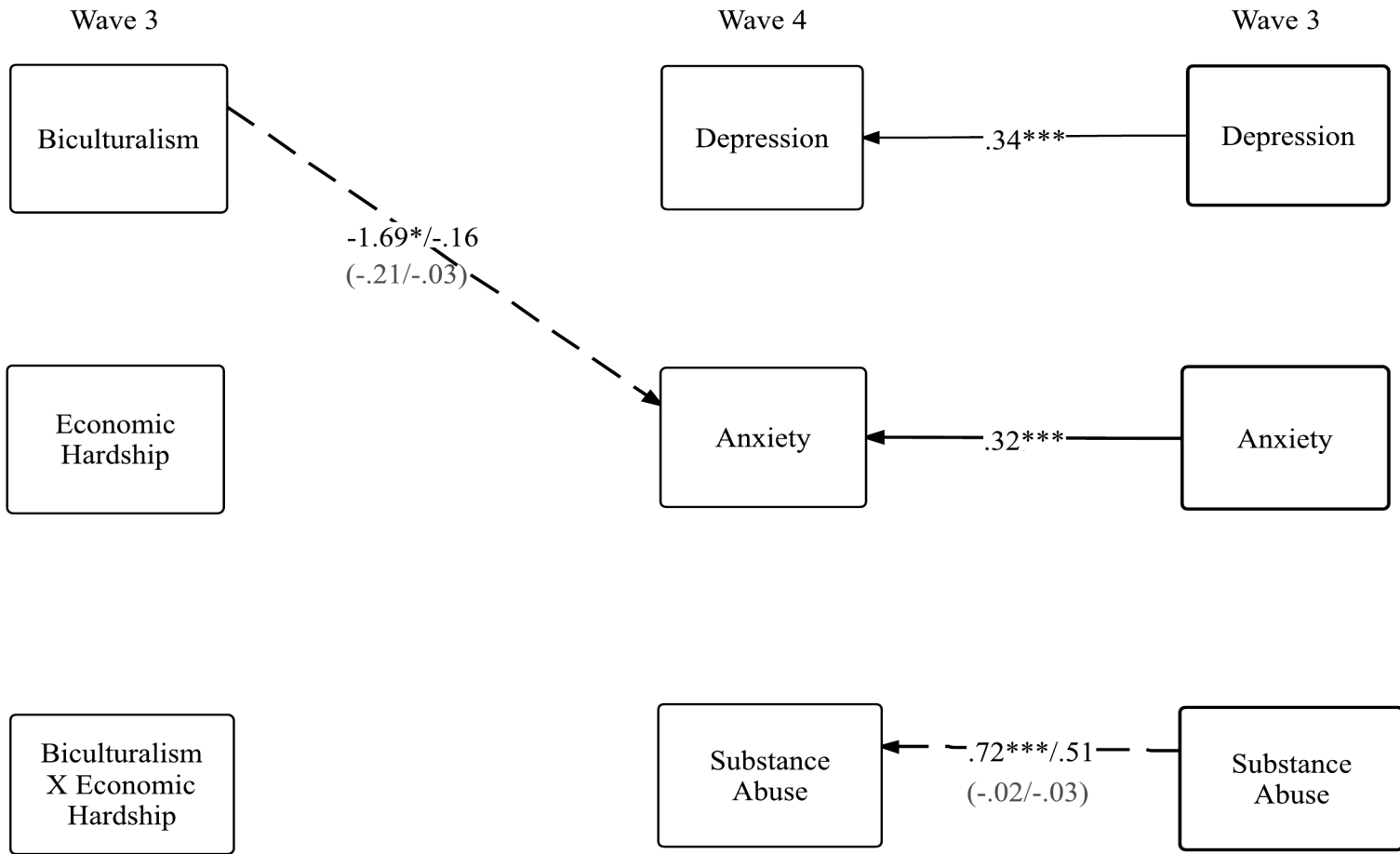


Figure 1b. Model 1 – Moderation by Gender: Moderation by Gender: unstandardized coefficients. Dashed lines signify significant paths for males but not females, and numbers reported are unstandardized/standardized coefficients for males (females).

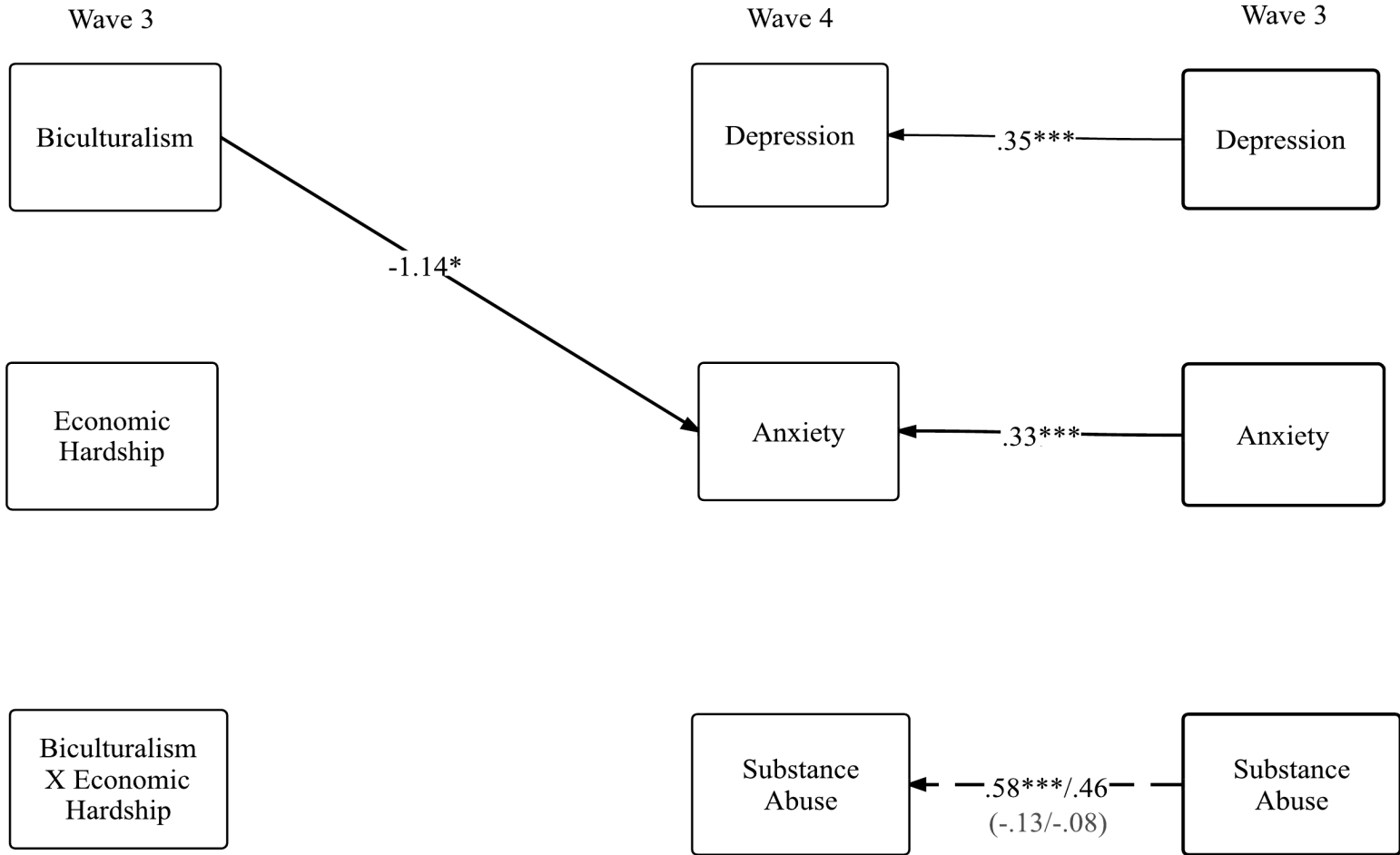


Figure 1c. Model 1 – Moderation by Nativity: Biculturalism, economic hardship, and their interaction predicting depression, anxiety, and substance abuse by nativity. Only significant paths are shown. Solid lines signify paths constrained to be equal across nativity and numbers reported are unstandardized coefficients. Dashed lines signify significant paths for those US born but not Mexico born, and numbers reported are unstandardized/standardized coefficients for US born (Mexico born).

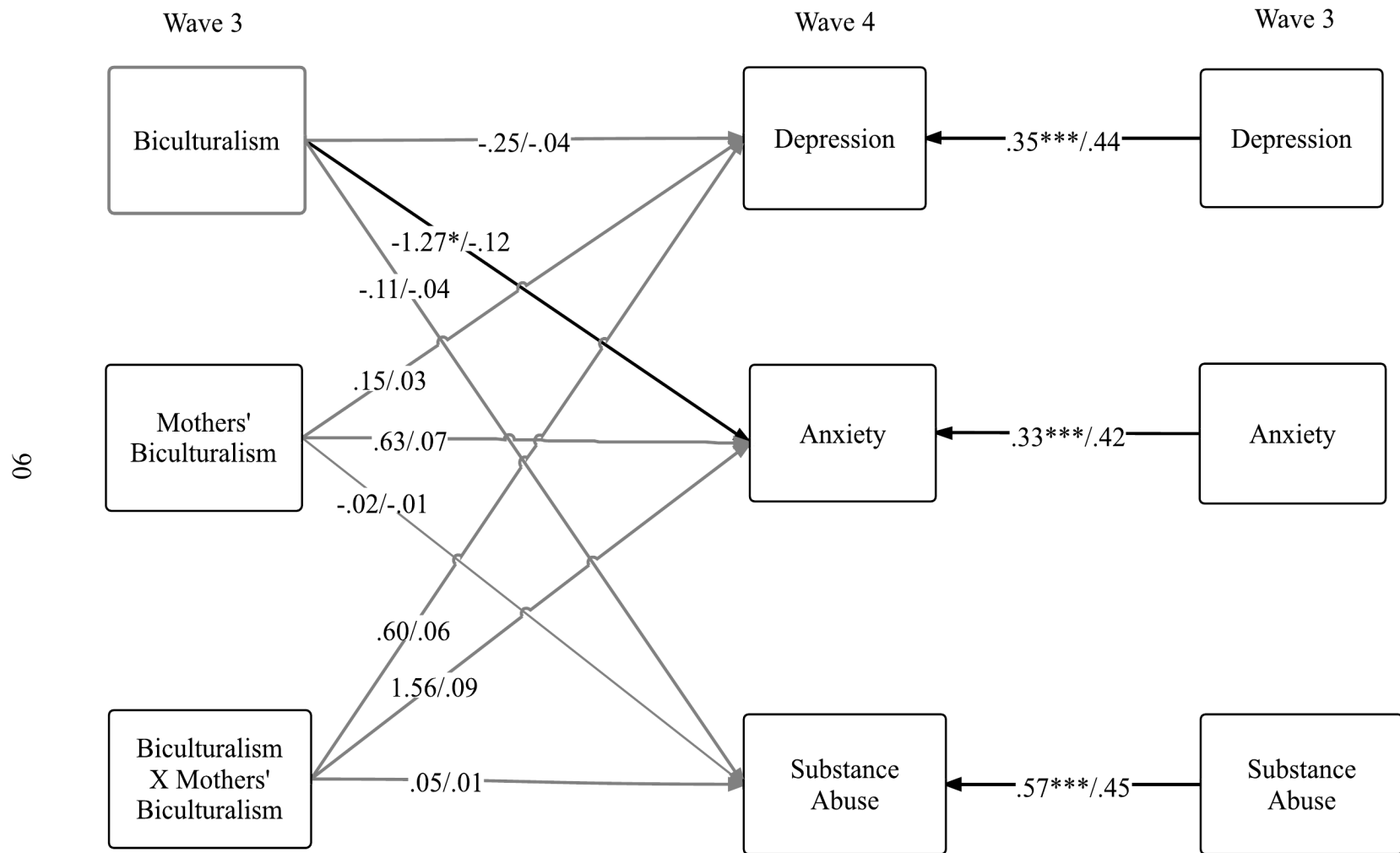


Figure 2a. Model 2 – Biculturalism, Mothers' Biculturalism, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

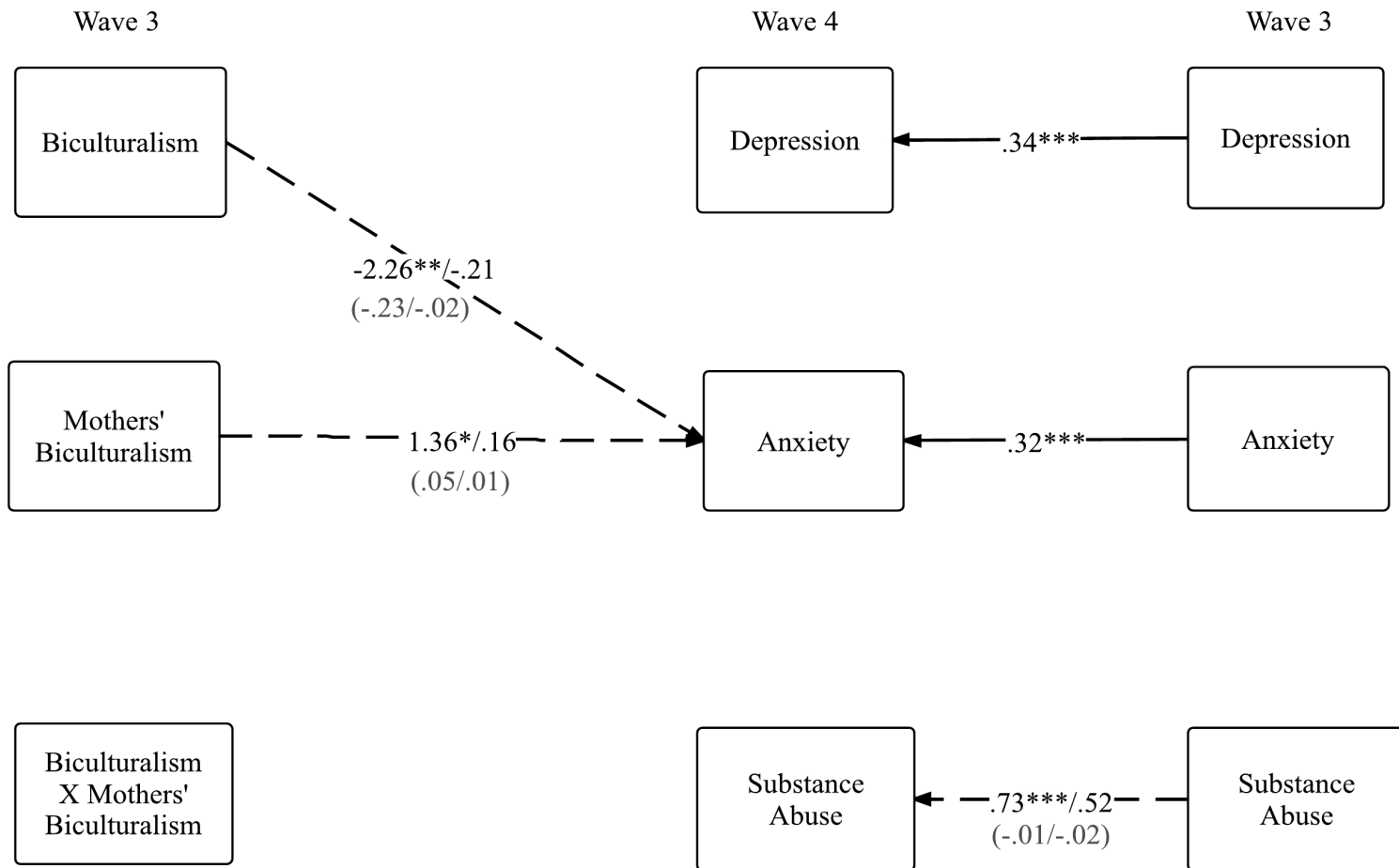


Figure 2b. Model 2 – Moderation by Gender: Biculturalism, mothers' biculturalism, and their interaction predicting depression, anxiety, and substance abuse by gender. . Only significant paths are shown. Solid lines signify paths constrained to be equal across genders and numbers reported are unstandardized coefficients. Dashed lines signify significant paths for males but not females, and numbers reported are unstandardized/standardized coefficients for males (females).

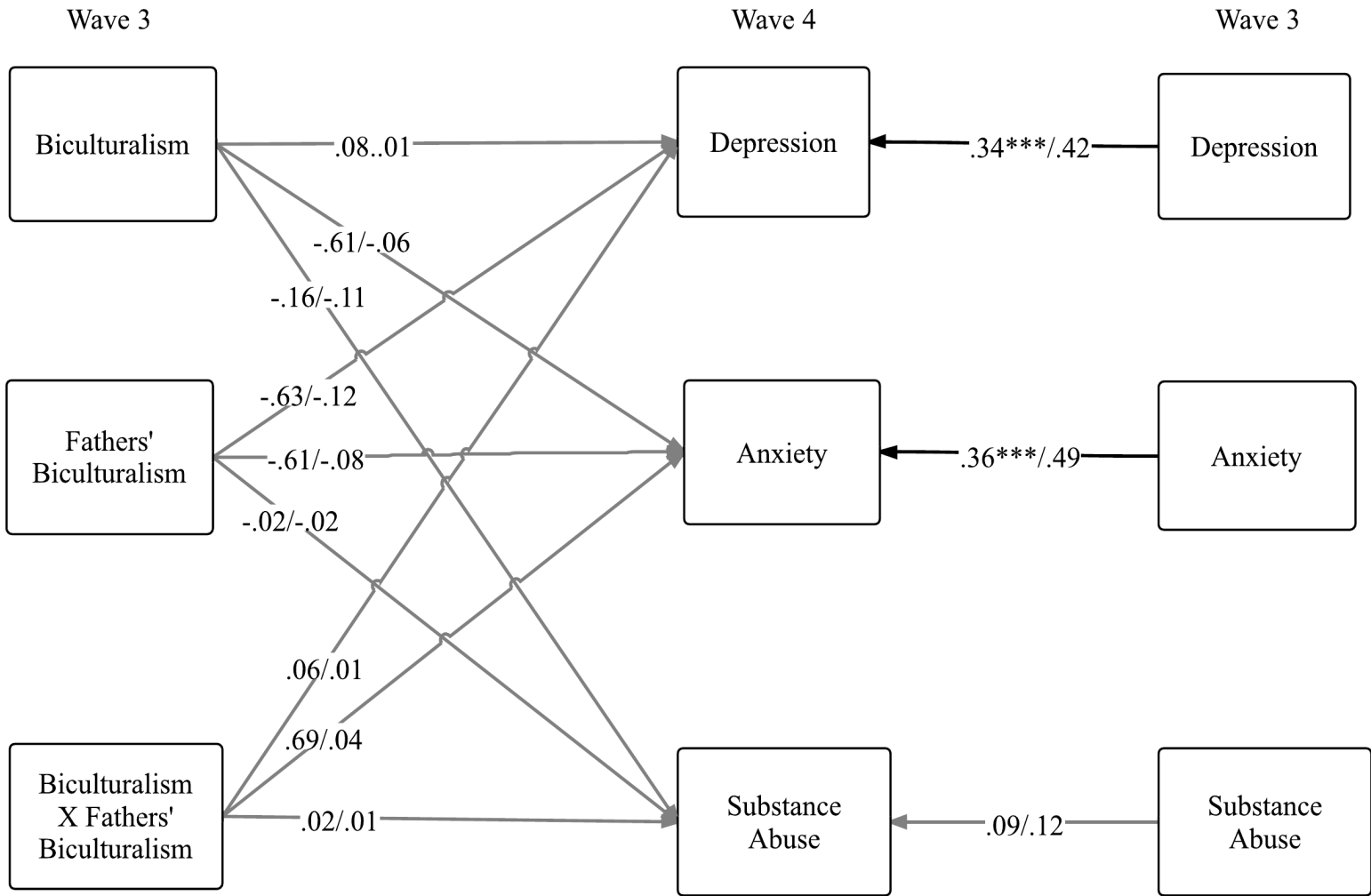


Figure 3. Model 3 – Biculturalism, Fathers' Biculturalism, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

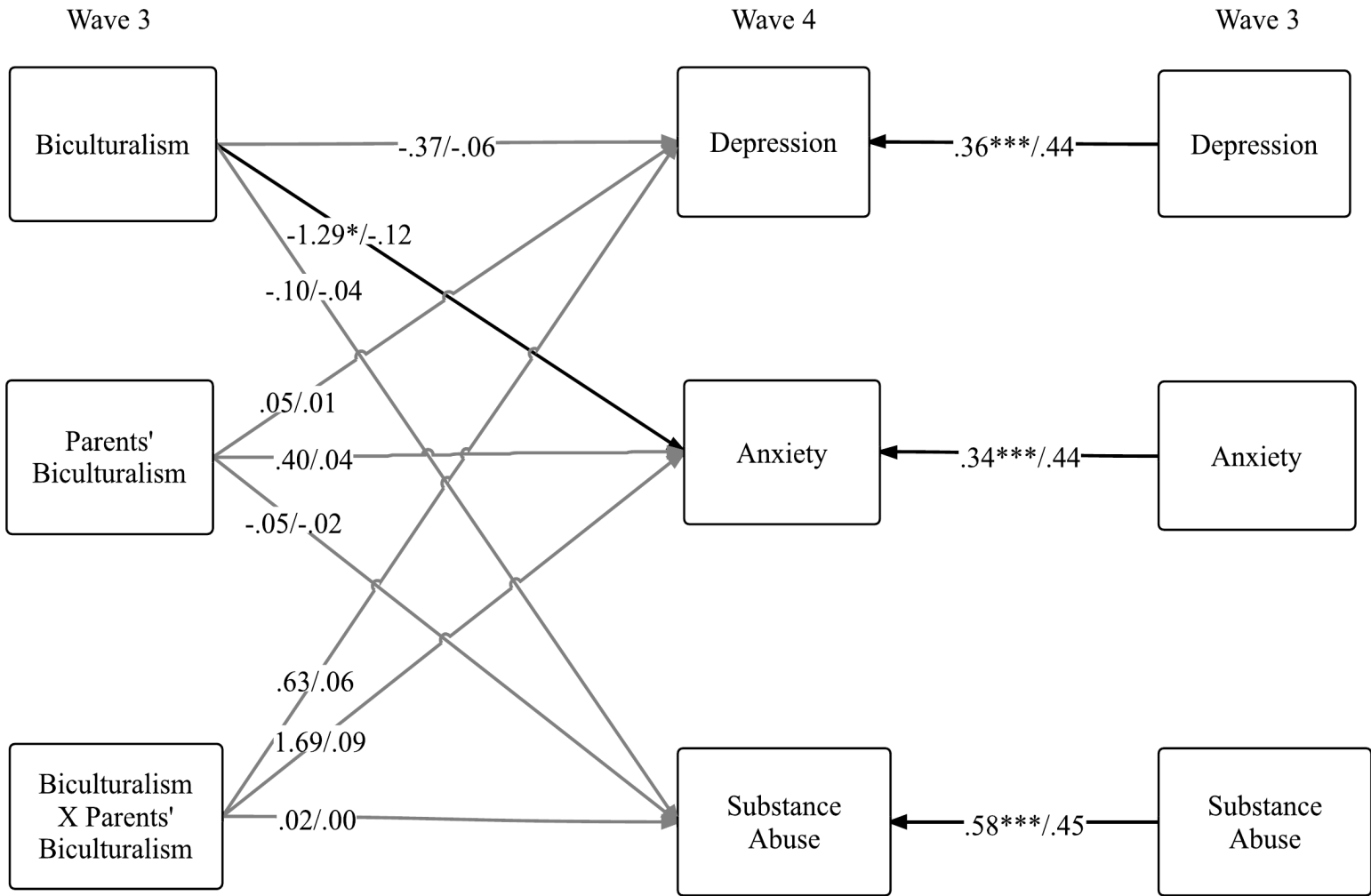


Figure 4a. Model 4 - Biculturalism, parents' biculturalism, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

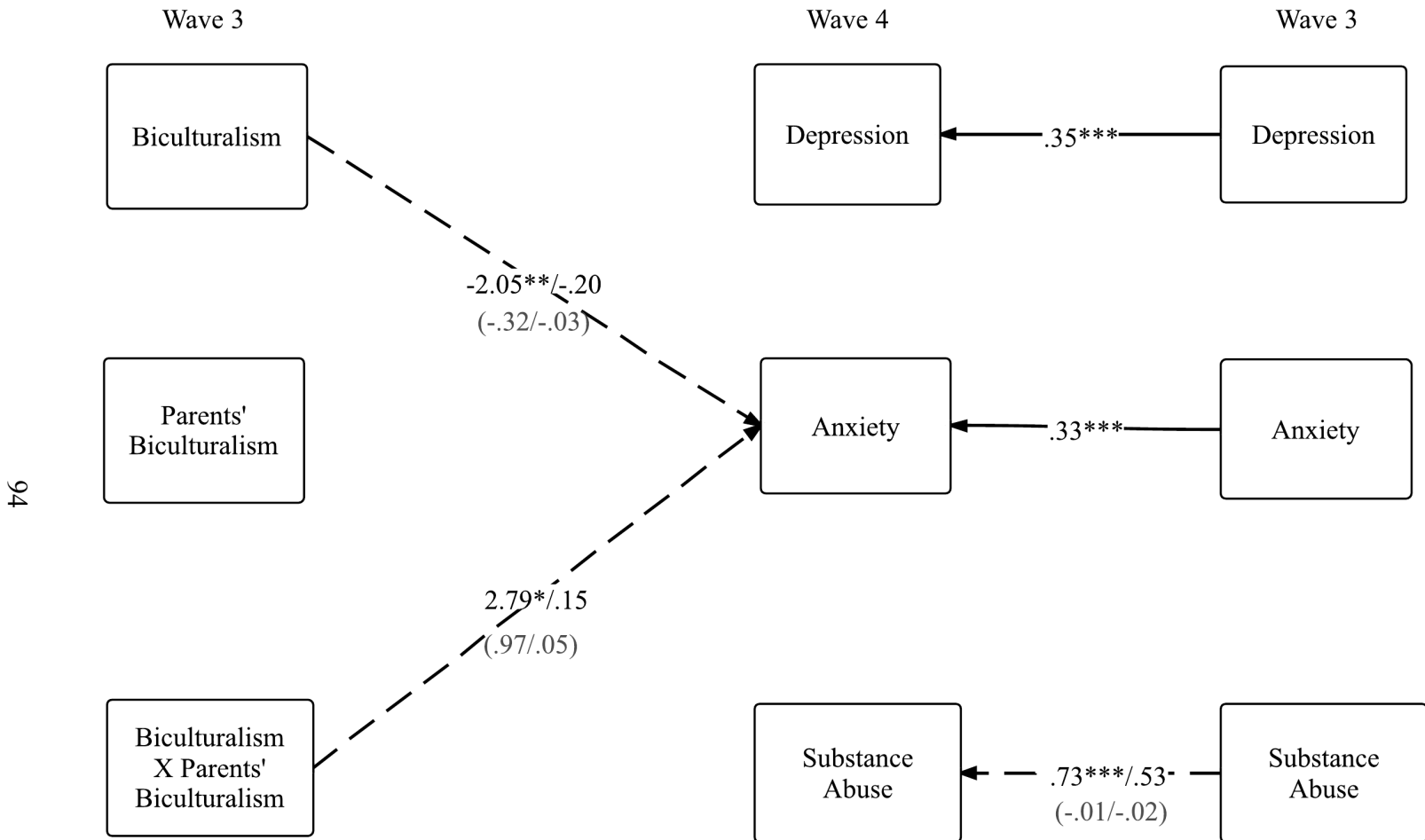


Figure 4b. Model 4 – Moderation by Gender: Biculturalism, parents' biculturalism, and their interaction predicting depression, anxiety, and substance abuse by gender. Only significant paths are shown. Solid lines signify paths constrained to be equal across genders and numbers reported are unstandardized coefficients. Dashed lines signify significant paths for males but not females, and numbers reported are unstandardized/standardized coefficients for males (females).

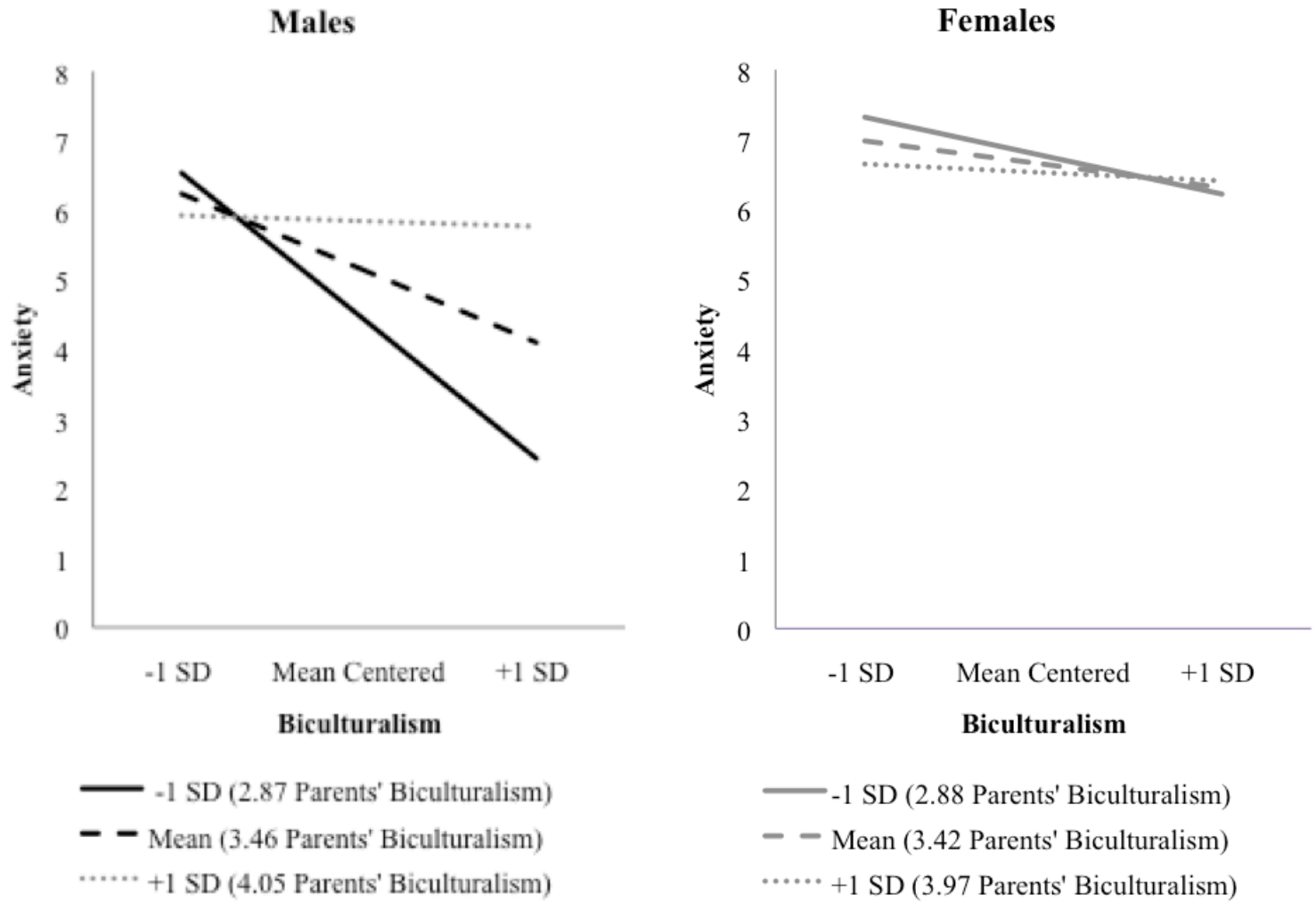


Figure 4c. Model 4 –Interaction effects of biculturalism and parents’ biculturalism on anxiety. Black lines indicate significant slopes, gray lines indicate non-significant slopes.

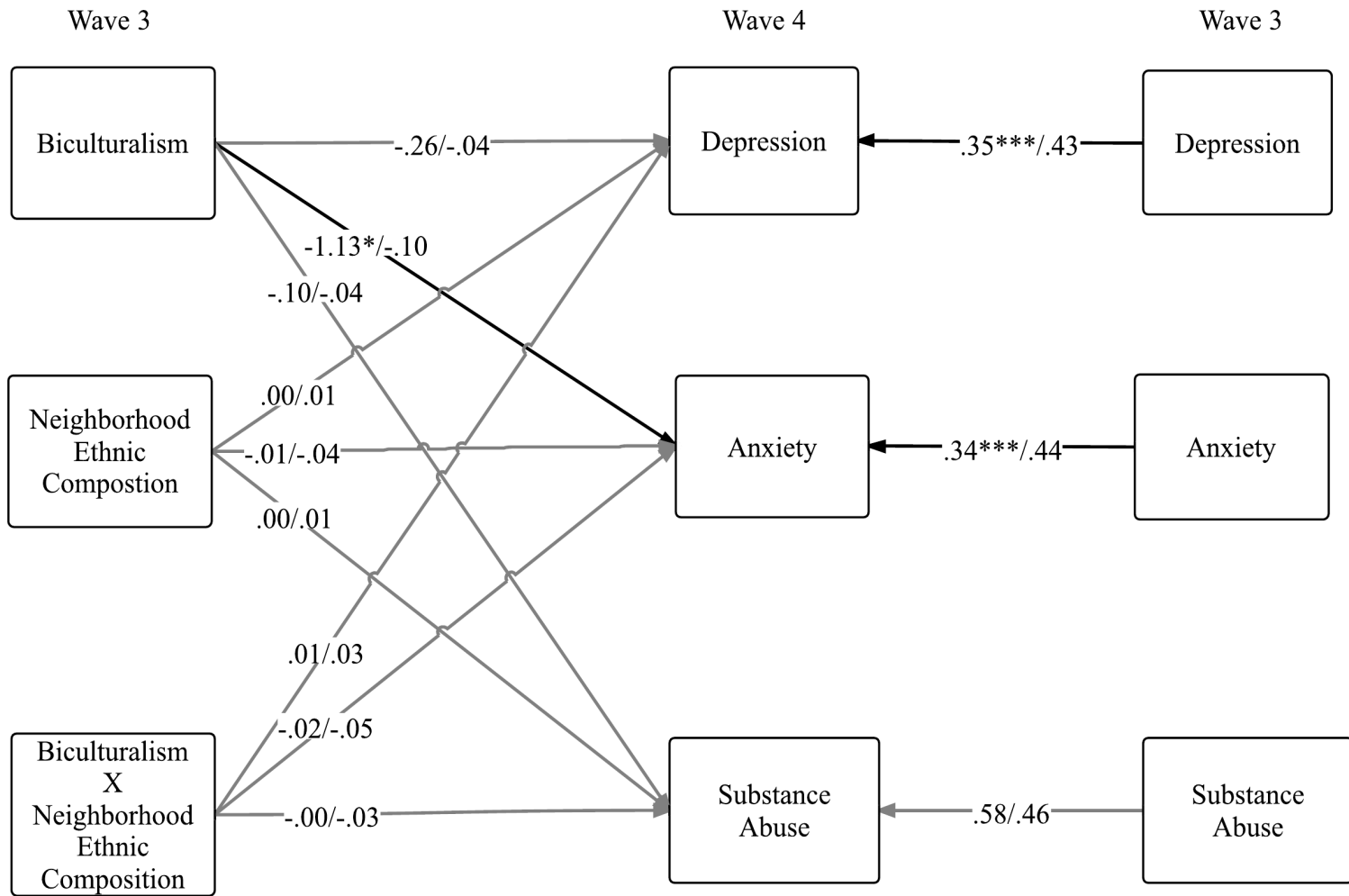


Figure 5a. Model 5 – Biculturalism, neighborhood ethnic composition, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

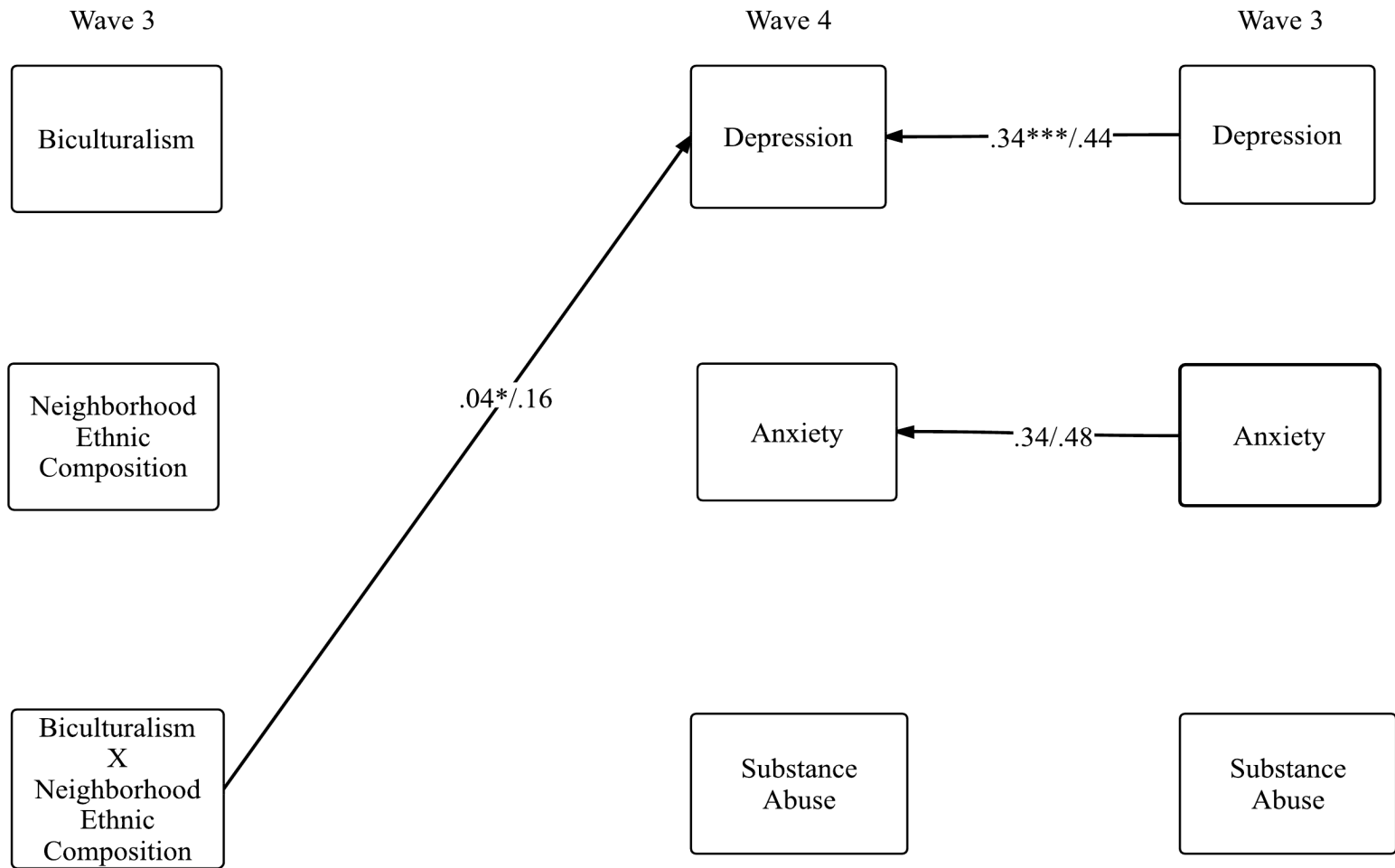


Figure 5b. Model 5 – Model for Females Only: Biculturalism, neighborhood ethnic composition and their interaction predicting depression, anxiety, and substance abuse. Only significant paths are shown. Numbers reported are unstandardized/standardized coefficients.

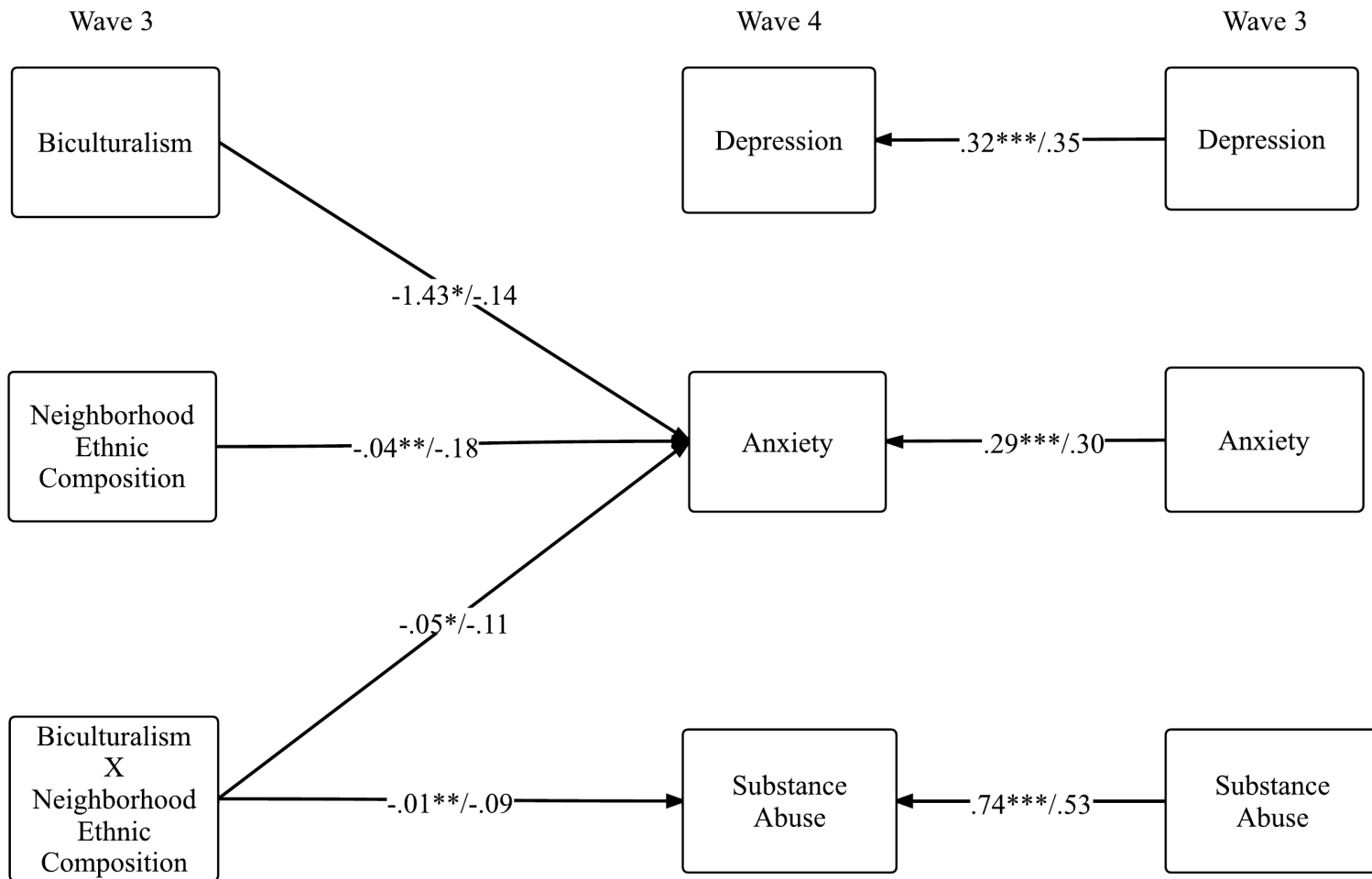


Figure 5c. Model 5 – Model for Males Only: Biculturalism, neighborhood ethnic composition and their interaction predicting depression, anxiety, and substance abuse. Only significant paths are shown. Numbers reported are unstandardized/standardized coefficients.

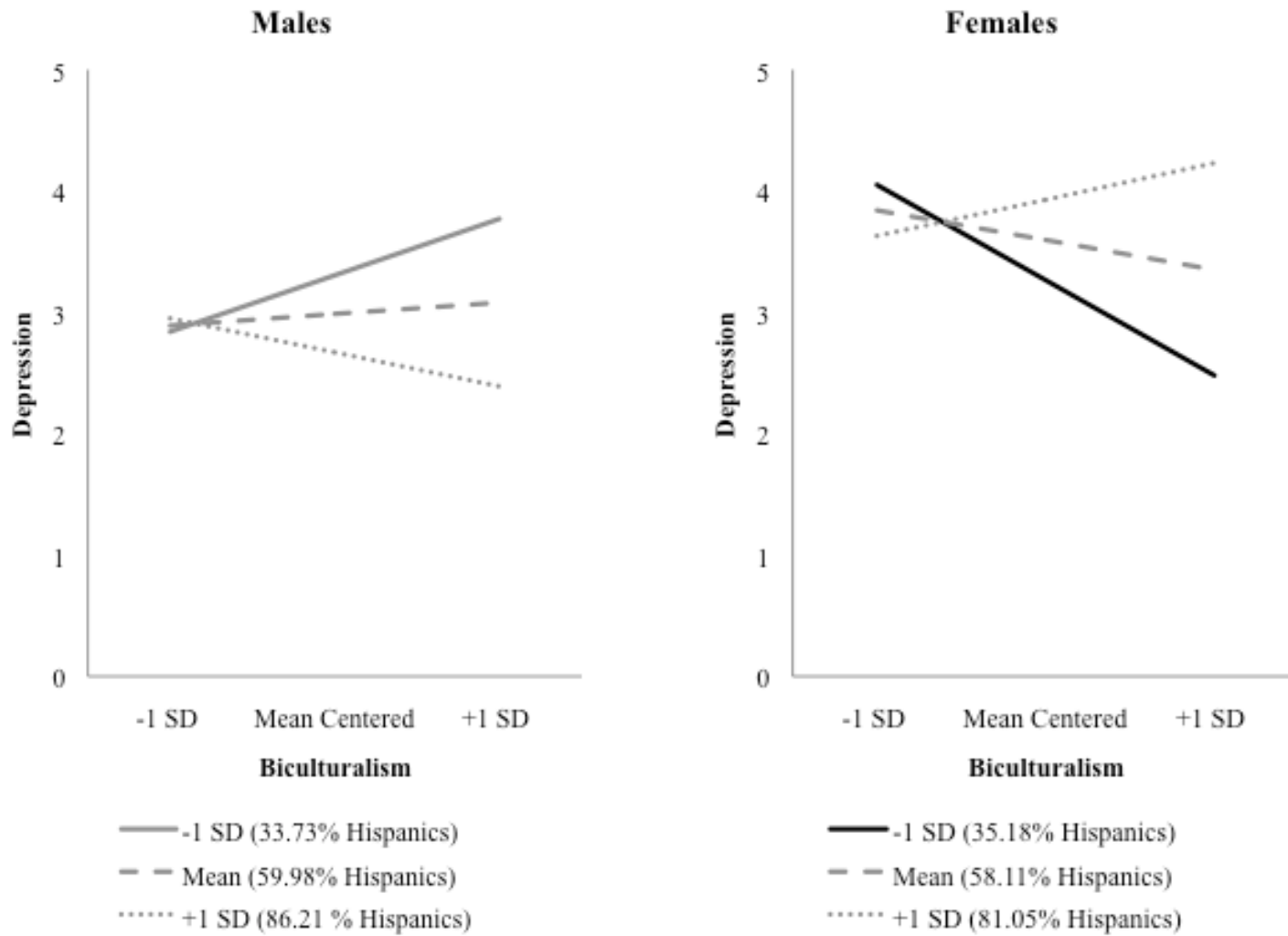


Figure 5d. Model 5 – Interaction effects of biculturalism and neighborhood ethnic composition on depression. Black lines indicate significant slopes, gray lines indicate non-significant slopes.

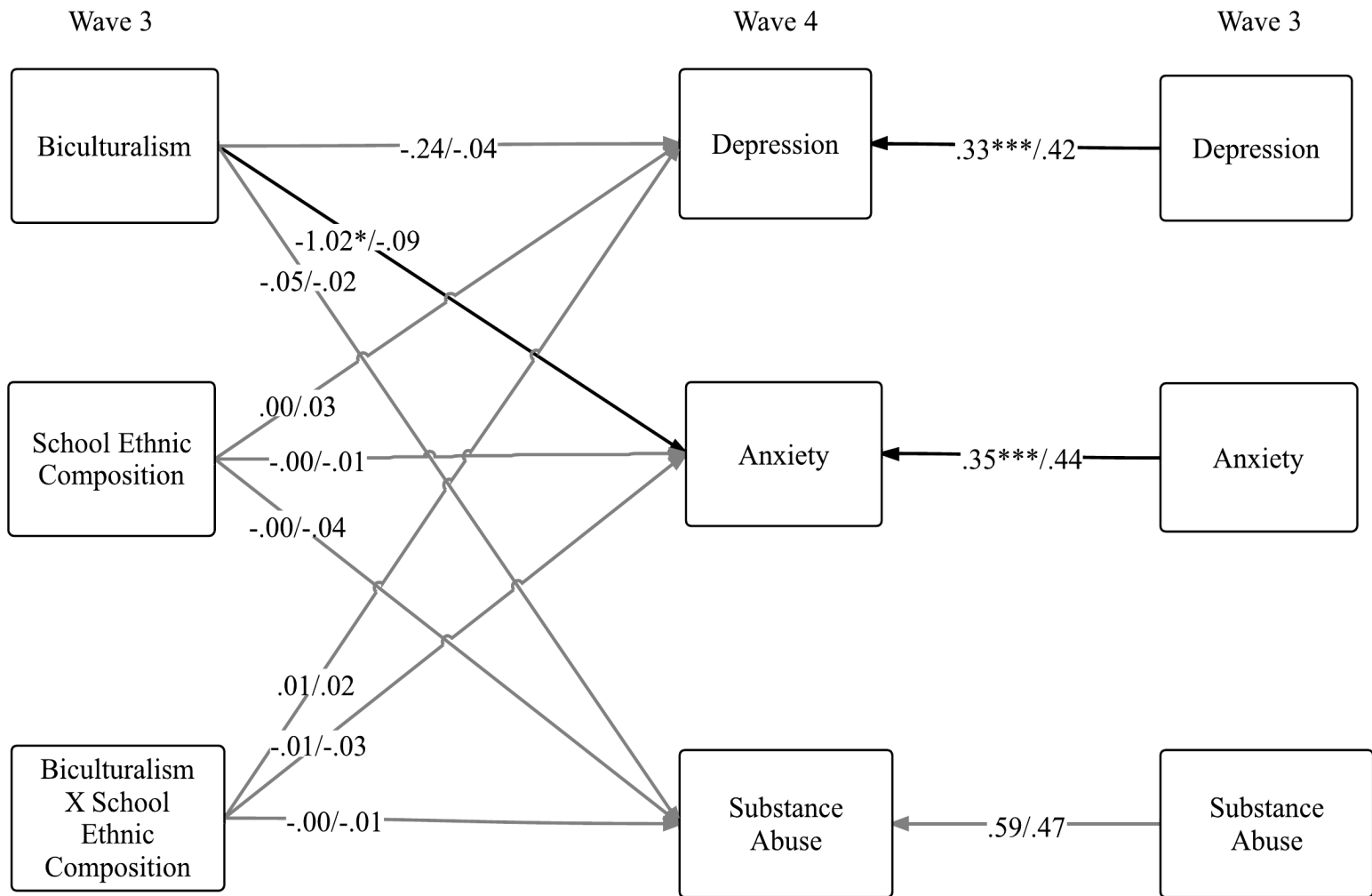


Figure 6a. Model 6 – Biculturalism, school ethnic composition, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

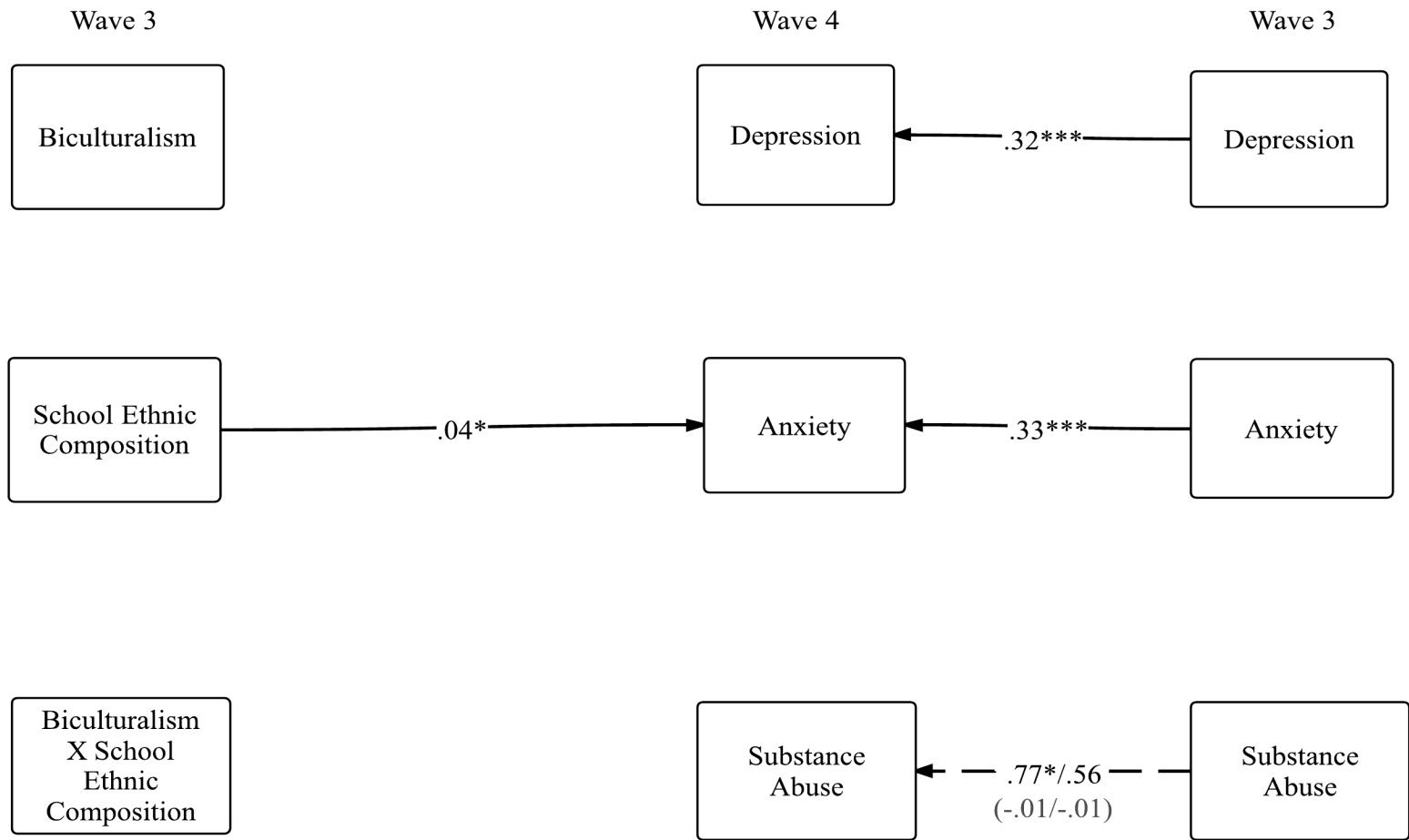


Figure 6b. Model 6 – Moderation by Gender: Biculturalism, school ethnic composition, and their interaction predicting depression, anxiety, and substance abuse by gender. Only significant paths are shown. Solid lines signify paths constrained to be equal across genders and numbers reported are unstandardized coefficients. Dashed lines signify significant paths for males but not females, and numbers reported are unstandardized/standardized coefficients for males (females).

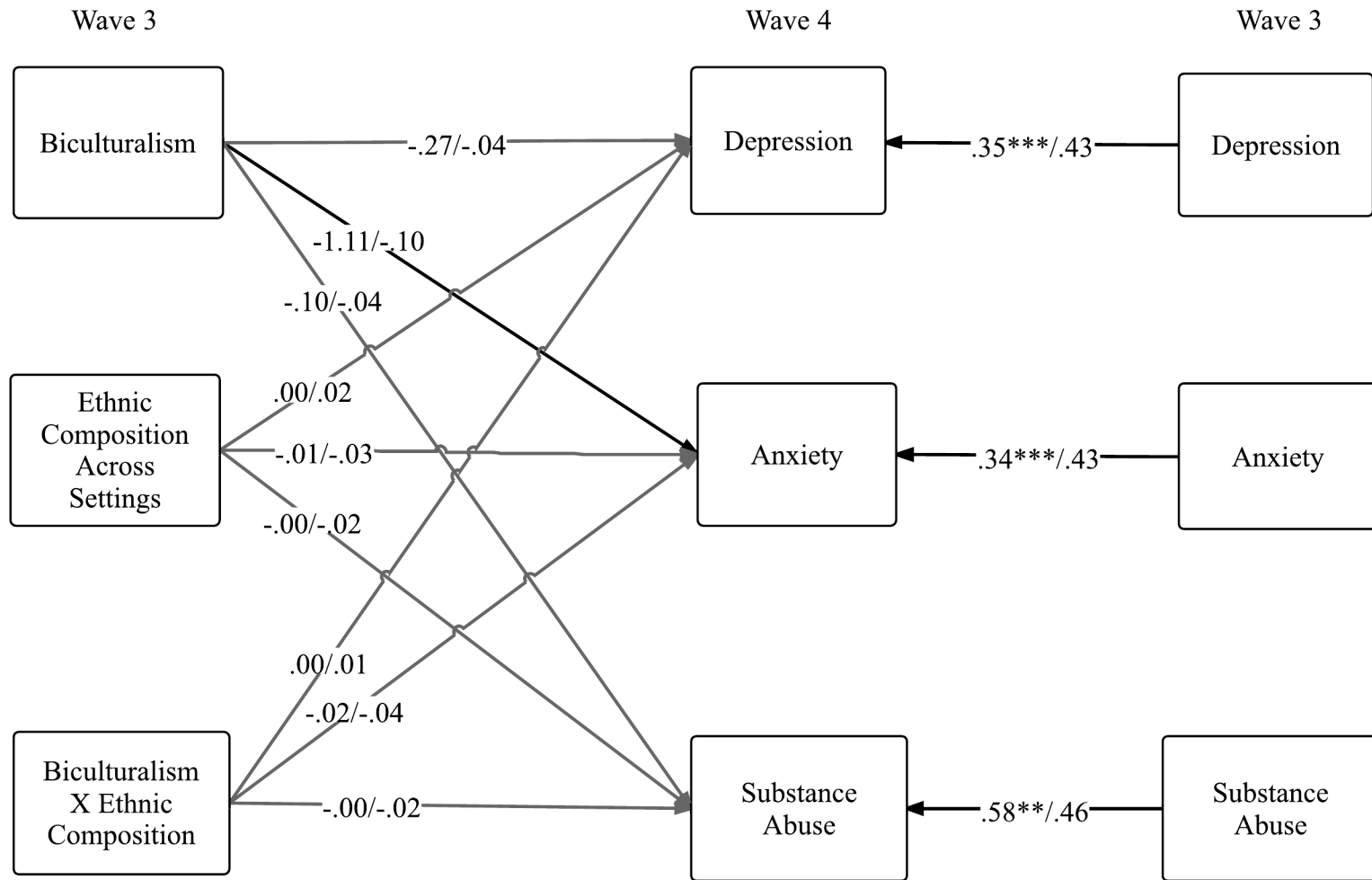


Figure 7a. Model 7 – Biculturalism, ethnic composition across settings, and their interaction predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

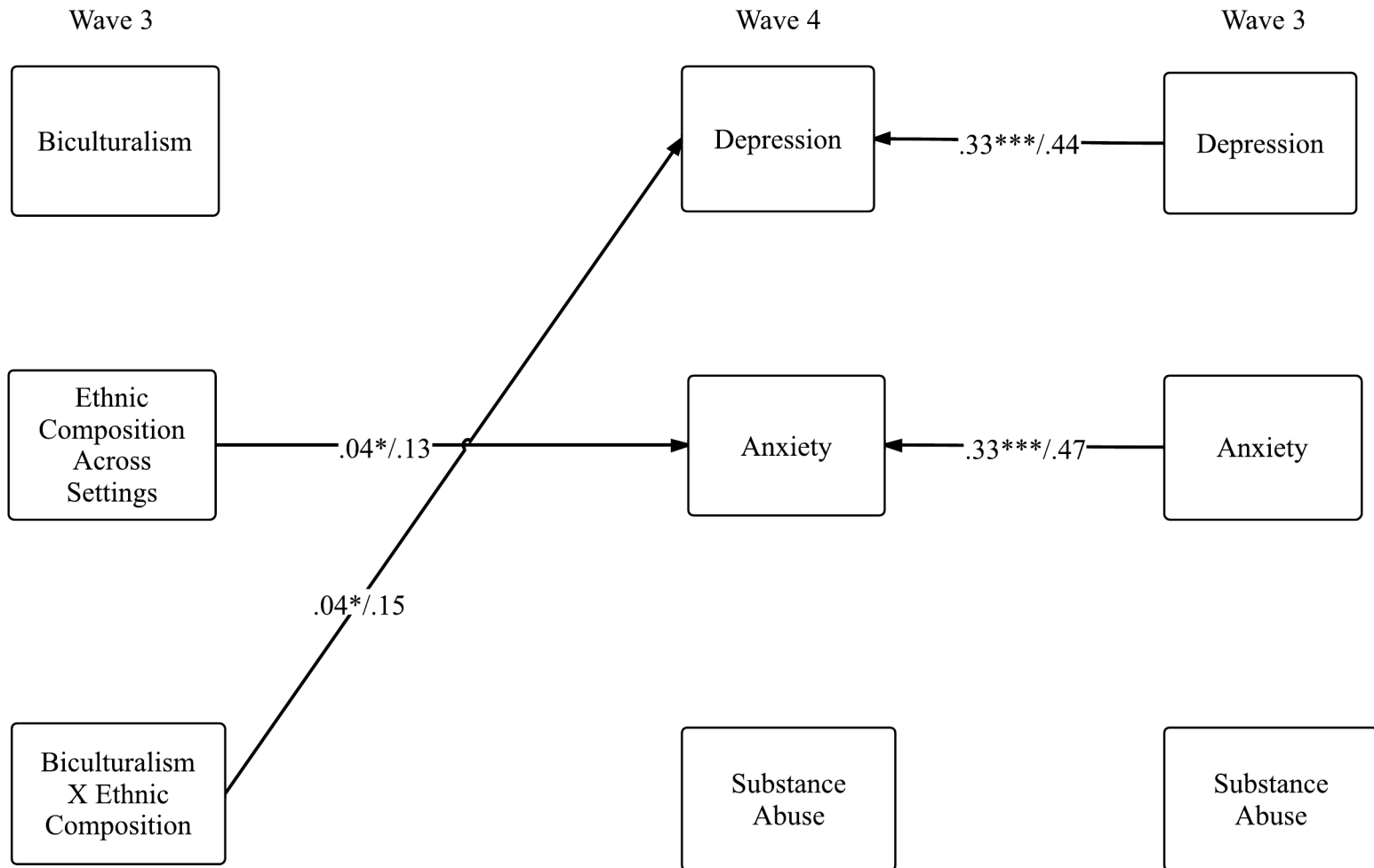


Figure 7b. Model 7 – Model for Females Only: Biculturalism, ethnic composition across settings, and their interaction predicting depression, anxiety, and substance abuse. Only significant paths are shown. Numbers reported are unstandardized/standardized coefficients.

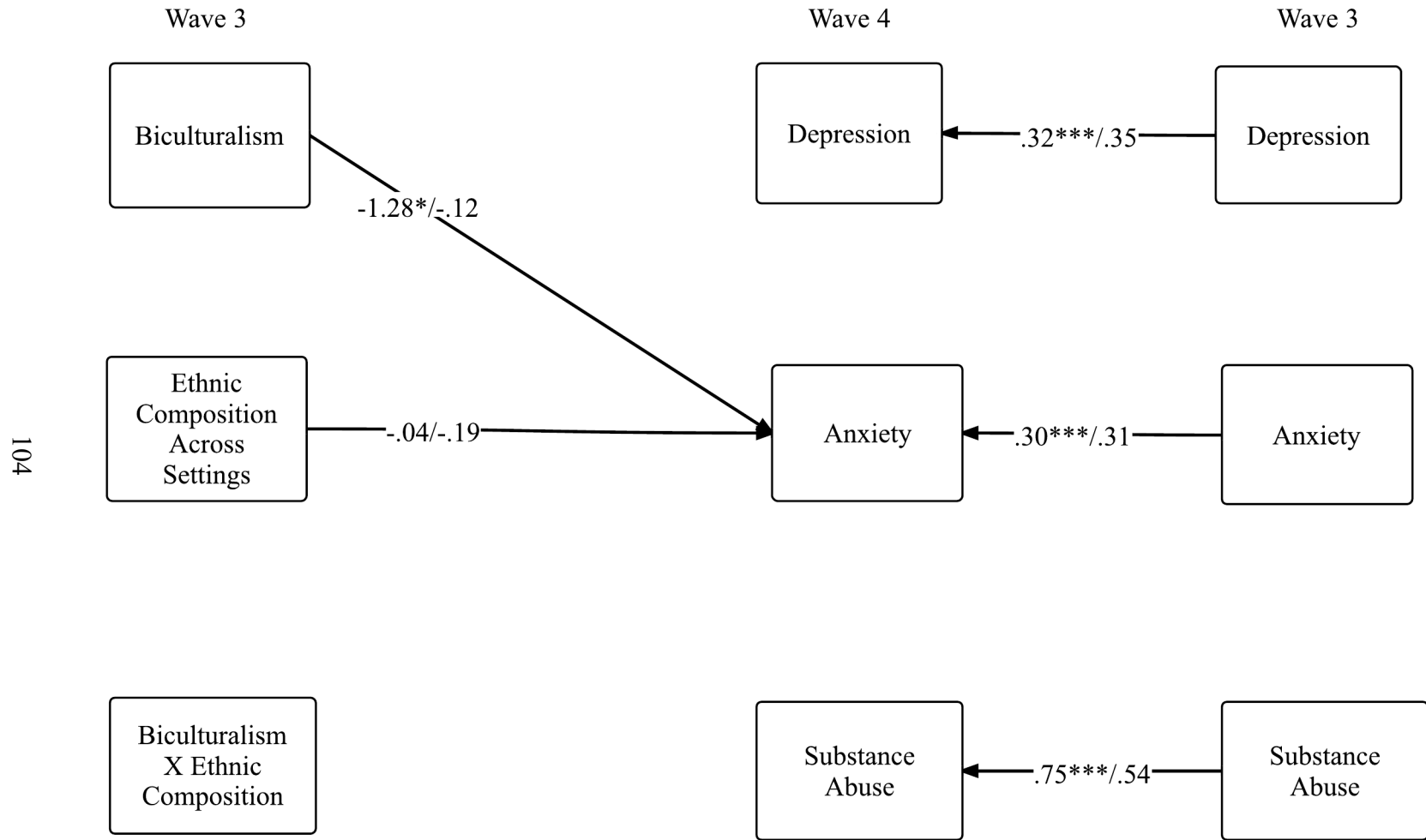


Figure 7c. Model 7 – Model for Males Only: Biculturalism, ethnic composition across settings, and their interaction predicting depression, anxiety, and substance abuse. Only significant paths are shown. Numbers reported are unstandardized/standardized coefficients.

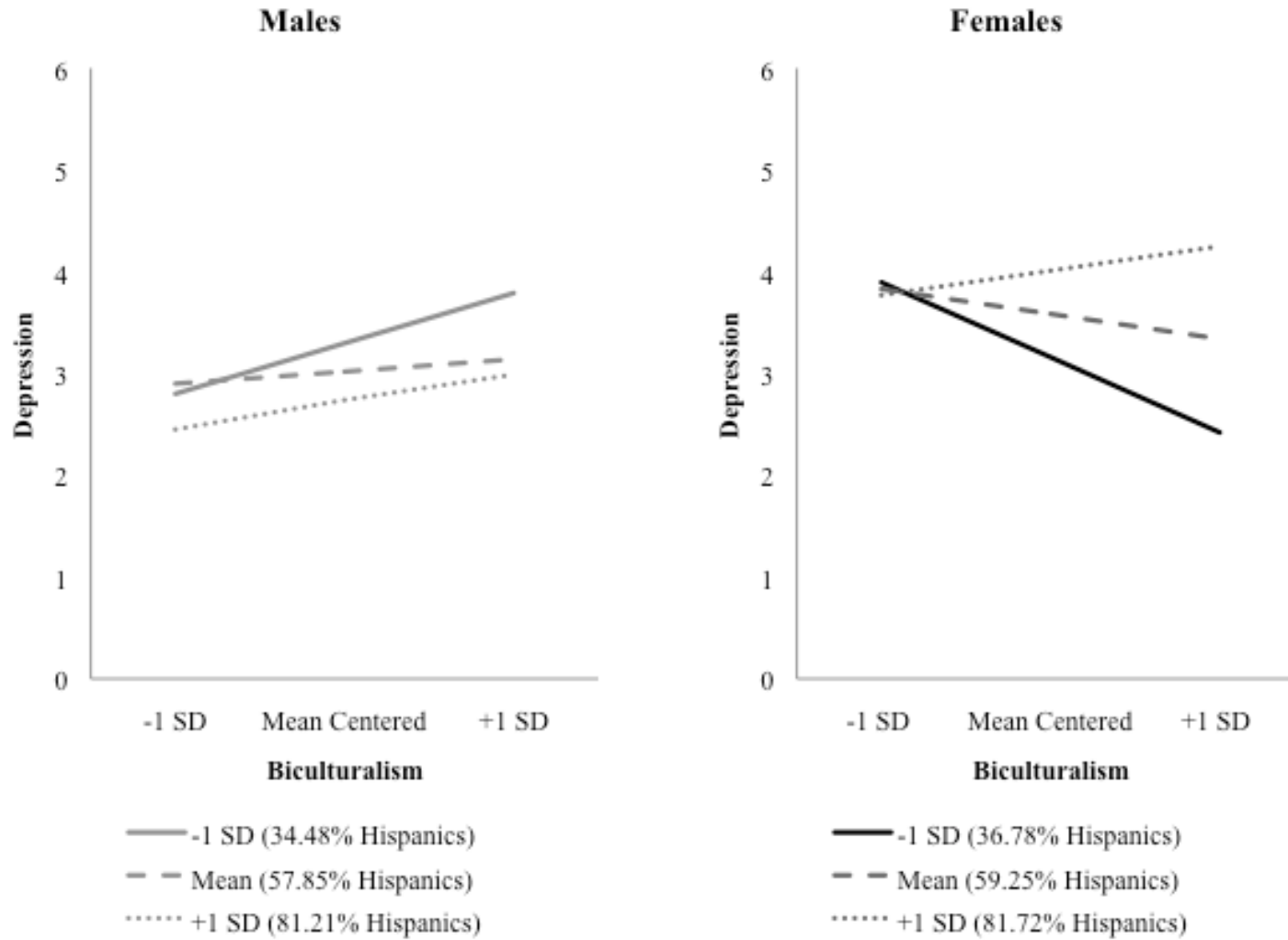


Figure 7d. Model 7 – Interaction effects of biculturalism and ethnic composition across settings on depression. Black lines indicate significant slopes, gray lines indicate non-significant slopes.

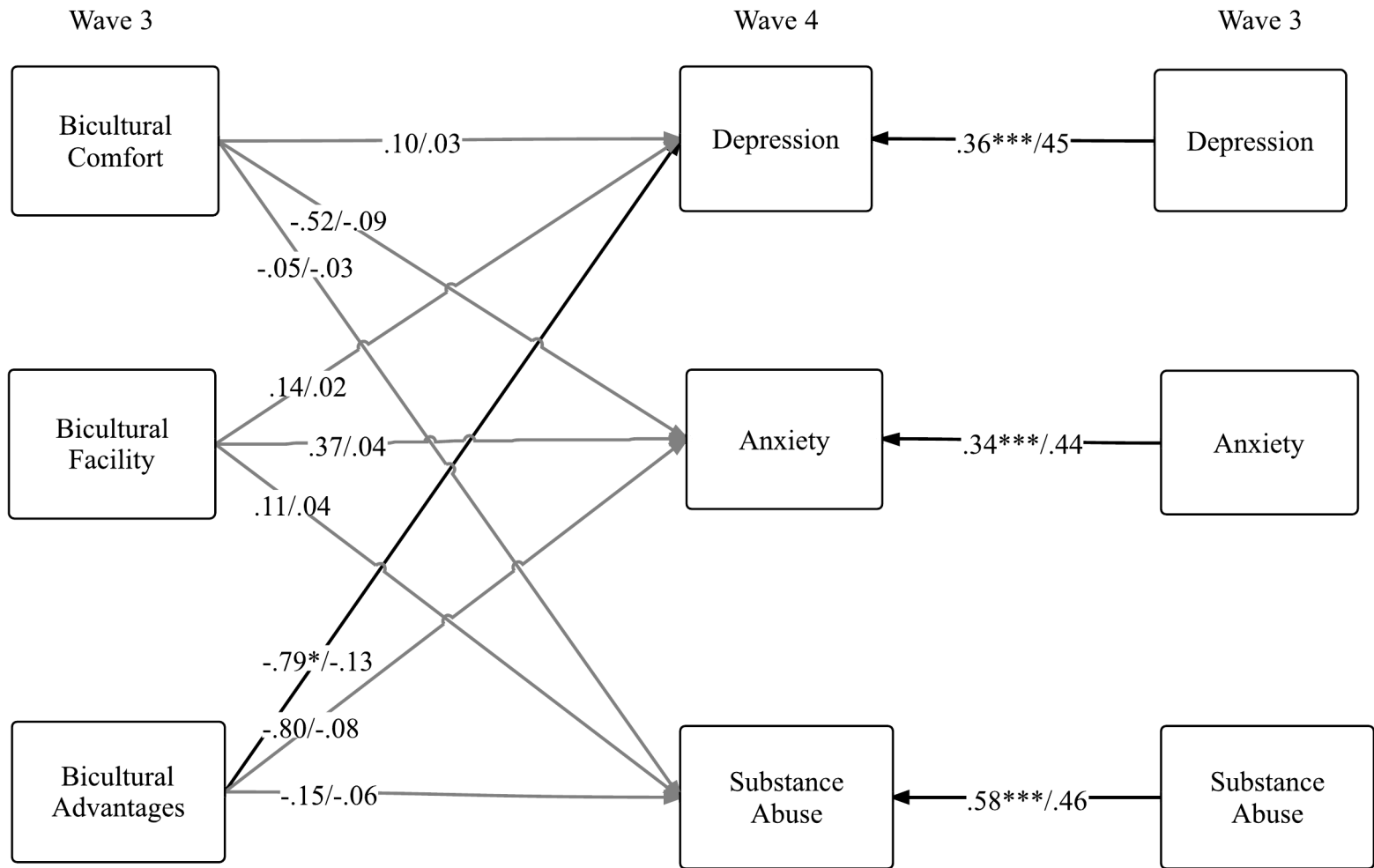


Figure 8a. Model 8 – Bicultural comfort, bicultural facility, and bicultural advantages predicting depression, anxiety, and substance abuse. Numbers reported are unstandardized/standardized coefficients for the overall model across gender and nativity.

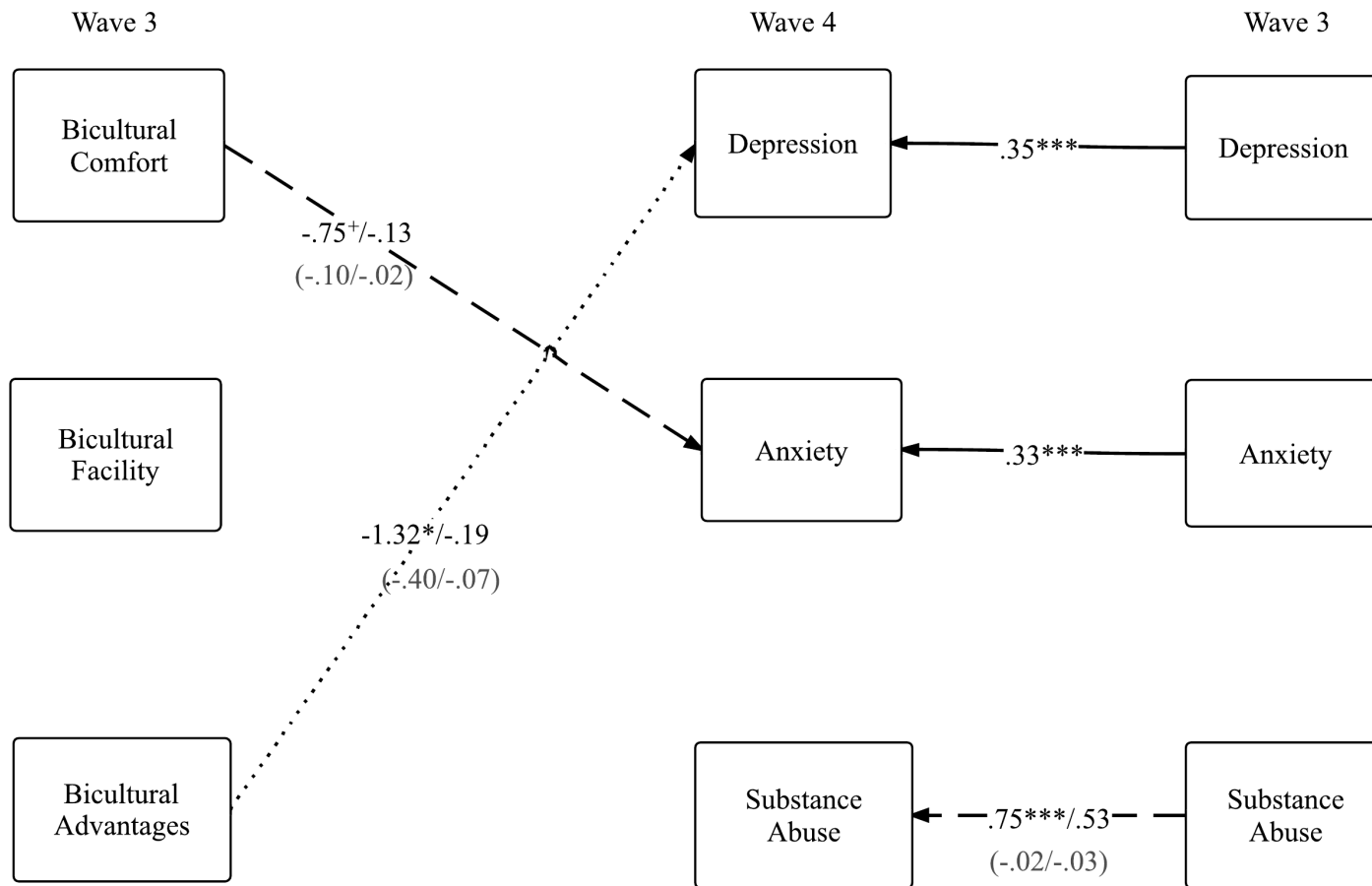


Figure 8b. Model 8 – Moderation by Gender: Bicultural comfort, facility, and advantages predicting depression, anxiety, and substance abuse by gender. Only significant paths are shown. Solid lines signify paths constrained to be equal across genders and numbers reported are unstandardized coefficients. Dashed lines signify significant paths for males but not females, and numbers reported are unstandardized/standardized coefficients for males (females). Dotted lines signify significant paths for females but not males, and numbers reported are unstandardized/standardized coefficients for females (males).

APPENDIX A

THE MEXICAN AMERICAN BICULTURALISM SCALE

Bicultural Comfort Subscale

Mexicans/Mexican Americans may act differently when they are with other Mexicans/Mexican Americans than when they are with Whites (Gringos; individuals of European American backgrounds). In the following items we will be asking you how comfortable you are in these different situations.

Example Response Options

- 1 = I am only comfortable when (I need to speak in Spanish).
- 2 = I am only comfortable when (I need to speak in English).
- 3 = I am sometimes comfortable in both of these situations.
- 4 = I am often comfortable in both of these situations.
- 5 = I am most of the time comfortable in both of these situations.
- 6 = I am always comfortable in both of these situations.

1. Sometimes you may need to speak Spanish, and other times you may need to speak English. Which of the following best describes you?
2. Sometimes you may feel a part of the Mexican/Mexican American community, and other times, you may feel a part of the White (Gringo) community. Which of the following best describes you?
3. Sometimes you may need to work with a group for the group to be successful, and other times you may need to compete with others for you to be successful. Which of the following best describes you?
4. Sometimes you may need to solve a problem in a Mexican/Mexican American way, and other times you may need to solve a problem in a White (Gringo) way. Which of the following best describes you?

Subescala de la Comodidad Bicultural

Los Mexicanos/México-Americanos pueden actuar de manera diferente cuando están con otros Mexicanos/México-Americanos que cuando están con los blancos (gringos; individuos de origen europeo americano). En las siguientes frases, le vamos a preguntar qué tan cómodo(a) está en estas distintas situaciones.

- 1 = Solamente estoy cómodo(a) cuando (necesito hablar en español).
- 2 = Solamente estoy cómodo(a) cuando (necesito hablar en inglés).
- 3 = Algunas veces estoy cómodo(a) en ambas situaciones.
- 4 = A menudo estoy cómodo(a) en ambas situaciones.
- 5 = La mayoría de las veces estoy cómodo(a) en ambas situaciones.
- 6 = Siempre estoy cómodo(a) en ambas situaciones.

1. Algunas veces puede ser que necesite hablar en español, y otras veces, puede ser que necesite hablar en inglés. ¿Cuál de las siguientes respuestas le describe mejor a usted?
2. Algunas veces puede sentirse parte de la comunidad Mexicana/México-Americana, y otras veces, puede sentirse parte de la comunidad de los blancos (gringos). ¿Cuál de las siguientes respuestas le describe mejor a usted?
3. Algunas veces puede ser que necesite trabajar en grupo para que el grupo tenga éxito, y otras veces, puede ser que necesite competir con otros para que usted tenga éxito. ¿Cuál de las siguientes respuestas le describe mejor a usted?
4. Algunas veces puede ser que necesite resolver un problema a la manera

5. Sometimes you may need to interact with other Mexican/Mexican Americans, and other times you may need to interact with Whites (Gringos). Which of the following best describes you?
6. Sometimes you may need to make an important decision on your own, and other times you may need to ask your family for advice. Which of the following best describes you?
7. Sometimes you may need to participate in Mexican/Mexican American traditions, and other times you may need to participate in White (Gringo) traditions. Which of the following best describes you?
8. Sometimes you may feel proud to be part of the Mexican/Mexican American community, and other times you may feel proud to be part of the US community. Which of the following best describes you?
9. Sometimes you may be obligated to satisfy your family's needs, and other times you may satisfy your own needs. Which of the following best describes you?

- Mexicana/México-Americana, y otras veces, puede ser que necesite resolver un problema a la manera de los blancos (gringos). ¿Cuál de las siguientes respuestas le describe mejor a usted?
5. Algunas veces puede ser que necesite tratar con otros Mexicanos/México-Americanos, y otras veces, puede ser que necesite tratar con los blancos (gringos). ¿Cuál de las siguientes respuestas le describe mejor a usted?
 6. Algunas veces puede ser que necesite tomar una decisión importante por si solo(a), y otras veces, puede ser que necesite pedirle un consejo a su familia. ¿Cuál de las siguientes respuestas le describe mejor a usted?
 7. Algunas veces puede ser que necesite participar en las tradiciones Mexicanas/México-Americanas, y otras veces, puede ser que necesite participar en las tradiciones de los blancos (gringos). ¿Cuál de las siguientes respuestas le describe mejor a usted?
 8. Algunas veces puede ser que se sienta orgulloso(a) de ser parte de la comunidad Mexicana/México-Americana, y otras veces, puede ser que se sienta orgulloso(a) de ser parte de la comunidad de los Estados Unidos. ¿Cuál de las siguientes respuestas le describe mejor a usted?
 9. Algunas veces puede ser que se sienta obligado(a) a satisfacer las necesidades de su familia, y otras veces, a satisfacer sus propias necesidades. ¿Cuál de las siguientes respuestas le describe mejor a usted?

Bicultural Facility Subscale

Now we would like you tell us how easy or difficult you find the kind of situations we have been asking you about.

Response Options

- 1 = very easy
- 2 = easy
- 3 = neither easy or difficult
- 4 = difficult
- 5 = very difficult

1. Needing to speak Spanish sometimes, and English other times is _____.
2. Being considered a part of the Mexican/Mexican American community sometimes, and a part of the White (Gringo) community other times is _____.
3. Needing to work with a group for the group to be successful sometimes, and needing to compete with others for me to be successful other times is _____.
4. Needing to solve a problem in a Mexican/Mexican American way sometimes, and in a White (Gringo) way other times is _____.
5. Needing to interact with other Mexicans/Mexican Americans sometimes, and with Whites (Gringos) other times is _____.
6. Needing to make important decisions on my own sometimes, and asking my family for advice other times is _____.
7. Needing to participate in Mexican/Mexican American traditions sometimes, and White (Gringo) traditions other times is _____.
8. Being proud to be part of the Mexican/Mexican American community sometimes, and being proud to be part of the US community other times is _____.
9. Being obligated to satisfy my family's needs sometimes, and satisfying my own needs other times is _____.

Subescala de la Facilidad Bicultural

Ahora, nos gustaría que nos diga qué tan fácil o difícil encuentra el tipo de situaciones sobre las que le hemos estado preguntando.

- 1 = muy fácil
- 2 = fácil
- 3 = ni fácil ni difícil
- 4 = difícil
- 5 = muy difícil

1. El necesitar hablar español algunas veces, y otras veces inglés es _____.
2. El considerarme a mí mismo(a) parte de la comunidad Mexicana/México-Americana algunas veces, y otras veces considerarme parte de la comunidad de los blancos (gringos)es _____.
3. . El necesitar trabajar en grupo para que el grupo tenga éxito algunas veces, y otras veces necesitar competir con otros para que yo tenga éxito es _____.
4. El necesitar resolver un problema a la manera Mexicana/México-Americana algunas veces, y otras veces a la manera de los blancos (gringos) es _____.
5. El necesitar tratar con otros Mexicanos/México-Americanos algunas veces, y otras veces con los blancos (gringos) es _____.
6. El necesitar tomar decisiones importantes por mí mismo(a) algunas veces, y otras veces necesitar pedirle un consejo a mi familia es _____.
7. El necesitar participar en las tradiciones Mexicanas/México-Americanas algunas veces, y otras veces en las tradiciones de los blancos (gringos) es _____.
8. El estar orgulloso(a) de ser parte de la comunidad Mexicana/México-Americana algunas veces, y otras veces el estar orgulloso(a) de ser parte de la comunidad de los Estados Unidos es _____.
9. El ser obligado(a) a satisfacer las necesidades de su familia algunas veces, y otras veces satisfacer sus propias necesidades es _____.

Bicultural Advantages Subscale

Now we would like you to tell us how much advantage or disadvantage you find in the kind of situations we have been asking you about.

Response Options

- 1 = many advantages
- 2 = advantages
- 3 = no advantages or disadvantages
- 4 = disadvantages
- 5 = many disadvantages

1. For me, being able to speak Spanish sometimes, and English other times has _____.
2. For me, being able to feel part of the Mexican/Mexican American community sometimes, and being able to feel part of the White (Gringo) community other times has _____.
3. For me, being able to work with a group, for the group to be successful sometimes, and being able to compete with others for me to be successful other times has _____.
4. For me, being able to solve a problem in a Mexican/Mexican American way sometimes, and being able to solve a problem in a White (Gringo) way other times has _____.
5. For me, being able to interact with other Mexicans/Mexican Americans sometimes, and being able to interact with Whites (Gringos) other times has _____.
6. For me, being able to make important decisions myself sometimes, and being able to ask my family for advice other times has _____.
7. For me, being able to participate in Mexican/Mexican American traditions sometimes, and being able to participate in White (Gringo) traditions other times has _____.
8. For me, being proud of being part of the Mexican/Mexican American community sometimes,

Subescala de la Ventajas Bicultural

Ahora, nos gustaría que nos diga cuánta ventaja o desventaja encuentras en el tipo de situaciones sobre las que le hemos estado preguntando.

- 1 = muchas ventajas
- 2 = ventajas
- 3 = ni ventajas ni desventajas
- 4 = desventajas
- 5 = muchas desventajas

1. Para mí, el poder hablar en español, algunas veces, y otras veces en inglés tiene _____.
2. Para mí, el poder sentirme parte de la comunidad Mexicana/México-Americana algunas veces, y otras veces el poder sentirme parte de la comunidad de los blancos (gringos) tiene _____.
3. Para mí, el poder trabajar en grupo para que el grupo tenga éxito algunas veces, y otras veces el poder competir con otros para que yo tenga éxito tiene _____.
4. Para mí, el poder resolver un problema a la manera Mexicana/México-Americana algunas veces, y otras veces el poder resolver un problema a la manera de los blancos (gringos) tiene _____.
5. Para mí, el poder tratar con otros Mexicanos/México-Americanos algunas veces, y otras veces el poder tratar con los blancos (gringos) tiene _____.
6. Para mí, el poder tomar decisiones importantes por mí mismo(a) algunas veces, y otras veces el poder pedirle un consejo a mi familia tiene _____.
7. Para mí, el poder participar en las tradiciones Mexicanas/México-Americanas algunas veces, y otras veces el poder participar en las tradiciones de los blancos (gringos) tiene _____.
8. Para mí, poder estar orgulloso(a) de ser parte de la comunidad Mexicana/México-Americana algunas veces, y otras veces poder estar orgulloso(a) de ser parte de la

and being proud of being part of the US community other times has _____.

9. For me, being obligated to satisfy my family's needs sometimes, and satisfying my own needs other times has _____.

Comunidad de los Estados Unidos tiene _____.

9. Para mí, ser obligado(a) a satisfacer las necesidades de mi familia algunas veces, y otras veces satisfacer mis propias necesidades tiene _____.

Scoring

The response options and their associated values presented in the appendix are values prior to recoding. Comfort Subscale: Response options 1 and 2 are recoded to a score of 1, option 3 to a score of 2, option 4 to a score of 3, option 5 to a score of 4, and option 6 to a score of 5.

Facility Subscale: All responses are reverse coded so that higher scores indicate higher bicultural facility.

Advantages Subscale: All responses are reverse coded so that higher scores indicate higher bicultural advantages.

Survey responses were collected through computer-assisted interviews and the labels "Mexican" and "Mexican American" were self-chosen by the participants and were then used during the administration of the MABS.

APPENDIX B

ECONOMIC HARDSHIP

Inability to Make Ends Meet Scale

1. Think back over the past 3 months and tell us how much difficulty you had with paying your bills. Would you say you had:

Response Options (reverse coded):

- 1 = A great deal of difficulty
- 2 = Quite a bit of difficulty
- 3 = Some difficulty
- 4 = A little difficulty
- 5 = No difficulty at all

2. Think again over the past 3 months. Generally, at the end of each month did you end up with:

Response Options:

- 1 = A lot of money left
- 2 = Some money left
- 3 = Just enough money left
- 4 = Somewhat short of money 5 = very short of money
- 5 = Very short of money

1. Ahora, piense en los últimos tres meses desde y dígame cuánta dificultad usted tuvo en pagar sus cuentas. Diría usted que tuvo:

- 1 = Muchísima dificultad
- 2 = Bastante dificultad
- 3 = Algo de dificultad
- 4 = Un poco de dificultad
- 5 = Nada de dificultad

2. Piense otra vez en los últimos tres meses. Por favor dígame generalmente al final del mes usted se quedó con:

- 1 = Sobra
- 2 = Algo de dinero de sobra
- 3 = Apenas suficiente dinero
- 4 = Algo corta de dinero
- 5 = Muy corta de dinero

Not Enough Money for Necessities Scale

3. Your family had enough money to afford the kind of home you needed.

Response Options (reverse coded):

- 1 = Not at all true
- 2 = A little true
- 3 = Somewhat true
- 4 = Mostly true
- 5 = Very true

4. You had enough money to afford the kind of clothing you needed.

5. You had enough money to afford the kind of furniture or household appliances you needed

6. You had enough money to afford the kind of car you needed.

7. You had enough money to afford the kind of food you needed.

8. You had enough money to afford the kind of medical care you needed.

3. Su familia tuvo suficiente dinero para proporcionar el tipo de hogar que necesitaron.

- 1 = Nada cierto
- 2 = Un poco cierto
- 3 = Algo cierto
- 4 = Cierto
- 5 = Muy cierto

4. Ustedes tuvieron suficiente dinero para proporcionar el tipo de ropa que necesitaron.

5. Ustedes tuvieron suficiente dinero para proporcionar el tipo de muebles o aparatos del hogar que necesitaron.

6. Ustedes tuvieron suficiente dinero para proporcionar el tipo de automóvil que necesitaron.

7. Ustedes tuvieron suficiente dinero para proporcionar el tipo de comida que necesitaron.

8. Ustedes tuvieron suficiente dinero para proporcionar el tipo de servicios médicos que necesitaron.

9. Your family had enough money to afford leisure and recreational activities.

9. Su familia tuvo suficiente dinero para proporcionarse actividades recreativas y de diversion

Economic Adjustments / Cutbacks Scale

In the last 3 months, has your family made any of the following adjustments because of financial difficulties?

En los últimos tres meses, ¿Ha realizado su familia alguno de los siguientes ajustes, debido a una necesidad financiera?

10. ...changed food shopping or eating habits a lot to save money?

10. ¿...cambiaron mucho su manera de comer o hacer compras para ahorrar dinero?

Response Options:

1 = Yes

1= Si

2 = No

2 = No

11. ...shut down the heat or air conditioning to save money even though it made the house uncomfortable?

11. ¿...apagaron el calenton o aire acondicionado para ahorrar dinero aunque la casa se sintiera incomoda?

12. ...did not go to see the doctor or dentist because you did not have the money?

12. ¿...no fueron a ver al doctor o dentista debido a que no tenían dinero?

13. ...fell far behind in paying bills?

13. ¿...se atrazaron en sus pagos de las cuentas?

14. ...asked relative or friends for money or food to help you get by?

14. ¿...le pidieron a sus parientes o amigos dinero o comida para ayudarse?

15. ...added another job to help make ends meet?

15. ¿...consiguieron otro trabajo para que les alcanzara?

16. ...received government assistance?

16. ¿...recibieron ayuda del gobierno?

17. sold some possessions because you needed the money (even though you really wanted to keep them)?

17. ¿...vendieron algunas cosas porque ustedes necesitaron el dinero (aunque ustedes deveras querían quedarse con ellas)?

18. moved to another house or apartment to save some money?

18. ¿...se mudaron a otra casa o apartamento para ahorrar dinero?

Financial Strain Scale

19. In the next three months, how often do you expect that you and your family will experience bad times such as poor housing or not having enough food?

19. ¿En los próximos tres meses, que tan seguido espera que usted y su familia pasen por tiempos dificiles como no tener una vivienda adecuada o no tener suficiente comida?

20. Basic things your family needs?

20. cosas básicas que su familia necesita?

Response Options:

1 = Almost never or never

2 = Once in a while

3 = Sometimes

4 = A lot of the time

5 = Almost always or always

1 = Casi nunca o nunca

2 = De vez en cuando

3 = A veces

4 = Muchas veces

5 = Casi siempre o siempre

Scoring

For the Financial Strain, Inability to Make Ends Meet, and Not Enough Money for Necessities scales, scoring is done by taking a mean of the items within each scale. Higher numbers represent greater financial strain, greater inability to make ends meet, and a greater sense of not having enough money for one's needs, respectively. The Economic Adjustments scale is computed as a count of the 9 items, and higher scores reflect more adjustments. Because the 9 items for that scale are life-events-type items that were thought to be independent of one another, a decision was made to use the single-indicator score for the Economic Adjustments scale. Then the items from the Financial Strain scale, the Inability to Make Ends Meet scale, the Not Enough Money for Necessities scale, and a single-indicator "count" scale score from the Economic Adjustments scale (a total of 12 items) were used to create a composite variable to represent subjective economic hardship.

APPENDIX C

MODEL 3: FATHERS' BICULTURALISM

Model 3: fathers' biculturalism. For the subset of participants who had fathers' reports on biculturalism ($N = 164$), the potential moderating role of fathers' biculturalism was also examined. The results showed that this model fit the data well, $\chi^2 (6) = 5.82, p = .44$, CFI = 1.00, RMSEA = .00 (.00, .10), SRMR = .02. However, in this model, adolescents' and fathers' biculturalism, as well as their interaction were not significant predictors of biculturalism (Figure 3).

Gender. The unconstrained model fit the data well, $\chi^2 (12) = 5.37, p = .94$, CFI = 1.00, RMSEA = .00 (.00, .02), and SRMR = .02. Similarly, the model constraining the path coefficients to be equal for males and females also fit the data well, $\chi^2 (24) = 17.86, p = .81$, CFI = 1.00, RMSEA = .00 (.00, .06), and SRMR = .05. In addition, the chi-square difference test between the constrained and unconstrained model was not significant, $\Delta \chi^2 (\Delta df = 12) = 12.49, p = .41$. Thus, there was no moderation by gender.

Nativity. The moderating effect of nativity could not be examined because of model nonidentification due to a variance of zero for substance abuse symptoms at Wave 3 for those who had fathers' reports on biculturalism and who were born in Mexico.

APPENDIX D

MODEL 6: SCHOOL ETHNIC COMPOSITION

Model 6: School ethnic composition. Since adolescents were clustered within schools, the “COMPLEX” command in Mplus was again utilized to account for nonnormality and nonindependence of observations. The results of this analyses showed that this model had good fit. $\chi^2(6) = 8.43, p = .21, CFI = .99, RMSEA = .04 (.00, .10), SRMR = .04$. However, the school ethnic composition (i.e., percentage of Hispanics) had no effects on mental health outcomes (Figure 6a) and none of the interaction effects were significant. Again, biculturalism significantly predicted anxiety symptoms.

Gender. The unconstrained model fit the data well, $\chi^2(12) = 17.32, p = .14, CFI = .99, RMSEA = .06 (.00, .12),$ and $SRMR = .05$. However, the model constraining the path coefficients to be equal for males and did not fit the data well, $\chi^2(24) = 89.69, p < .001; CFI = .84, RMSEA = .15 (.12, .18),$ and $SRMR = .08$. In addition, the Satorra-Bentler scaled chi-square difference test between the constrained and unconstrained model was significant, $\Delta\chi^2(\Delta df = 12) = 88.74, p < .001$. Thus, there was moderation by gender. An examination of the differences in path coefficients from the unconstrained model and modification indices in the constrained model revealed that allowing the paths from Wave 3 substance abuse predicting Wave 4 substance abuse, and school ethnic composition predicting depression and anxiety to vary across genders should improve model fit. Indeed, the partially constrained model fit the data well, $\chi^2(20) = 24.89, p = .21, CFI = .99, RMSEA = .04 (.00, .09),$ and $SRMR = .05$. Additionally, the Satorra-Bentler scaled chi-square difference test between the partially constrained and unconstrained model was not significant, $\Delta\chi^2(\Delta df = 8) = 7.09, p = .53$. Thus, for males, substance abuse at Wave 3 significantly predicted substance abuse at Wave 4, but not for females.

Nativity. The moderating effect of nativity could not be examined because of model nonidentification due to problems estimating the regression coefficient of substance abuse at Wave 3 predicting substance abuse at Wave 4 for those born in Mexico.

APPENDIX E

MODEL 7: DIVERSITY ACROSS SETTINGS

To examine the degree of biculturalism of the cultural environment adolescents are exposed to *across* settings, a latent variable was created with parents' biculturalism (composite of mothers' and fathers' biculturalism) and neighborhood and school ethnic composition. However, initial model analyses, which included the latent variable by adolescent's biculturalism interaction, would not converge. Thus a stepwise approach in including parameters in the model was taken (Muthen & Muthen (1998-2012). First, the loadings of factor indicators were examined. The results showed that parents' biculturalism was not significantly loading on to the latent construct ($p = .57$), signifying that parents' biculturalism does not represent the same construct as ethnic composition. Thus, parents' biculturalism variable was dropped as an indicator of the latent variable of diversity across settings. Furthermore, the latent by observed variable interaction lead to model non convergence. Consequently, a composite variable of the neighborhood and ethnic composition variable was created instead, which represents the degree of biculturalism of the environment across settings.

Since adolescents were clustered within neighborhoods and schools, potential data non-independency might exist. To account for both nonnormality of the data and clustering effects in the sample, the "COMPLEX" command in Mplus was again used. For this model, neighborhood tracts were used as the clustering variable since previous analyses revealed that neighborhood ethnic composition had more significant effects than school ethnic composition. Furthermore, neighborhood tracts may be more likely to represent the ethnic composition of the schools than vice versa.

The results of this analyses showed that this model fit the data well, $\chi^2 (6) = 8.37$, $p = .21$, CFI = .99, RMSEA = .04 (.00, .09), SRMR = .03. However, the ethnic

composition across neighborhoods and schools had no effects on mental health outcomes (Figure 7a). Again, biculturalism significantly predicted anxiety symptoms.

Gender. Because the chi-square value obtained from MLR cannot be used for chi-square difference test in the traditional way, the Satorra-Bentler scaled chi-square difference test was used. The unconstrained model fit the data well, $\chi^2(12) = 15.26, p = .23$, CFI = .99, RMSEA = .04 (.00, .10), and SRMR = .04. However, the model constraining the path coefficients to be equal for males and did not fit the data well, and the Satorra-Bentler scaled chi-square difference test between the constrained and unconstrained model was significant, $\Delta\chi^2(\Delta df = 12) = 177.72, p < .001$. Thus, there was moderation by gender. The results revealed marked differences between males and females. For males, there were significant main effects of biculturalism on anxiety. The interaction of biculturalism and ethnic composition across settings was also marginal ($p = .07$). Additionally, substance abuse at Wave 3 significantly predicted substance abuse at wave 4. For females, there was a significant interaction effect of biculturalism and ethnic composition across settings on depression, while this was not true for males. To probe whether the interaction effects were significantly different for males and females, the MODEL CONSTRAINT command was used. The results showed that the interaction effects for depression was significantly ($p < .001$) different for males and females, and the interaction effect on anxiety was marginally significant ($p = .07$). Because many paths varied across males and females, a partially constrained model was not particularly useful. Thus, the models are presented separately for females (Figure 7b) and males (Figure 7c) separately.

To probe the significant interaction effect on depression for females, all independent variables and covariates were centered and simple slopes were calculated at the mean (centered), one standard deviation above, and one standard deviation below the mean of ethnic composition across schools and neighborhoods. The results showed that the simple slopes were not significant in environments where there was high (81.72%) or mean (59.25) levels percentage of Hispanics. However, the simple slopes were significant in environments that had low (36.78%) level percentage of Hispanics. In these environments, biculturalism had a significant main effect on depression for females (Figure 7d). That is, in environments that are more monocultural European American, greater biculturalism predicted fewer depression symptoms.

Nativity. The moderating effect of nativity could not be examined because of model nonidentification due to problems estimating the regression coefficient of substance abuse at Wave 3 predicting substance abuse at Wave 4 for those born in Mexico.

APPENDIX F
DESCRIPTIVE STATISTICS BY GENDER

Table 5

Means, Standard Deviations, Minimum, Maximum Values for Variables of Interest by gender. Numbers reported are for males/females.

	Mean	SD	Minimum	Maximum
Biculturalism (Wave 3)				
Overall Biculturalism	3.60/3.61	.52/.56	2.41/2.41	4.96/4.93
Bicultural Comfort	3.23/3.24	.99/.98	1.00/1.11	5.00/5.00
Bicultural Facility	3.69/3.65	.53/.57	2.33/2.33	5.00/5.00
Bicultural Advantages	3.89/3.92	.57/.52	1.11/2.67	5.00/5.00
Mental Health (Wave 4)				
Major Depression Symptoms	3.03/3.50	3.47/3.63	.00/.00	18.00/14.00
Anxiety Symptoms	5.30/6.67	5.53/6.10	.00/.00	34.00/27.00
Substance Abuse Symptoms	.50/.10	2.00/.52	.00/.00	20.00/5.00
Cultural Environment (Wave 3)				
Mother's Biculturalism Score	3.41/3.36	.68/.59	1.85/1.89	5.00/4.96
Father's Biculturalism Score	3.59/3.47	.62/.67	1.89/1.78	4.96/5.00
% European American in Schools	26.63/25.94	23.48/23.18	.00/.00	83.54/79.75
% Hispanics in Schools	59.98/60.40	26.24/26.32	9.56/11.22	93.40/93.40
% European American in Neighborhoods	32.98/31.20	22.62/21.18	2.49/3.83	85.81/88.91
% Hispanics in Neighborhoods	56.55/57.52	23.96/22.94	7.00/5.84	93.55/91.32
Economic Hardship (Wave 3)				
Mother's report of economic hardship	-.08/.08	3.35/3.31	-6.68/-6.39	8.15/8.91

APPENDIX G
NEIGHBORHOOD DANGER SCALE

Neighborhood Danger Scale

1. Your neighborhood is safe for children during the daytime.

2. It is safe in your neighborhood.

3. It is safe for your child to play outside your home.

1. Su vecindario es seguro para los niños durante el día.

2. Su vecindario es seguro.

3. Es seguro para su hijo(a) que juegue afuera de su casa.

Scoring:

1 = Not at all true

2 = A little true

3 = Somewhat true

4 = Mostly true

5 = Very true

All items were reverse coded.

APPENDIX H

NEIGHBORHOOD CRIMINAL ACTIVITIES SCALE

Neighborhood Criminal Activities

Think about the past year, and tell me how often each of the following happened in your neighborhood

1. violent crimes including stabbings, shootings, violent assaults
2. people taking others' wallets or purses (muggings)
3. people damage other people's property
4. people break into homes and cars to take things
5. people throw trash in the streets or break glass in the streets
6. gang fights
7. drug use and dealings in public
8. alcohol use in public
9. graffiti is put on buildings, fences, elsewhere
10. groups of people or kids hanging around the neighborhood who make you feel unsafe

Piense en el último año desde, y dígame qué tan seguido sucedió cada cosa en su vecindario.

1. Crímenes violentos, incluyendo puñaladas, balaseras, asaltos violentos
2. Gente llevándose carteras o bolsas de otros (asaltos)
3. Gente dañando la propiedad de otros
4. Gente que se mete a casas y a carros para llevarse cosas
5. Gente que tira basura en las calles o que quiebra vidrio en las calles
6. Pleitos de pandillas
7. Gente usando droga o vendiéndola en público
8. Gente tomando alcohol en público
9. El poner grafiti en edificios, carros, u otro lugar
10. Grupos de gente o niños en su vecindario que le dan a usted inseguridad

Scoring:

- 1 = Rarely or none of the time
- 2 = Some or a little of the time
- 3 = Occasionally or a moderate amount of the time
- 4 = A lot or all the time

APPENDIX I

CORRELATION TABLE OF NEIGHBORHOOD CHARACTERISTICS

Table 6

Correlation table of percentage of Hispanics in neighborhood with gender, neighborhood danger, criminal activity, and poverty.

	1	2	3	4
1. % Hispanics in Neighborhood	1			
2. Child's Gender	-.01	1		
3. Neighborhood Danger	.29***	-.14*	1	
4. Neighborhood Criminal Events	.23***	-.02	.50***	1
5. % of Families Below Poverty	.63***	-.02	.22***	.25***

Note. Child's gender was coded 1 = female, 2 = male; ⁺ $p = .06$, * $p < .05$, ** $p < .01$, *** $p < .001$.

APPENDIX J

GENDER DIFFERENCES IN NEIGHBORHOOD CHARACTERISTICS

Table 7

Means, standard deviations, and mean differences between males and females on neighborhood characteristics.

	Females		Males		<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD		
*Hispanics in Neighborhood	57.36	22.95	56.711	23.94	2.44	.81
Neighborhood Danger	2.38	.90	2.13	.87	2.49	.01
Neighborhood Criminal Events	.41	.51	.39	.51	.42	.67
% of Families Below Poverty	6.61	4.25	7.63	5.12	-1.89	.06