THE INFLUENCE OF SOCIOECONOMIC ADVERSITY, RACE, AND IMMIGRANT

GENERATION ON THE TRAJECTORIES OF AND PATHWAYS TO HEALTH

BEHAVIORS

by

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(Under the Direction of K. A. S. Wickrama)

ABSTRACT

The present dissertation addresses two research questions: 1) how does the intersection of race/ethnicity and immigrant generation associate with the heterogeneity in the developmental trajectories of health behaviors from adolescence into adulthood? and 2) how do the structural pathways that lead to substance use and obesogenic behaviors differentiate across the intersections of race/ethnicity and immigrant generation? The present studies used a sample of 20, 745 adolescents and their parents from the longitudinal Add Health dataset. The two studies used a latent growth mixture model paired with multinomial logistic regressions to observe the latent classes of trajectories of health behaviors and their associations with socioeconomic adversity, race/ethnicity, and immigrant generation, and a structural equation model with multiple group comparisons to observe differential structural pathways that lead to health behaviors in early adulthood. The findings suggest that the interaction of race and immigrant generation are associated with latent trajectory classes differentially, and also present with differential structural pathways from socioeconomic adversity to health behaviors through

parental support, perceived discrimination, and heritage language retention, with partial support

for the immigrant paradox. These results emphasize the need for preventive intervention

programs to address the parent-child relationship in preventing engagement with health

compromising behaviors for ethnic minority and immigrant youth.

INDEX WORDS: Latent growth mixture model; cumulative disadvantage; race; immigrant

generation; life course; stress process; intersectionality; obesogenic behaviors; substance

use; parental support; perceived discrimination; heritage language retention

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DEDICATION

I dedicate this dissertation to my father and mother, who encouraged and fought with me every step of the way. I wrote this dissertation with a full heart and stomach thanks to the food and love that they provided. Mom and Dad, I know you are proud of me; thank you. I hope you are also proud of yourselves for coming to America, and despite what little you had, still being able to make me, Oppa, and Grace feel like we were never wanting. Thank you for teaching me about our family's values, culture, and language that I will proudly teach my children one day.

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CHAPTER 1: GENERAL INTRODUCTION

General Introduction

Currently in the United States, one in eight residents is foreign-born; that is, 1 in 8 U. S. residents emigrated from another country to live in the United States. Though most immigrants in the U. S. are from Latin American and Asian countries, the African-born population in the U.S. has doubled in the past decade, indicating a rapidly growing portion of the foreign-born population in the U. S. (U. S. Census, 2014). Further, an additional 11 percent (i.e., 1 in 5) are considered second-generation immigrant adults, or U. S. born natives who have at least one foreign-born parent. First and second-generation immigrant youth in the United States constitute approximately 20% of children under the age of 18 (Suarez-Orozco & Todorova, 2003). This shifting demographic landscape of the United States has prompted significant progress in studying the health of the immigrant population; however, there is much research left to do to comprehensively understand the development of health behaviors of immigrant youth in the United States (Mather, 2009).

Disparities in health, in both behaviors and outcomes, have been of interest to researchers for many decades. Notably, researchers have long since documented the strong inverse and graded association between socioeconomic status (SES) and health throughout the life course (Adler et al., 1994; Antonovsky, 1967; Braveman & Barclay, 2009; Cohen, Janicki-Deverts, Chen, Matthews, 2010). In particular, socioeconomic adversity (i.e., low SES, poverty) experienced during early childhood has been shown to have a long term detrimental impact on later adolescent and adult health (Cohen et al., 2010; Conroy, Sandel, & Zuckerman, 2010;

Hanson & Chen, 2007; Taylor, Way, & Seeman, 2011). This is especially concerning given that

21.8% of children living in the United States live in poverty (DeNavas-Walt, Proctor, & Smith,

2012). Recent studies have examined not only how health behaviors grow over time (e.g., latent

growth curves; Oshri, Schwartz, Unger, Kwon, Des Rosiers, Baezconde-Garbanati, et al., 2014),

but also the heterogeneity of these developmental trajectories as 'classes' (e.g., latent trajectory

class analyses; Wickrama, Mancini, Kwag, & Kwon, 2013). Such methodologies have enabled

practitioners to better understand how socioeconomic disadvantage and other contextual factors

may precipitate a health compromising behavioral trajectory.

The impact of early adversity on health must be understood relative to race and ethnicity,

as well as to immigrant generational status, as a disproportionate percentage of children living in

poverty are often ethnic minority youth and immigrant youth. Approximately 31% of foreign-

born children under the age of 18 live under the poverty level, which contrasts with the 21% of

native-born children living under the poverty level (Grieco et al., 2012). The majority of foreign-

born (i.e., first-generation) children living in poverty are of Hispanic descent (Grieco et al.,

2012), whereas the majority of native-born children living in poverty are either of Hispanic or

African American ethnicity (Kids Count, 2015). Thus, examining the impact of early adversity

on adolescent and adult health requires the consideration of immigrant generation as well as

race/ethnicity. While recent studies have examined how race/ethnicity or immigrant generation

are associated with the aforementioned trajectories of health behaviors, few have examined how

these intersections are associated.

Health disparities based on socioeconomic status, immigrant generation, and

race/ethnicity have grown since 1999 (i.e., Perreira & Ornelas, 2011; Singh & Hiatt, 2006;

Singh, Siahpush, & Kogan, 2010). Even when accounting for the influence of socioeconomic

disadvantage, studies have shown that a longer duration of residing in the U. S. is associated with increased rates of obesity, increased health risk behaviors (i.e., smoking), and lower rates of physical activity (Oza-Frank & Cunningham, 2010; Perreira & Ornelas, 2011; Ra, Cho & Hummer, 2013; Singh et al., 2011). Further, the increase in obesity rates, health risk behaviors, and reduction in health promoting behaviors has been observed in later generations of immigrants (Perreira & Ornelas, 2011; Ra et al., 2013; Singh et al., 2011). This decline across generation in healthy behaviors and increase in poor health is reflective of the immigrant paradox, wherein which first generation immigrants in comparison to second generation and on immigrants (i.e., foreign-born individuals in comparison to native-born individuals) show healthier outcomes (i.e., lower rates of obesity; lower rates of psychological distress) (Garcia-Coll & Marks, 2012). This growing body of research around health disparities between race/ethnic groups and immigrant generations indicate how urgent it is to understand the etiology of these health disparities.

Although many studies have documented common antecedents and correlates of disparities in health behaviors, few have examined the processes and typologies of health behaviors with immigrant generation, class, gender, and race/ethnicity across a nationally representative longitudinal sample of adolescents and their parents. As health behaviors beginning in adolescence are likely to be maintained throughout adulthood (Umberson, Crosnoe, & Reczek, 2010), understanding how the developmental process changes in tandem through adolescence is essential to reducing disparities in health outcomes across racial or ethnic groups of persons. The impact of early childhood adversity on later health may operate through multiple mechanisms (i.e., cumulative disadvantage) on multiple levels of influence (i.e., familial, community, individual), through differing psycho-social and physiological mediators (e.g.,

depression, stress dysregulation). These pathways must be understood relative to individual demographic identifiers, which are strong indicators of the social climate that one develops within.

To this end, borrowing from several theories provides the foundation for understanding the development of health risk behaviors in immigrant minority adolescents. Both a life course perspective (Elder, 1998) and a stress process perspective (Pearlin et al., 2005) suggest that an accumulation of early life stressors, such as perceived neighborhood danger and family socioeconomic disadvantages, in conjunction with stressful transitions, may contribute to later life health disadvantages through multiple mechanisms. Further, applying intersectional analyses addresses the heterogeneity of social climates of ethnic minority immigrant youth. This theoretical combination provides the common underlying foundation for the present dissertation.

As prior studies have noted meaningful intersecting influences of race, gender, class, and immigrant generation on the links between early adversity and later health, applying an intersectional understanding to the diversity of experiences within a nationally representative sample allows for the examination of these pathways across individual social locations, or the intersection of one's multiple social identifiers (i.e., race and immigrant generation) (Crenshaw, 1989). An intersectional lens considers multiple social disadvantages resulting from multiple social identity group memberships over which multiple systems of oppression and prejudice operate (Hankivsky, 2014). Given the empirical evidence for health disparities between racial/ethnic groups and immigrant generation, observing how the entangled and overlapping disadvantages of belonging to these social categories takes into consideration the diverse social experiences of members of these social categories, and also sets the methodological foundation for multiple group comparisons across the life course.

Overview of Studies

To further the research on the development of health behaviors of ethnic minority immigrant youth, two studies are proposed in this dissertation to answer two central questions: 1) how does the intersection of race/ethnicity and immigrant generation associate with the heterogeneity in developmental trajectories of substance use behaviors and obesogenic behaviors, and 2) how might the pathways that lead to substance use and obesogenic behaviors (e.g., socioeconomic adversity leading to obesogenic behaviors) shift across the intersection of race/ethnicity and immigrant generation.

Study 1. The first study attends to the need for research on the heterogeneity of trajectories of health compromising behaviors of foreign-origin youth. Prior literature has noted ethnic/racial and immigrant generational differences in rates of participation in health compromising behaviors have been noted in adolescence (i.e., Atyaclar et al., 1999; Marti et al., 2010; Johnston et al., 2011). Studies examining rates of substance use have found conceptually similar classes of trajectories in representative samples of adolescents with an early onset and heavy using, a normative using, a late onset using, and a late onset and heavy using class (Tucker et al., 2005). However, prior studies have not fully addressed how intersections of race/ethnicity and immigrant generation are associated across heterogeneous and multidimensional latent classes of health behavior trajectories.

The importance of understanding how the heterogeneity of latent trajectories of health behaviors lies in the power of such techniques to potentially identify risky developmental stages, sub-populations, or antecedents for informing prevention or intervention programs. Thus, investigating race x immigrant generation associations with heterogeneous classes of health trajectories presents an opportunity to deepen our understanding how specific social contexts

(e.g., early socioeconomic adversity) may be associated with riskier or healthier trajectories of substance use behaviors or obesogenic behaviors. Further, examining such latent trajectory classes of multiple dimensions of health can effectively account for the effect of numerous social contexts on numerous health behaviors (i.e., Wickrama, Mancini, Kwag, & Kwon, 2012). Whereas multidimensional substance use trajectories have been found to grow in association over time (i.e., Marti et al., 2010), co-analyses of multiple dimensions of health (i.e., substance use and sedentary lifestyles) have not been studied concurrently and within the same sample population. Thus, the goal of the first study is to investigate how race x immigrant generation may differentially associate with latent trajectory classes of multiple dimensions of health behaviors. Using a growth mixture modeling approach will provide a thorough examination of the multidimensional latent classes of trajectories health behaviors and allow for a richer understanding of how race/ethnicity and immigrant generation are associated with the observed developmental growth. Thus, study 1 will use advanced statistical techniques to examine how distinct social groups, as determined by the intersecting constructs of race/ethnicity and immigrant generation, associate with classes of adolescent health behavior trajectories.

Study 2. The second study builds on the first study by examining the structural paths that contribute to engaging in health behaviors across race x immigrant generation. Study 2 draws from the life course perspective and the stress process perspective as theoretical guideposts for the set of structural paths examined. Further, applying an intersection lens imports that examining these paths across race x immigrant generation may uncover insights that contribute to prior literature on the health behavior development of ethnic minority immigrant youth.

Early socioeconomic adversity has long since been documented as a predictor of maladaptive health (Adler, Boyce, Chesney, Cohen, Folkman, Kahn, & Syme, 1994). This early

adversity can beget a process by which stresses accumulate via multiple domains of life (e.g., harsh parenting, poor cardiovascular health; Conger, Ge, Elder, Lorenz, & Simons, 1994; Wickrama, Conger, & Abraham, 2005), and also creates a context that continually leaves one increasingly vulnerable to external stressors. For example, Beiser and colleagues (2002) reported that immigrant families that experience socioeconomic adversity may be more vulnerable to the effects of material deprivation than non-immigrant families, even when accounting for multiple accumulating stressors (e.g., single-parent status). Thus, the effect of socioeconomic adversity on health outcomes operates via increased exposure and increased vulnerability to stressors.

Specific psychosocial factors have been found to be meaningful mediators of the effect of early adversity on health in the period of adolescence, in particular for ethnic minority immigrant youth—specific to this study, parental support and perceived discrimination. According to the family stress model, the impact of socioeconomic adversity on children's development operates through parenting (i.e., closeness and involvement) such that socioeconomic hardships result in reduced parental closeness or involvement, which contributes to maladjustments for the child (Conger, Ge, Elder, Lorenz, & Simons, 1994). This decrease in parental support has been linked to health risk behaviors as well (Kwon & Wickrama, 2014) – a mechanism which may be especially harmful for ethnic minority immigrant adolescents as research has shown that parental support may be a specifically relevant component of immigrant adolescents' social support networks (Cho & Haslam, 2010; Thomas & Choi, 2006). Perceptions of discrimination and prejudice may also act as a mediating mechanism, particularly for ethnic minority and immigrant youth. Discriminatory experiences present as a particularly potent source of stress that is tied to health risk behaviors (i.e., Pearlin et al., 2005; Thoits, 2010; Williams & Mohammed, 2009), a factor which recent research suggests is mitigated via parental support (Zapolski, Fisher, Hsu, &

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Barnes, 2016). Thus, it is expected that both parental support and perceived discrimination may influence health behaviors in opposing directions, and that these two mediating constructs likely influence each other through this process. Finally, heritage language retention, which has been shown to operate as a salient aspect of immigrant youth's cultural heritage or cultural resource, has been reported as a protective factor against health risk behaviors in adolescence (Schwartz et al., 2011). Thus, heritage language retention may operate as a unique buffer for ethnic minority immigrant youth.

Using structural equation modeling with equality constraint tests to examine multiple group comparisons, the second study examines the direct and indirect pathways to maladaptive health behaviors from early socioeconomic adversity through and with meaningful constructs for ethnic minority and immigrant youth: parental support, perceived discrimination, and heritage language retention. Further, this study examines these structural pathways across the race x immigrant generation intersections to address how the differing social contexts of the heterogeneity of ethnic minority immigrant youth influence the structural paths being tested.

CHAPTER 2: Study 1

Multidimensional Latent Trajectory Classes of Health Behaviors and the Role of Early

Socioeconomic Adversity, Race, and Immigrant Generation

Introduction

The inverse graded association between socioeconomic status (SES) and health has been documented consistently and repeatedly in the United States since the 1960s (Adler et al., 1994; Antonovsky, 1967; Braverman & Barclay, 2009; Cohen, Janicki-Deverts, Chen, Matthews, 2010). More recently, research has shown that experiencing socioeconomic adversity via material and psychosocial resource deprivation in early childhood has severe and long-lasting consequences for later adolescent and adult health (Cohen et al., 2010; Conroy, Sandel, & Zuckerman, 2010; Hanson & Chen, 2007; Taylor, Way, & Seeman, 2011). Currently, more than 1 in 5 children between infancy and 17 years of age live in poverty in the United States (Federal Interagency Forum on Child and Family Statistics, 2016). Less than 1 in 5 of these children are White, compared to the 2 in 5 children who are African American, and more than 1 in 5 children who are foreign-born children (Grieco, 2012). Unpacking these health disparities within the intersection of race and immigrant status is essential to understanding how living in poverty at an early age translates to poorer health in adolescence and adulthood.

Further, research on health disparities across immigrant generations have shown that length of residency is associated with poorer health outcomes (e.g., increased rates of obesity, increased smoking, and lower rates of physical activity), even after accounting for the effect of socioeconomic adversity – suggesting the import of the effects of both the length of stay in the

US on these outcomes as well as the generation status of an immigrant on their health outcomes (Oza-Frank & Cunningham, 2010; Perreira & Ornelas, 2011; Ra, Cho & Hummer, 2013; Singh et al., 2011; Singh et al., 2006; Singh, et al., 2010). This inverse association between immigrant generation and healthy behaviors has been associated with the immigrant paradox, the phenomenon by which first generation immigrants show healthier or more optimal outcomes (e.g., lower rates of obesity, lower rates of psychological distress, infant developmental outcomes) when compared to their second generation or native-born counterparts (Garcia-Coll & Marks, 2012; Marks. Ejesi, Garcia-Coll, 2014).

Recent studies have examined immigrant-status related differentials in health behaviors while considering race/ethnicity. Singh and colleagues (2011) found the immigrant paradox to be upheld when examining differences in rates of obesity across foreign-born and native-born individuals (i.e., first vs. second and on generation immigrants), though the rates of obesity differed notably across ethnicities (i.e., 2.3% of Chinese immigrants compared to over 30% for Hispanic immigrants). Further, minority race/ethnicity children of immigrants show compounding risk for obesity-related illnesses when living in rural vs. non-rural areas (Wickrama, Elder, Jr., & Abraham, 2007). When examining rates of physical activity, a strong antecedent of obesity, Afable-Munsuz and colleagues (2010) found evidence for the immigrant paradox for Chinese immigrants, but not for Mexican immigrants. Whereas leisure time physical activity declined for later generation Chinese immigrants, later immigrant generation predicted increased leisure time physical activity for Mexican immigrants. Though the literature thoroughly examining health differentials across immigrant generation with respect to race/ethnicity are fewer, this prior literature supports that even within an immigrant generation, race/ethnicity plays a role in understanding health behaviors.

Studying the development of health behaviors in adolescence presents an important step in unraveling the etiologies of health disparities. Health behaviors learned in adolescence are likely to maintained throughout adulthood (Umberson et al., 2010; Wickrama, Conger, Wallace, & Elder, Jr., 1999); thus, understanding the heterogeneity in these developmental trajectories can elucidate what levers to push or pull in working towards reducing disparities in health outcomes in adulthood across race/ethnic groups. As such, the study of health behavior trajectories in adolescence must be contextualized by individual social characteristics (e.g., race, class, immigrant generation) as these demographic factors together can indicate the social context of development for an individual.

Both a life course perspective (Elder, 1998) and a stress process perspective (Pearlin et al., 2005) suggest that an accumulation of early life stressors, such as perceived neighborhood danger and family socioeconomic disadvantages, in conjunction with stressful transitions, may contribute to later life health disadvantages through multiple cumulative mechanisms. Applying an intersectional lens (Crenshaw, 1989) can further addresses the heterogeneity of the different social climates of ethnic minority immigrant youth.

A Life Course and Stress Process Perspective

Researchers call for a longitudinal and multicultural understanding of the unfolding of the impact of early disadvantage on later health (Adler & Stewart 2010; Williams et al., 2010; Hankivsky, 2014). To that end, blending complementary components of the life course perspective with components of the stress process perspective and viewed through an intersectional lens provides a comprehensive theoretical foundation for such research. The life-course framework (Elder, Johnson, & Crosnoe, 2003) provides the broad structure in which we can understand the cumulative mechanisms through which early disadvantages impact health

through the life course. Life-course theory emphasizes the ecology of life-long development. Life stages are understood in relation to each other and as nested within a social context (Conroy et al., 2010; Elder, 1998; Elder et al., 2003). Exposure to socioeconomic difficulties, such as material or resource deprivation, can activate an accumulation of disadvantage across a person's entire life course (Cable, 2014). For example, the proliferation of stress related to succeeding life events can be linked by socioeconomic lack according to the stress process perspective (Pearlin, 2005), which has negative physical and mental ramifications for an individual, such as chronically dysregulated physiological responses to stress or detrimental stress coping behaviors (Evans, 2004; Evans & Kim 2007; Shonkoff, Boyce, & McEwen, 2009; Taylor et al., 2011). In addition, the life-course perspective theorizes that these accumulating stresses, or "cumulative disadvantages," impact succeeding developmental stages (O'Rand, 2009). For example, African American young adults who experienced more stressful life events across their preceding life stages reported higher levels of negative emotionality, which, in turn, was predictive of more deviant social affiliations, which ultimately were predictive of increased health risk behaviors, such as sexual activity under the influence of substances, increased risky alcohol use, and increased cannabis use (Brody, Chen, & Kogan, 2012). Recent research suggests that these accumulating stressors may further precede an increased vulnerability to socioeconomic adversity for Black youth specifically in young adulthood (Wickrama, Bae, & O'Neal, 2016).

The accumulation of disadvantages initiated by socioeconomic disadvantage is multifaceted, affecting multiple life domains, from academic achievement, to stressful psychosocial family contexts, and structural risks (O'Rand, 2009; Wickrama, Kwon, Oshri, & Lee, 2014). Living in poverty can delay specific academic developments of a child, which may predict lower levels of socioeconomic attainment, and relatedly, poorer health, in adulthood

(Leventhal & Brooks-Gunn, 2000; Turrell et al., 2002). This stressful environment may manifest as increased exposure to the structural risks associated with living in poorer communities, such as toxins, violence, and a less language-rich environment (Conroy et al., 2010; Evans & Kantrowitz, 2002). Low family SES, specifically family economic conditions, has also been linked with harsh parenting and increased child externalizing problems (Scaramella, Neppl, Ontai, & Conger, 2008). These accumulated disadvantages also weigh heavily on an individual's propensity, or on an individual's vulnerability, to health compromising or health promoting behaviors, ultimately contributing to one's health in adulthood.

Empirical studies over the past several decades have consistently found that adversities experienced in early life specifically have life-long consequences on health. Key characteristics of such early adversities include, but are not limited to, stressful early contexts and transitions, socioeconomic disadvantages, and minority group status (Evans & Kim, 2010; 2012; 2013; Evans, Li, & Whipple, 2013; Williams et al., 2010). Evans and Kim (2010; 2012; 2013) have shown how socioeconomic disadvantages in early life increases exposures to structural stressors (e.g., environmental quality, adverse interpersonal relationships), which disrupts and dysregulates internal psychological processes that equip a developing child to cope with their contexts (e.g., self-regulation), and leads to greater allostatic load in adolescence. Ultimately, these increased exposures, dysregulated self-processes, and heightened allostatic load have adverse effects on health in adolescence and adulthood. Studies have shown socioeconomic disadvantages to associate with health compromising behaviors in adolescence, such as sedentary behaviors and smoking, as well as poor health outcomes adulthood, such as poor cardiovascular/metabolic health and higher counts of physical illnesses (Cohen, Janicki-Deverts,

Chen, & Matthews, 2010; Hanson & Chen, 2007; Wickrama, Conger, Wallace & Elder, 1999; Wickrama, Lee, O'Neal, & Kwon, 2015; Wickrama, O'Neal, & Lee, 2013; 2016).

Importantly, the influence of early childhood adversity on sub-optimal developmental outcomes in adulthood has been found to be mediated by more proximal adverse experiences in adolescence (Hazel, Hammen, Brennan, & Najman, 2008). That is, the impact of early childhood adversity on adult outcomes can operate indirectly through adversities or stresses experienced in early adolescence. Furthermore, adversities experienced in adolescence have been found to be linked to greater allostatic load, the physiological manifestation of the cumulative disadvantages, in adulthood independent of adversities experienced in childhood (Gustafsson, Janlert, Theorell, Westerlund, & Hammarstrom, 2012). Finally, prior studies have consistently found early adversities measured in early to mid-adolescence to negatively impact health outcomes, such as body mass index, cardiovascular/ metabolic health, physical disease counts, as well as depressive symptoms (Kwon & Wickrama, 2014; Wickrama, Kwon, Oshri & Lee, 2014; Wickrama, Lee, O'Neal, & Kwon, 2015; Wickrama, O'Neal, & Lee, 2013; 2016). Given the importance of both early and proximal adverse life experiences on later health, as well as prior research that documents the impact of adversities experienced in early adolescence on health, the present study means 'early adversity' to reference adversities experienced in early adolescence.

Adolescence presents as a particularly salient starting point to study how health and health behaviors develop as the health behaviors that develop in adolescence have been consistently linked to the same behaviors in later life (i.e., smoking, alcohol consumption; Latendresse, Rose, Viken, Pulkkinen et al., 2008; Paavola, Vartiainen, & Haukkala, 2004). In addition, Hoss, Chen, and Yi (2014) found that the greater number of substances used in early adolescence was more strongly predictive of substance use problems in early adulthood,

suggesting that greater health compromising behaviors developed in adolescence likely leads to poorer health outcomes in adulthood. This consistency from adolescence into adulthood emphasizes that the behaviors learned in adolescence set a precedence for health habits that extend throughout the life course, and identify adolescence as a key developmental stage to prevent the development of health compromising behaviors (Lohaus, Vierhaus, & Ball, 2009; Maggs, Schulenberg, & Hurrelmann, 1997; Raposa, Bower, Hammen, Najman, & Brennan, 2014).

The Salience of Intersectionality

As prior studies have noted meaningful intersecting influences of race, gender, class, and immigrant generation on the links between early adversity and later health, applying an intersectional understanding to the diversity of experiences within a nationally representative sample allows for the examination of these pathways across individual social locations, or the intersection of one's multiple social identifiers (i.e., race and immigrant generation) (Crenshaw, 1989). An intersectional lens considers multiple social disadvantages resulting from multiple social identity group memberships over which multiple systems of oppression and prejudice operate (Hankivsky, 2014), similar to the concept of multiple risk exposures, which suggests that experiencing multiple and concurrent risk factors (i.e., race/ethnicity, class) places an individual at greater risk of poorer health – a likely mechanism for the documented SES-health gradient (Evans & Kim, 2010). Given the empirical evidence for health disparities associated with race and immigrant status, examining how the entangled and overlapping disadvantages of belonging to these social categories not only takes into consideration the diverse social experiences of members of these social categories, but allows for multiple group comparisons across the life

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course. Methodologically, this can be explained by multiple interactions, or an inter-categorical approach (Hankivsky & Christofferson, 2008).

The racially and ethnically informed social contexts within which an immigrated individual develops alters later health outcomes, as evidenced by health differentials found across race and immigrant generation (Dunn & Dick, 2000; Glick, 2010). The study of the sources health disparities is often framed within the health determinants approach (i.e., social determinants of health; Marmot, 2005). This approach identifies specific cultural and behavioral constructs that are strongly linked to disparate health outcomes (i.e., early childhood adversity, race, gender, and social hierarchy; Wilkins & Marmot, 2003), but does not adequately address the interactions of the social determinants of health. The interactions of said social determinants of health (i.e., race, immigrant generation, class) have meaningful implications for individuals who identify with multiple types of social determinants of health (Hankivsky & Christoffersen, 2008).

The paradigm of intersectionality builds well upon a health determinants framework. Intersectionality states that to understand what leads to a specific outcome, multiple aspects of one's social identify must be considered; one social identifier (i.e., race, class, gender) does not adequately encompasses the experiences of an individual (Crenshaw, 1989). Rather, it is the multiple intersections of these social identifiers that determine one's 'social location' (Crenshaw, 1989). Take the case of children living in poverty. Children of immigrants are nearly 10% more likely to be living in poverty compared to the children of all races and nativity statuses (DeNavas-Walt et al., 2012; Kids Count, 2015). Furthermore, the majority of foreign origin children living in poverty also identify as part of an ethnic minority group (i.e., Hispanic or African American) (Kids Count, 2015; Grieco et al., 2012), indicating a significant intersection

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for study on the impact of early adversity on later health. Research that examines the intersection of nativity and race/ethnicity as it relates to childhood socioeconomic disadvantage on health behaviors considers the mutually created and interrelated categories of race and immigrant generation, and allows for clearer translation to practice in policy recommendations and preventative intervention programming (Mullings & Schulz, 2006).

While early socioeconomic adversity has been shown to have adverse outcomes for African Americans, Hispanic, and Asian American groups in the United States (Barrera et al., 2006; Benner & Kim, 2010; Conger et al., 2002; Chartier, Walker, & Naimark, 2007), consideration of these racial groups in conjunction with immigrant generation groups would shed further light on how such multiple social determinants impact health differentially (Thoits, 2010; Williams, Mohammed, Leavell, and Collins, 2010). For example, immigrant children and ethnic minority children are more likely to live and remain living in impoverished environments (i.e., social immobility; Beiser, Hou, Hyman, & Tousignant, 2002; Conger et al., 2002; Kids Count, 2015; Grieco et al., 2012) when compared to native-born majority youth in the Western industrialized countries. This likelihood of social immobility may then be compounded for immigrant children who are also ethnic minority children, which is approximately 80% when considering only foreign-born youth (i.e., first-generation immigrants, v.s., first and second generation immigrants; Colby & Ortman, 2015). That is, the early socioeconomic disadvantages experienced by immigrant families and ethnic minority families are possibly compounded for ethnic minority immigrant families, which is further compounded as developmental stages pass, as the socioeconomic adversities are likely to persist due to disproportionate likelihoods of social immobility in these populations.

Intersectionality calls for treating the social identities of ethnic minority immigrant children as interactive effects (e.g., first-generation immigrant X Asian), and concepts from life course theory suggest that the lived experiences of ethnic minority immigrant children also involve an interaction of increased vulnerabilities and increased exposures (Kuh et al., 2003). Specific to ethnic minority immigrant children, economic insecurity, social immobility, barriers to education, threat of deportation to family members, and perceptions of marginalization and discrimination are significant indicators of early adversity related to the experience of acculturation and enculturation (Andoff et al., 2011). Further, immigrating to a new country during significant developmental periods adds to the burden of stress for ethnic minority immigrant youth (Rutter, 1996). Beiser and colleagues (2002) found that some indicators of adversity studied in non-immigrant samples, such as single-parent status, did not account for additional variance in the path from early adversity to mental health outcomes, suggesting that immigrant families may show an increased vulnerability or susceptibility to the negative influence of material deprivation related to socioeconomic disadvantage may wield than non-immigrant families. The greater likelihood of immigrant families remaining consistently poor suggests that these 'risky' families (Repetti, Taylor, & Seeman, 2002) also face more financial hardships, a higher likelihood of poor parental mental health (potentially leading to decreases in family cohesion and increases in poor parenting), and greater material deprivation (Beiser et al., 2002; Devine, Plukett, & Wright, 1992); that is, children of immigrants have increased exposures to stressful disadvantages at greater rates than non-immigrant families. Prior literature has shown that minority children face increased exposures as well, creating multiplied increased exposures; Wickrama and colleagues (2016) found that black youth evidenced increased exposure to socioeconomic adversity, which in turn manifested as additive influences on disease risk in

young adulthood. The concurrency of increased exposures to socioeconomic disadvantages and increased vulnerability to the health-related repercussions of socioeconomic stressors of ethnic minority immigrant children represents a significant interactive lived experience of ethnic minority immigrant children. This distinction is relevant in that such potentiation suggests that the co-occurring nature of these increased exposures and increased vulnerabilities for ethnic minority immigrant children weigh heavier than for individuals who experience both exposures and vulnerabilities, but independently. Therefore, the consequences of early adversity for ethnic minority immigrant youth, when compared to their native counterparts, may have compounding mechanisms that are acting on the development of their health behaviors in adolescence.

Development of Health Behaviors in Ethnic Minority Immigrant Youth

Understanding the development of health behaviors in ethnic minority immigrant youth requires understanding both the temporal development and variance, or heterogeneity, of health behaviors from adolescence into early adulthood in conjunction with the time-invariant interactive effects of race/ethnicity and immigrant generation. Given theoretical frameworks that identify multiple subgroups of patterned health behaviors (i.e., at risk, low risk), the study of the development of health behaviors must be person-centered, thereby considering the relationships between these sub-groups, rather than examining the growth of a specific variable as entirely representative of a sample population (i.e., a variable-centered approach; Burchinal, Nelson, & Poe, 2006; Jung & Wickrama, 2008). Such a person-centered analysis also allows for the selection of these sub-groups in advance, which is ideal for examining relationships with time-invariant covariates (e.g., race/ethnicity) across the sub-groups. Understanding the health behaviors of immigrants entering early adulthood through a person-centered approach provides salient information on the current demographic patterns of health behaviors of immigrants

entering young adulthood for practitioners in considering vulnerable vs. resilient youth. Thus, growth modeling, specifically a latent growth mixture model (LGMM; Preacher, Wichman, MacCallum, & Briggs, 2008), is an optimal statistical technique for this study.

Examining multiple dimensions of health behavior classes may also illustrate the parallel changes over time across a variety of health behaviors for a number of specified latent classes. Studies have highlighted significant differences in health behaviors across immigrant generation and race/ethnicity for levels of physical activity (Afable-Munsuz, Ponce, Rodriguez, & Perez-Stable, 2010) and substance use (Taylor, Beech, & Cummings, 1997). However, no studies thus far have examined differences across race/ethnicity and immigrant generation of multiple health compromising behaviors (Williams et al., 2010). Investigating multiple dimensions of latent classes of health behavior trajectories would essentially investigate how trajectories of health behaviors across multiple domains may be conjoined.

While the intersection of immigrant generational status and race/ethnicity has been considered in prior large-scale studies (i.e., Singh & Siahpush, 2002), to date, no studies have considered how these social categories co-vary with distinct developmental trajectories of health behaviors. Substance use in adolescence has been studied as latent growth curves or as latent classes, though other domains of health behaviors have only recently been examined using growth modeling techniques. Further, multidimensional latent classes of trajectories have only recently been examined. For example, Mustanski and colleagues (2013) found four distinct classes of health risk behavior trajectories: a normative class, a low risk class, an increasingly risky class (a class specifically characterized by risky sex), and an early experimenting class. This 4-class solution has been found in prior literature examining only substance use trajectories across multiple substances (Marti, Stice, & Springer, 2010; Tucker et al., 2005), with a

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normative using, late onset using, late onset and heavy using, and an early onset heavy using

class. Studies have further supported that the transition from adolescence to early adulthood is

marked as a sensitive period during which health risk behaviors (i.e., substance use) may curb or

increase significantly (Tucker et al., 2005). By comparison, latent classes of physical activity

trajectories are the most commonly examined health promoting behavior, though these studies

are recent and few, with mixed conclusions. While some studies have found a 4-class solution to

optimally fit their sample (e.g., Barnett, Gauvin, Craig, Katzmarzyk, 2008; Dumith et al., 2012),

others have found a 5 class solution to be most representative of latent classes of trajectories of

physical activity (Audrain-McGovern et al., 2012). Thus, the number of classes to be selected for

latent classes of multiple health behavior trajectories would benefit from additional exploratory

research that would observe how multiple health behaviors act together (e.g., substance use,

sedentary activity, physical activity).

Race/Ethnicity and health behaviors.

Prior literature has noted the gradation of health outcomes across minority ethnic groups

with reference to the majority Caucasian ethnic group in the United States (Williams et al.,

2010). While a significant portion of this gradation is linked to socioeconomic and social

disadvantages, the links between earlier health behaviors (i.e., smoking) and later health

outcomes (i.e., lung cancer) has also been linked to racial differences. For example, African

Americans are at an elevated risk of lung cancer (Haiman et al., 2006), less physically active

when compared to their Caucasian counterparts through high school and college (Taylor, Beech,

& Cummings, 1997), and report higher incidences of cardiovascular, metabolic (i.e., obesity

related), and cancer-related illnesses (Williams et al., 2010). By comparison, Asian-origin

individuals are less likely to be obese (Williams et al., 2010). Prevalence rates for childhood

obesity show significant racial differences as well: Black children and Hispanic children showed the highest prevalence rates for obesity in childhood (Capri et al., 2008). While these racial differences are for specific developmental stages, longitudinal studies also indicate racial/ethnic differences in BMI trajectories for Asian and African American youth (Bae, Wickrama, & O'Neal 2014). Therefore, it is expected that race/ethnicity will be associated with differences in the developmental trajectories of obesity-related health behaviors.

Specific to substance use behaviors in adolescence, prior studies indicate that ethnic minority adolescents are significantly more likely than their Caucasian peers to have ever tried alcohol and may be more likely to continue consuming alcohol in late adolescence (Johnston, O'Malley, Bachman, & Schulenberg, 2011; Malone, Northrup, Masyn, Lamis, & Lamot, 2011). However, more recent studies suggest that these differences found in mean comparisons across ethnic groups likely do not manifest as differential likelihoods of riskier health behavior trajectories based on race or ethnicity. Chen and Jacobsen (2012) examined the trajectories of substance use across race/ethnicity and found that though they found differences in usage by race/ethnicity at specific developmental timepoints, overall developmental patterns of substance use were similar across racial/ethnic groups, with an increase in substance use from adolescence into adulthood and slowly declines into later adulthood. For example, whereas Hispanic youth exhibited the highest initial levels of substance use, Caucasian youth exhibited the most rapidly increasing substance use in early adolescence, and African American youth exhibited the slowest decline in substance use into later adulthood. These findings support that 1) race alone does not fully explain the heterogeneity in trajectories of health-compromising behaviors, and 2) any mean comparison differences found across race/ethnicity do not directly translate to differences

in risky substance use trajectories based on race/ethnicity. Thus, it is expected that race/ethnicity will not be significantly associated with a latent drug risk trajectory in the current study.

Immigrant generation and health outcomes.

The immigrant paradox and the various contexts of entry for immigrants call for the consideration of both immigrant generational status and race/ethnicity—the intersection of these two social identities. Prior literature has also examined the impact of immigrant generation on health outcomes. Most notably, a consistent pattern of findings shows foreign-born citizens to have better health outcomes relative to their native-born counterparts across multiple ethnic groups, a pattern often referred to as the immigrant paradox (i.e., Garcia-Coll & Marks, 2012; Williams & Mohammed, 2009). Importantly, the pattern associated with the context of immigration is essential to understanding the distinctions across multiple ethnic groups. For example, Hispanic immigrants often enter the United States with a lower socioeconomic profile than do Asian immigrants (Williams et al., 2010). Prior literature examining levels of substance use in ethnic minority adolescent youth support the immigrant paradox, in finding that U.S. born immigrant youth (i.e., second and third generation immigrant youth) show higher rates of alcohol and tobacco use compared to first-generation, or foreign-born, immigrant youth (Almeida, Johnson, Matsumoto, & Godette, 2012; Bacio, Mays, & Lau, 2013; Maldonado-Molina, Reingle, Jennings, & Prado, 2011). However, the effect of the immigrant paradox may differ by the substance being studied; the protective effect of the immigrant paradox was found to erode across generations (ie., from first, to second, to third) more quickly for alcohol than for other substances (i.e., tobacco, marijuana; Almeida et al., 2012). Thus, it is expected that immigrant generation will be associated with an increased likelihood of belonging to health behavior trajectories that are characterized by low levels of risky health behaviors.

Whereas rates of obesity in the United States also support the immigrant paradox in finding that later-generation immigrants show higher rates of obesity (Singh et al., 2011; Oza-Frank & Cunningham, 2010), levels of physical activity across generation were found to show differential support for the immigrant paradox by race/ethnicity (Afable-Munsuz et al., 2010). Levels of physical activity declined as generations passed for Mexican-origin adults, but no such generational attenuation was found for Chinese and Filipino immigrant adults (Afable-Munsuz et al., 2010). Thus, it is expected that first and second-generation immigrants will exhibit a latent trajectory characterized by low obesity risk health behaviors.

Though prior studies have examined the association between race/ethnicity, or immigrant generation, or even further, the effect of immigrant generation within a single race/ethnicity and the developmental trajectories of health behaviors, no studies thus far have examined the developmental trajectories of health behaviors in adolescence through an intersectional lens that considers the interaction of these two social identifiers. Such demographic distinctions call for examining the life course through an intersectional lens that considers multiple social disadvantages resulting from multiple social identity group memberships (Hankivsky et al., 2008). Finally, considering the changes over time of multiple types of health behaviors amongst and across these groups would contribute a nuanced perspective that has yet to be examined in this body of literature (Williams et al., 2010; Hankivsky, 2014).

The Present Study

The present study relies on the intersectional understanding of the multiple social identities of foreign origin youth. Prior literature has noted ethnic/racial and immigrant generational differences in rates of participation in health compromising behaviors have been noted across adolescence (i.e., Atyaclar et al., 1999; Marti et al., 2010; Johnston et al., 2011). Studies examining rates of substance use find conceptually similar classes of trajectories as those found in representative samples of adolescents with an early onset and heavy using, a normative using, a late onset using, and a late onset and heavy using class (Tucker et al., 2005).

However, prior studies have not considered how the intersections of race/ethnicity and immigrant generation associate with differing classes of multidimensional trajectories of health compromising behaviors. Thus, it is expected that a normative using class and 2 to 4 variants of non-normative using classes will arise from the analyses; however, only general hypotheses are drawn regarding the associations between race/ethnicity and immigration generation and the resulting classes of health compromising behaviors. More specifically, I expected to find that (1) experiencing greater socioeconomic adversity would be associated with a trajectory class characterized by increasing substance use and obesogenic health risk behaviors, (2) identifying as a person of color (i.e., Black, Hispanic, Asian) would not be associated with a latent class characterized by increased drug use trajectories, though would be associated with a latent class characterized by increases in obesogenic behaviors, and (3) identifying as a first or second generation immigrant would be associated with an increased likelihood of belonging to a latent class characterized by low levels of risky health behaviors with marginal average increases or no increases in health compromising behaviors from adolescence into adulthood. No specific broad hypotheses were set regarding the influence of the interaction of race/ethnicity and immigrant

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generation on latent class trajectory membership; thus, the study takes an exploratory approach to observe how the race x immigrant generation intersection associate across the multidimensional latent classes of health behavior trajectories.

Studying multiple dimensions of health can better reflect the cumulative impact of the multiple disadvantages associated with identifying with numerous disadvantaged social statuses (i.e., Wickrama, Mancini, Kwag, & Kwon, 2012). Substance use trajectories of multiple substances have been found to grow in association over time (i.e., Marti et al., 2010). However, analyses of the associations across multiple dimensions of health (i.e., substance use and sedentary lifestyles) have not been considered. Using a growth mixture modeling approach will provide a thorough examination of multidimensional latent classes of health behaviors and allow a better understanding of how race/ethnicity and immigrant generation are associated with these patterns of development. Thus, the present study will use sophisticated statistical methodologies to examine how distinct social groups, as determined by the intersecting constructs of race/ethnicity and immigrant generation, associate with classes of adolescent health behavior trajectories.

Further, by investigating the heterogeneity of latent growths health behavior trajectories from adolescence into young adulthood allows the examination of the divergence or convergence of classes of trajectories, as well as how the aforementioned race x immigrant generation may be associated with these patterns. This builds upon prior understandings of the idea of the linear accumulated disadvantages in the life course (e.g., accumulated from adolescence into adulthood) perspective by considering that dynamic interacting or additive disadvantages from adolescence (i.e., adversities associated with race and/or immigrant generation) factor into how health behavior trajectories manifest.

Methods

Sample

Data for this study comes from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Data were initially collected in 1994 – 1995 from a stratified cluster-sampling of middle and high school students with an initial sample size of 20,745 participants (M_{age} =15.3 years, range = 11 to 21) from 134 schools in the United States. Parents of participating students were also asked to complete questionnaires only at baseline. Both parent-report and adolescent-report data are used in this study. Data was collected again in 1995 – 1996 (wave 2, M_{age} =16.2 years, range = 11 to 23), 2001 – 2002 (wave 3, M_{age} =21.6 years, range = 18 to 27), and 2007 – 2008 (wave 4, M_{age} =28.2 years, range = 24 to 33). Data from the adolescent in-home interview from all four waves and data from the parent questionnaire at wave 1 was used. The final sample size included all participants from all waves (N = 20,745), and the grand sample weights at wave 1 were used to correct for oversampling. Missing data was handled using Full Information Maximum Likelihood (FIML) estimation, which 1) estimates missing values based on all other available data, and 2) estimates parameters on all these "imputed" and available data (Enders & Bandalos, 2001).

Measures

Early socioeconomic adversity was assessed via parent-reports of family economic pressure at wave 1 (1994). These items reflected economic hardship for parents and reported whether any member of the household had received: social security, supplemental security income, food stamps, housing subsidies, or aid to families with dependent children. These items were summed to create an index where higher scores reflected greater socioeconomic adversity

and had an internal consistency of .85. These indicators have been used in previous studies to represent socioeconomic hardship (Wickrama & Bryant, 2003; Wickrama et al., 2014).

Race and Immigrant Generation. Immigrant generation was assessed at wave 1 (1994) by a binary variable that asked the adolescent participant whether he/she was born in the United States, and a binary variable that as the participant's parent whether he/she had been born in the United States. Three additional dummy variables were created reflecting first generation immigrant participants (5.8% of whole sample; $n = 1203$) and second generation immigrant participants (12.2%; $n = 2530$). *Race or ethnicity* was indicated at wave 1 by three binary items that identified participants as Hispanic (17% of whole sample; $n = 3526$), African American (23%; $n = 4771$), or Asian (7.7%; $n = 1597$). Six additional dummy variables were created to represent the intersection of race and immigrant generation as the following groups: first generation Hispanic (3.3% of the whole sample; $n = 684$), second generation Hispanic (6.8%; $n = 1410$), first generation Black (0.4%; $n = 83$), second generation Black (1.2%; $n = 284$), first generation Asian (1.9%; $n = 394$), and second generation Asian (2.4%; $n = 498$).

Health compromising behaviors were assessed at waves 2 (1995), 3 (2001), and 4 (2007) with self-report items assessing frequency of activity.

Cigarette use was assessed using a single item reporter of the number of days within the past month the participant used cigarettes.

Alcohol use, *Binge Drinking, and Being Drunk* was each assessed with a single item assessing the number of days (on a 6-point Likert scale) within the past year that the participant had 1) consumed any alcohol, 2) consumed more than 5 (4 for females) drinks in one sitting, and 3) felt 'drunk or high' from consuming alcoholic beverages.

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Physical activity levels were assessed at waves 2 (1995), 3 (2001), and 4 (2007), with 3 items on the past week's frequency of participants engaging in aerobic exercise (i.e., biking, roller-blading), an active or strenuous team sport (i.e., basketball, soccer), and individual exercise (i.e., walking, working out) on a scale from 0 (Never) to 3 (5 or more times). These items showed acceptable internal consistency ($\alpha = .72$). These items were summed at each wave for a total measure of physical activity, with higher scores representing more physical activity.

Sedentary lifestyle was assessed waves 2 (1995), 3 (2001), and 4 (2007), with 3 items measuring the number of hours spent watching television, watching videos, or playing computer games in a usual week. These items showed acceptable internal consistency ($\alpha = .81$), and were averaged to create a mean of weekly hours spent being sedentary. At wave 2, the average number of weekly hours spent sedentary was 7.2 hours, at wave 3, 7.6 hours, and at wave 4, 8.1 hours.

Covariates. Adolescent age and gender at wave 1 (1994) were included as covariates in all analyses.

Analytical Technique

For all analyses, MPlus v. 7.14 was used (Muthén & Muthén, 2008-2012). The present study used a growth mixture modeling (GMM) approach (Muthén, 2004) to model different classes of trajectories of multiple health behaviors. Prior to the GMM, I analyzed each health behavior as a single unconditional latent growth curve to examine the overall trend of growth in each health behavior, the shape of the growth (i.e., linearity), and the levels of variance to assess whether the overall trend suggested enough heterogeneity to warrant a latent growth mixture model analysis. The model fit of the latent growth curve models were assessed using the

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recommended fit criteria set by Hu & Bentler (1999): the Root Mean Square Error of

Approximation (RMSEA) < .08, the Comparative Fit Index (CFI) > .95, and the standardized

root mean square residual (SRMR) < .07. I also considered the potential grouping of latent

multidimensional health behavior classes according to theoretical sense (i.e., support from prior

research and associations of health behaviors to health outcomes). Then, I proceeded with the

growth mixture modeling.

In the GMM, I first identified the smallest number of classes that best represent

subgroups with similar health behavior trajectories (Jung & Wickrama, 2007; Muthén & Muthén,

2000). To estimate the classes, maximum likelihood estimation with the expectation-

maximization algorithm was used. I used Little's Missing-Complete-at-Random test (MCAR) to

determine if the missing-at-random assumption is appropriate (MAR; Little & Rubin, 2002). To

estimate the most appropriate number of classes, a series of models was fitted, starting with a 2-

class solution, to a 5-class solution. The Bayesian information criterion, adjusted for sample size

(BIC-adj), the Akaike information criterion (AIC), entropy coefficients (Muthén, 2004), and the

Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR-LRT; Lo et al., 2001) were the statistical

criteria used to determine the optimal number of classes. Once the optimal number of classes was

determined, the race/ethnicity, immigrant generation, and socioeconomic adversity covariates

were analyzed as predictors in a multinomial regression using the 3-step procedure in *MPlus*.

This 3-step method accounts for possible uncertainty in class membership (Lanza et al., 2013),

and was used to analyze associations of predictors (i.e., early socioeconomic disadvantage,

intersections of race/ethnicity and immigrant generation) across the latent classes of trajectories.

Specifically, this procedure involves tests of the equality of means across classes using the

R3STEP function in *MPlus*. As the final step, I examined the lateral associations across the two

sets of multidimensional health trajectories by examining the cross-tabulations of class

memberships across the two sets of health trajectory classes.

Missing Data and Attrition. Rate of missing data in study variables reached a maximum

of 1.2% at waves 3 and 4. After testing for missing-at-random assumptions (MAR), missing data

were analyzed using Full Information Maximum Likelihood estimation. Attrition analyses of the

data from Wave 1 to Wave 4 indicate a negligible attrition bias for variables in this study,

indicating that the sample for Wave 4 adequately represented the baseline sample.

Results

Preliminary Analyses. Table 1.1 presents bivariate correlations and descriptive statistics for study variables. Overall, the repeated measures of each health behavior were expectedly correlated across time-points and expectedly associated across study variables.

Each health behavior from waves 2 to 4 was analyzed as a latent growth curve to assess overall trend, linearity, and variance. The latent classes of each health behavior (i.e., alcohol use, binge drinking, being drunk, cigarette use, physical activity, and sedentary lifestyle) had good model fit, with RMSEA < .08, CFI > .95, TLI > .95, and SRMR < .07. Each unconditional latent growth curve showed linear growth, with substance use behaviors each increasing slightly into early adulthood, and both physical activity and sedentary activity declining slightly into early adulthood. Each unconditional latent growth curve indicated significant variance of the slope (i.e., growth; $p < .05$), with moderate to large coefficients ($.20 < \sigma^2 \leq .75$).

The second preliminary consideration to make was to determine how to group the health behaviors as multidimensional health behavior trajectories. Alcohol use, binge drinking, being drunk, cigarette use, physical activity, and sedentary activity fall into two major groups of health behaviors: drug-related health behaviors and obesity-related health behaviors. Studies examining the associations between these two major groups are few, though research has found that significant associations exist in adulthood (Nelson & Gordon-Larsen, 2006). In fact, the two groups of behaviors were found to be divergent in adulthood such that adults battling drug dependence were less likely to be overweight or obese, and overweight or obese adults were at a lower risk of developing drug abuse or dependence (Pickering et al., 2011). A recent study examining the neurological mechanism of reward region response to explain obesogenic behaviors and substance use behaviors in adolescence found differential results for the two sets

of health behaviors; a more responsive neural reward region was a risk factor for substance use behaviors, but not for obesogenic behaviors in adolescence (Stice, Yokum, & Burger, 2013). Though the specific field of study is young, it suggests that these two sets of health behaviors may develop independently. Thus, alcohol use, binge drinking, being drunk, and cigarette use were analyzed as the set of drug-related multidimensional health behaviors. Physical activity and sedentary lifestyle were analyzed as obesity related multiple health behaviors in subsequent analyses.

Multidimensional Latent Classes of Health Behaviors

Substance Use Classes. I first identified the number of classes of drug-related health behaviors. Table 1.2 presents model fit indices and criteria used to evaluate differing class solutions from two to five classes hierarchically and based on recommended model fit statistics. Ultimately, the combination of lower AIC estimates, lower BIC-A estimates, larger class size, the Lo-M-R test, and the V-L-M-R-T test all indicated that the 3-class possessed better fit to the data than did the 4-class solution and the 2-class solution.

Figure 1.1 shows the estimated mean growths of alcohol use, binge drinking, being drunk, and cigarette use obtained across waves 2 to 4 for the 3-class solution. Class 1 showed low initial levels of alcohol use with a slow growth over 13 years (B = .72, p <.01, B = .11, p < .01, respectively), low initial levels of being drunk with a marginal growth over time (B = .34, p <.01, B = .04, p <.01, respectively), low initial levels of cigarette use with slow decline over time (B = 2.34, p < .01, B = -.13, p <.01, respectively), and low initial levels of binge drinking with a marginal growth over time (B = .28, p< .01, B = .05, p <.01, respectively). The combination of low initial levels of drug use coupled with marginal increases or declines over

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Table 1.1

Bivariate Correlations and Descriptive Statistics of Study 1 Variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Soc. Adversity W1	--											
2. Physical Activity W2	-.05**	--										
3. Physical Activity W3	-.07**	.27**	--									
4. Physical Activity W4	-.04**	.19**	.31**	--								
5. Sedentary Activity W2	.10**	.02**	-.01	-.02	--							
6. Sedentary Activity W3	.07**	.00	.02**	-.01	.25**	--						
7. Sedentary Activity W4	.05**	.01	-.02**	-.01	.19**	.28**	--					
8. Cigarette Use W2	.02**	-.10**	-.07**	-.01	-.02*	.05**	.03**	--				
9. Cigarette Use W3	-.01	.00	-.05**	.00	-.01	.11**	.07**	.50**	--			
10. Cigarette Use W4	.06**	.00	-.04**	-.02**	.03**	.11**	.09**	.42**	.65**	--		
11. Alcohol Use W2	-.04**	-.03**	.00	.06**	-.02**	.04**	-.01	.37**	.29**	.16**	--	
12. Alcohol Use W3	-.15**	.08**	.10**	.09**	-.06**	.03**	.03**	.13**	.37**	.14**	.27**	--
13. Alcohol Use W4	-.14**	.09**	.09**	.13**	-.03**	.01	.02**	.07**	.20**	.10**	.19**	.17**
14. Being Drunk W2	-.03**	-.03**	.00	.06**	-.02**	.04**	.00	.38**	.27**	.17**	.79**	.22**
15. Being Drunk W3	-.13**	.12**	.10**	.09**	-.04**	.04**	.03**	.13**	.37**	.16**	.24**	.72**
16. Being Drunk W4	-.08**	.08**	.07**	.09**	.01	.05**	.07**	.13**	.28**	.20**	.21**	.41**
17. Binge Drinking W2	-.03**	-.03**	.01	.07**	-.02*	.04**	.00	.37**	.26**	.16**	.80**	.22**
18. Binge Drinking W3	-.11**	.11**	.11**	.10**	-.04*	.06**	.05**	.15**	.37**	.17**	.26**	.73**
19. Binge Drinking W4	-.07**	.07**	.06**	.09**	.00	.05**	.06**	.15**	.29**	.21**	.22**	.41**
Mean	.66	3.52	1.50	1.46	7.27	7.63	8.10	5.17	13.17	7.88	1.09	2.16
SD	1.04	2.08	1.76	1.60	7.03	7.25	8.27	10.34	14.06	12.52	1.52	1.75

Note. SD = Standard Deviation. W = Wave of data. Soc = Socioeconomic.
* $p < .05$. ** $p < .01$.

Table 1.1 *Continued*

	12	13	14	15	16	17	18	19
1. Soc. Adversity W1								
2. Physical Activity W2								
3. Physical Activity W3								
4. Physical Activity W4								
5. Sedentary Activity W2								
6. Sedentary Activity W3								
7. Sedentary Activity W4								
8. Cigarette Use W2								
9. Cigarette Use W3								
10. Cigarette Use W4								
11. Alcohol Use W2								
12. Alcohol Use W3	--							
13. Alcohol Use W4	.17**	--						
14. Being Drunk W2	.22**	.15**	--					
15. Being Drunk W3	.72**	.40**	.23**	--				
16. Being Drunk W4	.41**	.67**	.20**	.47**	--			
17. Binge Drinking W2	.22**	.13**	.84**	.21**	.17**	--		
18. Binge Drinking W3	.73**	.38**	.25**	.78**	.43**	.25**	--	
19. Binge Drinking W4	.41**	.70**	.21**	.44**	.79**	.20**	.45**	--
Mean	2.16	2.23	.69	1.18	1.04	.71	1.25	1.21
SD	1.75	1.81	1.31	1.43	1.33	1.38	1.57	1.54

Note. SD = Standard Deviation. W = Wave of data. Soc = Socioeconomic.

* $p < .05$. ** $p < .01$.

time suggested that this class was at low risk of heavy drug use over time, and was labeled the *Low Substance Use Class* (67% of sample population).

Class 2 showed similar growths over time in alcohol use, binge drinking, and frequency of being drunk as Class 1, but showed high levels of initial cigarette use with steep increases in use over time, and was labeled the *Cigarette Risk Class* (25% of sample population). The *Cigarette Risk Class* showed high initial levels of cigarette use with the steepest increases in cigarette use over time (B = 12.85, *p* < .01, B = 1.22, *p* <.01, respectively), moderate initial levels of alcohol use with marginal growth over time (B = 1.54, *p* <.01, B = .09, *p*< .01, respectively), moderate initial levels of binge drinking with marginal growth over time (B = 1.06, *p* < .01, B = .05, *p*<..01, respectively), and moderate initial levels of being drunk with marginal growth over time (B = 1.05, *p* <.01, B = .03, *p* < .01, respectively).

Table 1.2

Model fit statistics for the two-class through five-class latent class solutions of substance use trajectories

Model	V-L-M-R-T, *p*	L-M-R, *p*	AIC	BIC-Adj.	Entropy	Smallest Profile† (%)
2 Classes	-327958.75, .00	11110.15, .00	644809.75	945107.34	.86	4662 (25%)
3 Classes	-312163.86, .00	3843.55, .00	620586.72	620926.16	.88	1179 (7.8%)
4 Classes	-180826.10, .17	9072.27, .17	652562.05	652827.08	.70	794 (4.2%)
5 Classes	-308552.80, 1.00	-2120.38, 1.00	624301.96	614855.11	.75	352 (1.9%)

Note. V-L-M-R-T = Vuong-Lo-Mendell-Rubin Likelihood Ratio Test; AIC = Akaike Information Criterion; BIC-Adj. = BIC Sample Size Adjusted.
†= Number of individuals in the smallest profile solution.

Class 3 showed overall higher initial levels of drug use with declines over time in all drug use, and was labeled the *Early Substance Risk Recovering Class* (8% of sample population). This class showed high initial levels of alcohol use with marginal declines over time (B = 3.79, *p*

<.01, B = -.09, p<.01, respectively), high initial levels of being drunk with decline in use over time (B = 3.20, p <.01, B = -.16, p<.01, respectively), high initial use of cigarettes with sharp declines over time (B=8.87, p<.01, B = -.55, p<.01, respectively), and high initial levels of binge drinking coupled with a decline in binge drinking over time (B = 3.89, p<.01, B = -.19, p<.01, respectively).

Obesity-Related Health Behavior Classes. To identify the appropriate number of obesity-related health behavior classes, I followed the same methodology of testing an increasing series of classes and comparing model fit statistics. Table 1.3 presents model fit indices and criteria used to evaluate differing class solutions from two to five classes hierarchically and based on recommended model fit statistics. Ultimately, the combination of lower AIC estimates, lower BIC-A estimates, larger class size, the Lo-M-R test, and the V-L-M-R-T test all indicated that the 3-class possessed better fit to the data than did the 4-class solution and the 2-class solution. While the V-L-M-R-T and L-M-R tests of the five class solution showed statistically significant p-values, indicating that the five class solution fit the sample population more accurately than did the four class solution (Jung & Wickrama, 2008), the solution entropy of the three class solution (0.93) was notably superior to the solution entropy of the five class solution (0.85) supporting the selection of the three class solution.

Figure 1.2 shows the estimated mean growths of sedentary activity and physical activity obtained across waves 2 to 4 (i.e., from adolescence to early adulthood) for the 3-class solution. Class 1 showed relatively low initial levels of sedentary activity with a slow growth over 13 years (B = 6.22, p <.01, B = .06, p <.01, respectively) and relatively moderate initial levels of physical activity with a decrease over time (B = 3.12, p <.01, B = -.14, p <.01, respectively). The initial levels of physical activity for all three classes were very similar, whereas the initial levels

of sedentary activity for this class were the lowest of the three classes. The combination of low

levels of sedentary activity coupled with moderate declines in physical activity over time

suggested that this class had the fewest indicators linked to obesity-related illnesses, and was

labeled the *Low Obesity Risk Class* (92% of sample population).

Table 1.3

Model Fit Statistics for the Two-Class through Five-Class Latent Class Solutions of Obesity-Related Health Trajectories

Model	V-L-M-R-T, *p*	L-M-R, *p*	AIC	BIC-Adj.	Entropy	Smallest Profile† (%)
2 Classes	-228495.72, .00	5838.02, .00	451084.63	451200.92	.95	611 (3.2%)
3 Classes	-22517.32, .00	3969.38, .00	447044.47	447184.02	.93	583 (3.1%)
4 Classes	-223492.24, .11	1731.45, .12	445287.79	445450.59	.88	155 (0.01%)
5 Classes	-222227.14, .01	1813.83, .00	442683.54	442869.59	.85	154 (0.01%)

Note. V-L-M-R-T = Vuong-Lo-Mendell-Rubin Likelihood Ratio Test; AIC = Akaike Information Criterion; BIC-Adj. = BIC Sample Size Adjusted.
†= Number of individuals in the smallest profile solution.

Class 2 showed the highest initial levels of sedentary activity (B = 28.27, *p* <.01) with a

significant decline of sedentary activity from adolescence into early adulthood (B = -1.56, *p*

<.01) and a moderate initial level of physical activity (B = 3.17, *p* < .01) in conjunction with an

increase in physical activity from adolescence into adulthood (B = .15, *p* <.01). The specifically

high initial levels of sedentary activity coupled with significant decreases in sedentary activity

and increases in physical activity suggested that this class was representative of an early risk and

subsequently health promoting class. Thus, class 2 is labeled as the *Early Obesity Risk*

Recovering Class (4% of sample population).

Class 3 showed moderate initial levels of sedentary activity coupled with steep increase

in sedentary activity from adolescence into adulthood (B = 8.48, *p* <.01, B = 2.19, *p* <.01,

respectively) and a moderate initial level of physical activity (B = 3.16, $p < .01$) with a moderate

decline in physical activity over the course of 13 years (B = -.16, $p < .01$). This decline in

physical activity, while moderate, was the steepest decline of the three classes in physical

activity. The steepest increase in sedentary activity coupled with the fastest decrease in physical

activity indicated that this class had the highest levels of indicators associated with obesity-

related diseases, and was thus labeled the *Obesity Risk Class* (4% of sample population).

To analyze the associations across the two sets of multidimensional health behavior

classes, I cross-tabulated the class memberships of each set of latent class growth models in a

3x3 table using SPSS 17.0. Cross-tabulation cross-references occurrences for categorical data to

describe associations; in this study, the cross-tabulation describes the frequency of drug use risk

class memberships as a function of obesity risk class memberships (Hinton, McMurray, &

Brownlow, 2014, p.43). Based on Cramer's V, a chi-square test for nominal data, the class

memberships were marginally, but significantly associated with each other (Cramer's V = .06, *p*

< .01; Agresti, 1996).

Seventy percent of individuals classified as low obesity risk class also classified as low

substance use class, whereas 24% of these individuals were also classified as belonging to the

cigarette risk class. Similarly, 67% of individuals in the early obesity risk recovering class

belonged to the low substance use class, whereas 26% of these individuals also belonged to the

cigarette risk class. Most interestingly, individuals classified into the obesity risk class largely

fell into either the low substance use class (55%) or the cigarette risk class (43%).

Comparatively, between 90-95% of individuals in each of the substance use classes (i.e., low

substance use class, cigarette risk class, and early substance risk recovering class) identified as

belonging to the low obesity risk class, suggesting that any association between the two class

memberships is driven by the effect of the obesity risk class memberships on the drug use class membership, not by the effect of the drug risk class memberships on the obesity risk class memberships.

Between-Class Differences in Socioeconomic Adversity, Race/Ethnicity. Immigrant Generation, and the Interaction of Race/Ethnicity X Immigrant Generation

After selecting the class solutions for obesity-related and substance use health behaviors, I used multinomial logistic regression to estimate the influence of socioeconomic adversity, race/ethnicity, immigrant generation, and the interaction of the race/ethnicity X immigrant generation on the latent classes of substance use and obesity-related health behaviors. I used the *Auxiliary* 3-step approach in *MPlus* to test the effect of the covariates without influencing or changing the initial class memberships. This method also tests each covariate independently, rather than cumulatively in a single model, thereby examining the independent association between a covariate and the identified latent classes of health behaviors. The covariates were added in blocks, starting with family economic pressure, then race and immigrant generation, and finally with race x immigrant generation binary constructs.

Table 1.4 shows the estimated logit coefficients and calculated odds ratios of the tested covariates, with the Early Substance Risk Recovering Class and the Cigarette Risk Class referencing the Low Substance Use Class. Individuals who experienced greater socioeconomic adversity in early adolescence were more likely to belong to the *Cigarette Risk Class* (OR = 1.21, $p < .01$) than the *Low Substance Use Class* and the *Early Substance Risk Recovering Class* (OR = 1.12, $p < .05$). That is, as exposure to socioeconomic adversity increased, the likelihood of showing a developmental pattern of long-term cigarette use increased. Though no significant likelihood effects were found by race/ethnicity, first-generation immigrants were less likely to
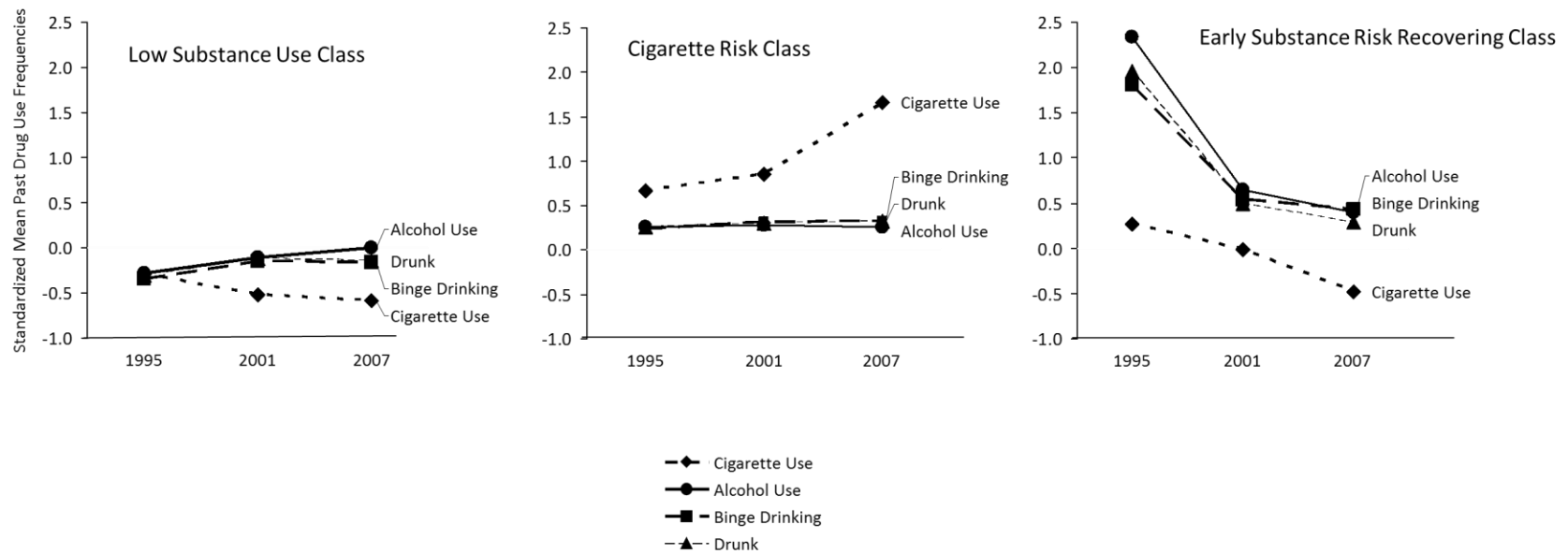
Figure 1.1. Low substance use, cigarette risk, and early substance use risk recovering latent classes

Note. These graphic representations of the three latent classes of substance use trajectories are scaled to averaged standardized transformations of the original measures to allow for ease of visual interpretation. In-graph notations are included for ease of interpretation.
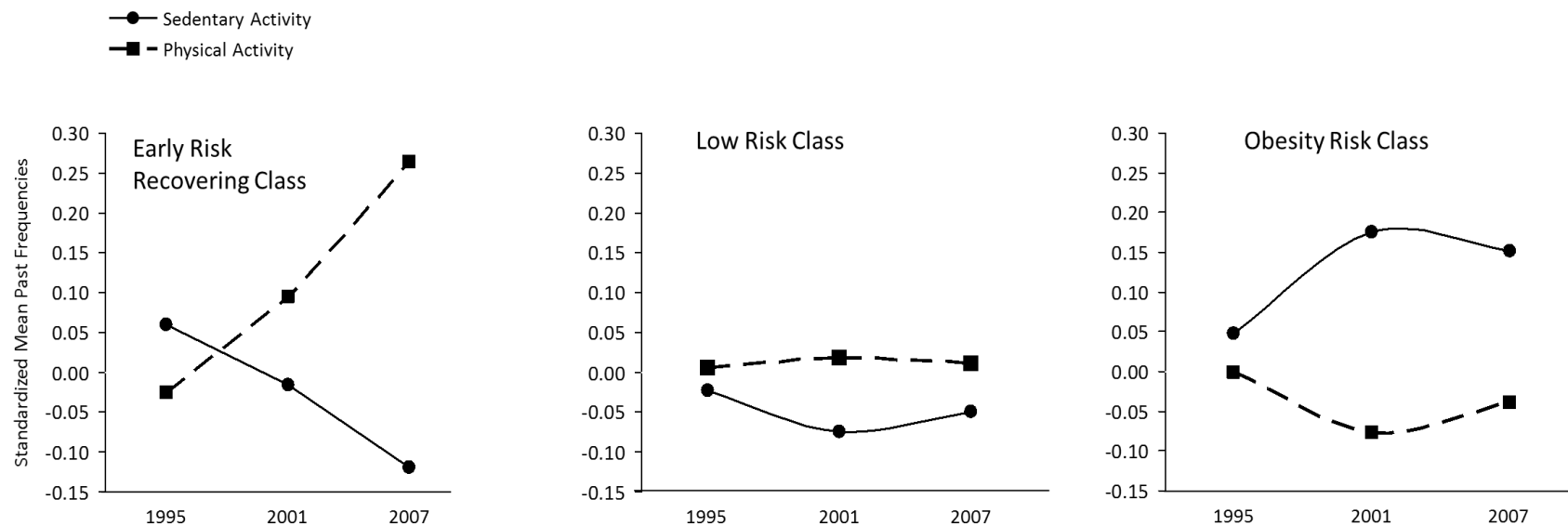
Figure 1.2. Low Obesity Risk, Early Obesity Risk Recovering, and Obesity Risk Latent Classes

Note. These graphic representations of the three latent classes of drug use trajectories are scaled to averaged standardized transformations of the original measures to allow for ease of visual interpretation.

belong to both *Cigarette Risk* (OR = .18, *p* < .01) and *Early Substance Risk Recovering Classes* (OR = .08, *p* < .01), whereas second-generation immigrants were only less likely to belong to the *Early Substance Risk Recovering Class* (OR = .05, *p* <.01). In other words, first-generation immigrants were less likely to engage in high and increasing levels of cigarette risk, whereas being a second-generation immigrant had no association with cigarette use. Both first- and second-generation immigrants were much less likely to show high initial levels of alcohol and cigarette use. Finally, no significant interaction effects were found for the six different interaction effects tested across race/ethnicity (Asian, Black, Hispanic) and immigrant generation (first-generation, second-generation).

Table 1.5 shows the estimated logit coefficients and calculated odds ratios of the tested covariates, with the Early Obesity Risk Recovering Class and the Obesity Risk Class referencing the Low Obesity Risk Class. Individuals who had experienced greater socioeconomic adversity were more likely to belong to either the *Obesity Risk Class* (OR = 1.28, *p* < .01) or the *Early Obesity Risk Recovering Class* (OR = 1.22, *p* <.01), when compared to the *Low Obesity Risk Class*. However, individuals who experienced greater socioeconomic adversity were not any more likely to belong to the *Obesity Risk Class* than the *Early Obesity Risk Recovering Class* (OR = .94, *p* = *n. s.*). That is, greater exposure to socioeconomic adversity did not account for the different developmental risk patterns of obesity-related health behaviors from adolescence to early adulthood.

Being Hispanic was associated with an increased likelihood of belonging to the *Obesity Risk Class* (OR = 1.60, *p* < .01), and being African American was associated with a significantly higher likelihood of belonging to the *Obesity Risk Class* (OR = 3.38, *p* < .01) and the *Early Obesity Risk Recovering Class* (OR =1.66, *p* < .01) when compared to the *Low Obesity Risk*

Class. African Americans were also more likely to belong to the *Obesity Risk Class* compared to the *Early Obesity Risk Recovering Class* (OR = 2.02, *p* <.01). That is, African Americans may show a greater risk of engaging in obesity-related health behaviors, and continuing to engage in obesity-related health behaviors.

Table 1.4

Covariates associated with the cigarette risk and early substance risk recovering classes

	Cigarette Risk Class[a]			Early Substance Risk Recovering Class[a]		
Covariates	Logit	OR	95% CI^{OR}	Logit	OR	95% CI^{OR}
Adversity W1	.19**	1.21	[1.10, 1.32]	.08	1.08	[.99, 1.17]
Hispanic	-.60**	.55	[.36, .83]	-.01	.99	[.34, 1.53]
Asian	-.21	.81	[.30, 2.14]	.23	1.25	[.46, 3.42]
African American	-.91**	.40	[.30, .52]	-1.09	.33	[.12, .92]
1st Generation	-1.68**	.18	[.03, .97]	-2.47**	.08	[.03, .28]
2nd Generation	-.53	.59	[.15, 2.23]	-2.93**	.05	[.01, .23].
1G Black	-.39	.67	[.13, 3.31]	1.06	2.88	[.59, 14.09]
2G Black	.84	2.34	[.28, 19.01]	1.25	3.49	[.36, 33.31]
1G Asian	.55	1.73	[.23, 12.54]	-.01	.99	[.20, 4.78]
2G Asian	-.82	.44	[.02, 8.71]	-.37	.69	[.03, 13.66]
1G Hispanic	.20	1.22	[.21, 6.78]	.07	1.07	[.32, 3.63]
2G Hispanic	-.24	.78	[.22, 2.92]	1.22	3.38	[1.85, 6.17]

Note. OR = Odds Ratios. [a] = Referenced to the Low Risk Class. Adversity W1=Socioeconomic adversity from wave 1 (1994). 1G = 1st Generation. 2G = 2nd Generation. 95% CI^{OR}: The 95% confidence intervals are for the odds ratio; confidence intervals not containing 1.0 are significant. * *p* <.05. ** *p* <.01.

First-generation and second-generation immigrants consistently showed lower likelihoods of belonging to either the *Obesity Risk Class* or the *Early Obesity Risk Recovering Class* compared to the *Low Obesity Risk Class*. First-generation immigrants were 47% and 42% less likely to belong to the *Obesity Risk* and the *Early Obesity Risk Recovering Classes*, respectively, whereas second-generation immigrants were 40% and 34% less likely to belong to the *Obesity Risk* and the *Early Obesity Risk Recovering Classes*, respectively.

Table 1.5

Covariates associated with the Obesity Risk and Early Risk Recovering Obesity-Related Health Behavior Classes

	Obesity Risk Class[a]			Early Obesity Risk Recovering Class[a]		
Covariates	Logit	OR	95% CI	Logit	OR	95% CI
Adversity W1	.20**	1.22	[1.11, 1.33]	.25**	1.28	[1.18, 1.39]
Hispanic	.47*	1.60	[1.05, 2.41]	-.04	.96	[.62, 1.49]
Asian	.05	1.05	[.39, 2.78]	-.15	.86	[.32, 2.34]
African American	1.22**	3.38	[2.58, 4.43]	.51**	1.66	[.61, 4.54]
1st Generation	-.63**	.53	[.09, .86]	-.54**	.58	[.37, .89]
2nd Generation	-.51**	.60	[1.15, 2.28]	-.41**	.66	[.45, .96]
1G Black	-1.69**	.18	[.03, .90]	1.15	3.15	[.64, 15.41]
2G Black	-.02	.98	[.11, 8.04]	.30	1.35	[.14, 12.88]
1G Asian	-1.19	.30	[.04, 2.20]	-1.52**	.22	[.05, .95]
2G Asian	-.94	.39	[.02, 7.73]	-1.96**	.14	[.02, .90]
1G Hispanic	1.13	3.09	[.55, 17.20]	1.07	2.91	[.86, 9.88]
2G Hispanic	.67	1.95	[.52, 7.27]	.16	0.16	[.64, 2.13]

Note. OR = Odds Ratios. [a] = Reference Class is Low Risk Class. Adversity W1=Socioeconomic adversity from wave 1 (1994). 1G = 1st Generation. 2G = 2nd Generation.
* $p < .05$. ** $p < .01$.

First-generation Black immigrants were less likely to belong to the *Obesity Risk Class* compared to the *Low Obesity Risk Class* (OR = .18, $p < .01$), whereas second-generation Black immigrants were no more or less likely to belong to the *Obesity Risk Class* when compared to the *Low Obesity Risk Class* (OR = .98, $p = n.s.$). First-generation and second-generation Asian immigrants were 78% and 86%, respectively, less likely to be in the *Early Obesity Risk Recovering Class* compared to the *Low Obesity Risk Class* (OR = .22, $p < .01$, OR = .14, $p < .01$, respectively).

Discussion

Rooted in the life course perspective and intersectional theory, the present study examined the influence of early socioeconomic disadvantage, race/ethnicity, and immigrant generation on the development of health behaviors from adolescence into early adulthood. The findings extend prior research in providing evidence for: 1) the use of applying an intersectional lens in understanding the life course, 2) supportive evidence of the immigrant paradox, and 3) supportive evidence for the influence of early SES disadvantage on the development of maladaptive health behaviors. Additionally, the present study found that race alone had no influence on the developmental trajectories of alcohol or cigarette use. Implications of the findings are discussed below.

The class solutions for the substance use health behaviors and the obesity-related health behaviors each showed a 3 class solution with a low risk class, an early risk recovering class, and a specific higher risk class, which is consistent with prior research that examines the class trajectories of similar behaviors in similar samples. Substance use behaviors (i.e., alcohol use, frequency of being drunk, frequency of binge drinking, and cigarette use) were classified into 3 classes: low substance use class, early substance risk recovering class, and a cigarette risk class (i.e., characterized by high and steeply increasing cigarette use). Prior studies using the same methodology examining alcohol and cigarette use in similar samples have found cigarette – specific risk classes as well; Lamont and colleagues (2013) found a smoking specific class characterized by high rates of smoking cigarette or marijuana and non-abnormal rates of alcohol use in a study of a sample of adolescents in the United States. Tomcyzk and colleagues (2015) also found a latent class characterized by high cigarette use in a sample of German adolescents, though in this study, the high cigarette use was accompanied by high rates of alcohol use as well.

Whereas the difference in association between cigarette and alcohol use across the two studies may be cultural, the two studies support the presence of unique subgroups of adolescents who show high and increasing rates of cigarette use in adolescence into early adulthood. A latent class characterized by decreasing alcohol and cigarette use has been documented in prior literature as well; Brooks-Russell and colleagues (2015) identified 5 latent classes of substance use in adolescence, including a decreasing substance use class and a class typified by high cigarette use. This specific identification suggests that interventions and preventive programs focusing on cigarette abstinence and/or cessation should consider adolescence a sensitive period.

Obesity-related health behaviors were classified into 3 classes: low obesity risk class, early obesity risk recovering class, and an obesity risk class (i.e. characterized by high and increasing sedentary activity and low and decreasing physical activity). Though only a few prior studies have longitudinally examined sedentary activity and physical activity from adolescence into adulthood, prior studies conducting latent class analyses to study sedentary activity and physical activity show similar results. Leech, McNaughton, and Timperio (2014) conducted a review of the clustering patterns of physical activity and sedentary activity, and found clusters tended to range from 3 to 7 clusters, representing greater obesogenic risk to lower obesogenic risk. The present study also documents a specific subgroup of individuals who present with obesogenic risk in adolescence and show a recovering pattern into adulthood – a specific trajectory of recovery of obesogenic behaviors. This finding supports that the transition from adolescent into adulthood may present as an optimal period for intervening and adopting healthful behaviors.

Post-hoc examinations of the association between the class memberships of substance use behaviors and of obesogenic behaviors showed a small but significant association. The

dispersion of each of the class memberships of substance use behaviors did not change across the obesity-related health behavior classes, whereas the dispersion of the latent class memberships of obesogenic health behaviors was different across the three drug use latent classes. Specifically, the percentage of individuals belonging to the obesity risk class that also belonged to the cigarette risk class (46%) was greater than the cross-tabulated percentage for the two other obesogenic latent classes (between 23 and 26%). These findings support the examination of the developmental trajectories of these two subsets of health behaviors independently and concurrently, as such examinations may elucidate how the two subsets of health behaviors may be linked across the life course. While research studying the association between groups of health behaviors (i.e., obesogenic behaviors and substance use behaviors) is still growing, a recent study suggests that the psychosocial context of being obese or overweight contributes to deviant social affiliation, which then contributes to increased cigarette use and alcohol use in adolescence (Lanza, Grella, & Chung, 2015). Still, the temporal order of these effects is yet unclear; future research should consider cross-lagged effects and the stability of these relationships across developmental time periods, such as adolescence into adulthood.

The current study addressed the first research objective of confirming the link between socioeconomic adversity and latent classes of trajectories of drug use and obesogenic health behaviors. The results confirmed that experiencing greater socioeconomic adversity was associated with an increased likelihood of belonging to a latent class characterized by risky health behaviors for both substance use behaviors and obesogenic behaviors. The result also indicated the likelihood of engaging in long term and increasing cigarette use rose as exposure to socioeconomic adversity increased. That is, there was a clear dosage-specific relationship between exposure to childhood socioeconomic disadvantages and an unhealthy pattern of

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cigarette use, such that with each unit of increase in exposures, the likelihood of engaging in an unhealthy pattern of cigarette use from adolescence into adulthood increased similarly. Recently, Pampel and colleagues (2015) examined the same sample that was used in the present study to examine cigarette usage across age-based trajectories; they concluded that achieved socioeconomic status in adulthood likely increases the socioeconomic resources available to aid in smoking cessation. Thus, experiencing childhood socioeconomic disadvantage activates a life-long accumulation of disadvantages, such as being enrolled in a subpar school feeder pattern, that increases the likelihood of cigarette use from adolescence into adulthood, and decreases the likelihood of cigarette cessation in adulthood via material deprivation.

The present study also showed that experiencing greater socioeconomic adversity increased the likelihood of belonging to either the obesity risk class or the early obesity risk recovering class. This finding is supported by prior studies that show similar effects of early SES impacting obesogenic health in adulthood (Purdrovska, Logan & Richman, 2014). Further, the present study found that experiencing early socioeconomic disadvantages increased the likelihood of engaging in obesogenic behaviors, but did not explain which individuals may recover from the pattern of obesogenic behaviors in the transition into adulthood; that is, socioeconomic adversity did not explain which individuals were identified as belonging to the obesity risk class vs. the early obesity risk recovering class. Specific social context mediators may explain this differentiation between individuals who recover from engaging in high levels of obesogenic behaviors. Purdrovska and colleagues (2014) found that mid-life SES explained some of the differentiation of body weight in adulthood, and Feng & Wilson (2015) found that neighborhood disadvantage partially explained variations in adult BMI. Given that SES often determines the neighborhood one lives in, the deprivation amplification hypothesis (McIntyre,

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2007) could explain which individuals who engage in obesogenic behaviors in adolescence do or do not continue engaging in adulthood. A gene by socioeconomic status interaction may also explain the later-life variations in obesogenic health behaviors, such that individuals who had persistently low or downwardly mobile SES and a higher predisposition of the 32 obesity-related single nucleotide polymorphisms showed the highest BMI scores in mid and later adulthood (Liu & Guo, 2015). Thus, experiencing socioeconomic adversity certainly precipitates obesogenic health behaviors in adolescence and into adulthood, and the transition from adolescence into adulthood is a period ripe for interventions that specific focus on disrupting the negative ramifications of low SES on health behaviors (e.g., deprivation amplification).

The present study addressed the second research objective examining the link between race/ethnicity and immigrant generation and latent trajectories of risky health behaviors. Findings showed that race/ethnicity was not associated with a significant likelihood of belonging to a substance use latent class, but race/ethnicity was associated with an increased likelihood of belonging to an obesity-risk latent class. These findings are partly consistent with prior research: whereas prior research has shown inconsistent findings in race/ethnic group differences in substance use, prior research has also shown consistent significant differences in obesity-risk across race/ethnic groups. For example, Caucasian adolescents are more likely to experiment with alcohol use into late adolescence compared to African American or Hispanic youth (Johnston, O'Malley, Bachman, & Schulenberg, 2011; Malone, Northrup, Masyn, Lamis, & Lamot, 2011), and other studies have shown no effect of race in rates of alcohol and cigarette use (Shih, Miles, Tucker & Zhou, 2010). Further, Chen and Jacobsen (2011) found that overall developmental trajectories of substance use across race and ethnicity were similar. The present

study did not find significant differences across substance use latent class trajectories by race/ethnicity.

Though these null findings support that race alone does not explain the etiology of substance use trajectories, these findings should not be interpreted as supporting the insignificance of race. Rather, it is likely the case that race contributes to between-group differences in substance use development only in conjunction with additional contextual characteristics, such as temporal developmental stage, gender, and class. While Chen and Jacobsen (2011) found similarities across race in overall developmental trajectory, they also found that Caucasian adolescents showed the higher rates of change from mid-adolescence into middle adulthood, whereas African Americans showed higher final levels of substance use in middle to later adulthood, suggesting that there may be nuanced differences specific to developmental stages. Future studies should consider transition analyses within and across developmental stages to understand sensitive periods of intervention.

Recent studies have examined gender or class in conjunction with race and have found that African American girls, when compared to Caucasian girls, are more likely to abstain or decrease in their substance use, whereas low-income African American older men are the demographic group most at risk for alcoholism (Dauber et al., 2011, Zapolski et al., 2014). The findings of the present study, in context of prior research, support that race be considered in conjunction with other demographic and social factors that most fully represent the complex and interacting systems of oppression that manifest as exposures to chronic stress and subsequent vulnerability to health compromising behaviors.

For obesity-related health behaviors, the present study did find that being Hispanic or African America was associated with an increased likelihood of belonging to the obesity risk

class or the early obesity risk recovering class. Further, African American adolescents showed greater odds of remaining in an upwards trajectory of obesity-related health behaviors rather than a declining or low obesity risk trajectory. This is consistent with prior research indicating that Black and Hispanic youth are more at risk for developing obesogenic health behaviors and cardio-metabolic diseases (Bae et al., 2014; Capri et al., 2008), and with research indicating that African American men are most at risk for being obese in later adulthood (Flegal, Carroll, Ogden, & Curtin, 2010).

The results also indicated that first generation immigrants were more likely to belong to a low risk latent class for both substance use behaviors and obesity-related health behaviors. First-generation immigrants were less likely to belong to the cigarette risk class, the early drug risk recovering class, the obesity risk class, and the early obesity risk recovering class compared to their native-born counterparts. That is, first-generation immigrants were less likely to engage in health compromising trajectories of alcohol use, cigarette use, sedentary activities, and infrequent physical activities. Second-generation immigrants were also less likely to belong to most, though not all, of the health compromising latent classes; second-generation immigrants were less likely to belong to the early drug risk recovering class, the obesity risk class, and the early obesity risk recovering class. However, second-generation immigrants were no less likely to belong to the cigarette risk class than their native counterparts. It may be the case that the potential protective effect of biculturalism declines in strength from adolescence into adulthood such that in early adulthood, second-generation immigrants are no less likely to engage in drug use behaviors than are native-born adults. These findings are consistent with the immigrant paradox hypothesis, which posits that earlier generation immigrant individuals display healthier behaviors, and relatedly, better health outcomes in adulthood (Prado et al., 2009). This specific

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finding for second-generation immigrants may potentially be explained by mediating social

contextual factors, such as heritage language use (Schwartz, Unger, Zamboanga, & Szapocznik,

2010) and peer social influence (Bui, 2012). The immigrant paradox pattern as also found with

the latent classes of obesogenic health behaviors such that first and second generation

immigrants were more likely to belong to the low obesity risk class compared to native-born

youth. This finding was consistent with prior research showing the presence of the immigrant

paradox for substance use and obesity related health behaviors (Afable-Munez et al., 2010).

While these findings support a general pattern of lower risk health behaviors for immigrant

adolescents, future research should consider in greater detail the mediating or moderating

processes that guide this developmental trajectory, preferably in conjunction with other social

contextual factors that significantly inform said mediating/moderating processes (Bui, 2012).

The present study also examined the combined influence of race/ethnicity and immigrant

generation. No specific hypotheses were set regarding the interactive effect of race/ethnicity and

immigrant generation on the latent class trajectories of health behaviors. Although the present

study found no significant associations between race X immigrant generation and the latent

classes of substance use trajectories, the study did find significant associations between race X

immigrant generation and the latent classes of obesogenic behavior trajectories. Firstly, a few

possibilities may address these null findings. Gender or socioeconomic status were not

considered as interacting driving social identifiers, though extant research has indicated

consistently strong gender and socioeconomic status differences in substance use in adolescence

(e.g., Cohen et al., 2010; Dauber et al., 2011). Future studies considering groups determined by

gender, race/ethnicity, and immigrant generation together may contribute to understanding the

developmental etiology of substance use. Additionally, the effects of both race/ethnicity and

immigrant generation substance use may be wholly mediated by other contextual factors, such as peer influence, heritage language use, or parent-child relationships; Bui and colleagues (2012) found that such contextual factors fully mediated the influence of immigrant generation for all races/ethnicities (independently) on substance use.

Secondly, the present study did find that race and immigrant generation jointly associated with latent classes of obesogenic behavior trajectories for Black first-generation immigrants and Asian first and second-generation immigrants, with consistent support for the immigrant paradox. First-generation Black immigrants and first and second-generation Asian immigrants were less likely to belong to an obesity-risk class, indicating that for Black immigrants, the protective influence of the immigrant paradox fades over generations, while for Asian immigrants, the protective influence of the immigrant paradox is sustained at least until the second-generation. The lack of generational attenuation for Asian immigrants is consistent with prior literature (Afable-Munez et al., 2010), and prior studies indicate that heritage cultural maintenance may influence nutrition positively for both Asian immigrants and Black immigrants (Garnweidner, Terragni, Pettersen, & Mosdol, 2012; Renzaho, Swinburn, & Burns, 2008). This cultural heritage maintenance may not have the same positive effect for Hispanic immigrants. Hispanic immigrants predominantly originate from Latin American countries, where rates of being overweight were between 50-60% compared to 10-30% in Asiatic/African countries around the time of the study. Further, the rate of obesity in several Latin American countries has rapidly increased since, becoming a public health concern (Rivera et al., 2014).

These findings support examining development within the context of race/ethnicity and immigrant generation. The findings provide nuanced information for practitioners: programs targeting obesity prevention in populations should consider how the effects of race/ethnicity and

immigrant generation inform the intervention population. Whereas Asian and Black first-generation and second-generation immigrants may not be at risk for developing obesity, Hispanic first and second generation immigrants do not show the same low risk for obesogenic health behaviors. This may be due to differences in heritage cultures across these races/ethnicities, disparities in education/social status of these groups upon entry, or differential access to resources during their residence in the United States. Additional research on understanding the effects of the race/ethnicity and immigrant generation interaction are likely to yield further nuances that inform practitioners. Future research should explore these effects by using more specific assessments of race/ethnicity and immigrant generation (e.g., country/continent of origin, age of entry into host culture) as well as multiple interactions with other social identifiers, such as gender or class.

Although the present findings are largely consistent with prior research and the hypothesized relationships, several limitations should be taken into consideration. Firstly, the assessment of race/ethnicity was measured through global measures, which groups a diverse group of cultures and traditions into a monolithic representation (e.g., Indian American and Japanese American as 'Asian American') due to constraints on sample size needed and data availability. Future studies should take into consideration incorporating questions of country of origin or country of heritage to better group races/ethnicities such that effects associated with race/ethnicity can be understood with greater nuance. Secondly, the present study used self-reported socioeconomic measures and health behaviors measures due to data availability constraints. Future studies should consider incorporating elements of both self-report and objective measures of socioeconomic status (e.g., tax brackets) and health behaviors (e.g., observation/daily diaries) to prevent self-report biases.

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Thirdly, whereas the present study provided key contributions to the current literature on the interactions of race/ethnicity and immigrant generation as it relates to health behavior development, the study did not consider additional factors that likely influence health behavior development as the analyses were limited in the number of interactions examined due to computational constraints on the software and methodology that was used, given the smaller sample sizes of some of the sub-groups. Future studies should consider additional interactions with social identifiers, such as gender, class, age, disability status, and religious orientation. Finally, this study did not examine any processes related to the health behavior trajectories studied, such as mediating or moderating processes, such as indirect relationships to physical illnesses in adulthood. This was in an effort to simplify the research objectives, upon which future research could be built. Additionally, the dataset was limited to 4 data collection time points, which limited the extent to which both growth modeling and mediation analyses could feasibly be done and still support temporal order.

Despite these limitations, the present study contributes novel findings to the current literature on the associations between early socioeconomic disadvantages, race/ethnicity, immigrant generation, and adolescent health behaviors. The study provides an important example in applying an intersectional lens to understand the health behavior development of ethnic minority immigrant youth to more holistically capture the effects of exposures and vulnerabilities. The present study also provides support for the importance of program design in obesity prevention programs to focus on the impact and incorporation of heritage culture, as well as for the importance of governmental or systemic legislation to work towards reducing the rate of poverty in young children as these early adversities have long-lasting and highly detrimental effects on health behavior development in adolescence and early adulthood.

CHAPTER 3: STUDY 2

Early adversity to health compromising behaviors in immigrant youth: The role of

parental support, perceived discrimination, and heritage language retention in immigrant

and native youth

Introduction

The increasing population of ethnic minority immigrant youth in the past decade has

accelerated the body of literature investigating health disparities across race, as well as

immigrant generation (i.e., the immigrant paradox; Garcia-Coll & Marks, 2012), resulting in

significant progress in understanding the development of health in minority and immigrant

populations in the United States (Mather, 2009). However, the developmental process of health

behaviors as examined in association with immigrant generation, class, and race/ethnicity

requires further study to uncover how these factors may exacerbate or protect potentially

vulnerable youth from embarking on unhealthy trajectories in their adulthood.

To this end, the demographic populations of immigrant youth and ethnic minority youth

present an interesting methodological challenge as the populations of immigrant youth and ethnic

minority youth overlap: over 80% of all foreign-born youths are considered to belong to an

ethnic minority group in 2014, which does not take into account the percentage of native-born

ethnic minority youth who were born to a foreign-born mother (i.e., second-generation

immigrants) (Colby & Ortman, 2015). One in four youth in the United States were a first or

second-generation immigrant in 2014 (Child Trends, 2014). Thus, contextual factors that may

influence the health of this population need study to inform any prevention or intervention programs aimed at encouraging optimal health in ethnic minority immigrants.

Studies examining a variety of health outcomes have noted the strong inverse and graded relationship between socioeconomic status (SES) and health throughout the life course since the 1960s (Adler et al., 1994; Antonovsky, 1967; Braveman & Barclay, 2009; Cohen, Janicki-Deverts, Chen, Matthews, 2010; Wickrama, Lee & O'Neal, 2015). SES adversity (e.g., low SES, poverty) experienced early in the life course has been shown to have a particularly long term and damaging influence on later adolescent and adult health (Cohen et al., 2010; Conroy, Sandel, & Zuckerman, 2010; Hanson & Chen, 2007; Taylor, Way, & Seeman, 2011). Nearly 31% of foreign-born children under the age of 18 live in poverty, most of whom are of Hispanic descent (Grieco et al., 2012), whereas 21% of native-born children are living in poverty, most of whom are of Hispanic or Black descent (Kids Count, 2015). These percentages suggest that not only is the notable damaging influence of early socioeconomic adversity more likely to impact foreign-born youth, this adversity is additionally more likely to impact ethnic minority youth as well.

Disparities in health by SES, immigrant generation, or race/ethnicity have diverged over the past 2 decades, with each of these groupings potentially having independent and additive effects on health outcomes (Perreira & Ornelas, 2011; Singh & Hiatt, 2006; Singh, Siahpush, & Kogan, 2010). For example, recent studies indicate that after accounting for the negative influence of socioeconomic adversity, years of life lived in the United States is associated an increased likelihood of becoming obese, increases in health risk behaviors, and reduced physical activity (Oza-Frank & Cunningham, 2010; Perreira & Ornelas, 2011; Ra, Cho & Hummer, 2013; Singh et al., 2011). This generational attenuation of health outcomes has been termed the immigrant paradox; the immigrant paradox describes a phenomenon where later generations of

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immigrants (e.g., second-generation, third) show relatively worse health outcomes (e.g., obesity, psychological distress) compared to first generation immigrants (Garcia-Coll & Marks, 2012).

Race or ethnicity also plays a role in understanding health disparities. Studies examining the immigrant paradox found notable group differentials in rates of physical activity across Chinese and Hispanic immigrants; second-generation Chinese immigrants engaged in less physical activity compared to first-generation Chinese immigrants, though the same was not true for Mexican immigrants (Afable-Munsiz et al., 2010). Though the literature thoroughly examining health differentials across immigrant generation and across race/ethnicity are fewer, this prior literature supports that even across immigrant generations, race/ethnicity plays a role in unpacking the development of health behaviors. Adolescence presents as an important developmental stage to study health behaviors as health behaviors learned or developed during adolescence are likely to continue into adulthood (Umberson et al., 2010). Thus, identifying the salient movers of health behavior development requires the study of how contextual factors in adolescence differentially contribute to health behavior outcomes across race/ethnicity and immigrant generation.

Early adversities can influence adult health through multiple mechanisms (i.e., cumulative disadvantage) and via psycho-social and physiological mediators (e.g., depression, stress dysregulation). Both a life course perspective (Elder, 1998) and a stress process perspective (Pearlin et al., 2005) emphasize the accumulated impact of early life stressors, such as perceived neighborhood danger and family socioeconomic disadvantages, in conjunction with stressful transitions, on later life health disadvantages. Additionally, applying intersectional thought to understanding these influences appropriately takes into account the heterogeneous lived experiences of ethnic minority immigrant youth (Crenshaw, 1989, Hankivsky, 2014).

Perceptions of discrimination and prejudice during adolescence may act as a mediating mechanism, particularly for ethnic minority and immigrant youth. Specific to ethnic minority adolescents, regardless of nativity, the experiences of discrimination present as a particularly potent source of psychological distress (i.e., Pearlin et al., 2005; Thoits, 2010). Even when controlling for the harmful influence of socioeconomic disadvantage on health, experiencing high rates of discrimination are associated with a wide range of negative health outcomes including high blood pressure, poor general health, and health risk behaviors (i.e., alcohol and cigarette use) (Prado et al., 2009; Williams & Mohammed, 2009). In addition to contributing to increases in psychological distress (Williams & Mohammed, 2009), experiencing discrimination and prejudice during adolescence is especially pernicious as the development of self may be hindered. Specific to ethnic minority youth, discrimination may disrupt the development of identity (Oshri, Schwartz, Unger, Kwon et al., 2014), a significant disruption that has been shown to predict increased health risk behaviors in adolescence (Masten, Faden, Zucker, & Spear, 2008; Schwartz et al., 2008).

Social resources, such as parental support, also present as a salient mechanism in linking early adversity to adult health behaviors. Within the family stress model, the impact of familial socioeconomic disadvantage contributes to maladjustments in children's development through reduced quality of parenting (i.e., closeness and involvement; Conger, Ge, Elder, Lorenz, & Simons, 1994). Though the impact of decreased parental support on health risk behaviors (i.e., Kwon & Wickrama, 2014) has been supported in prior literature across nationally representative samples, showing consistency across race and ethnicity (McLeod & Shanahan, 1993), this reduction in parental closeness and involvement may be particularly detrimental for immigrant

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adolescents for whom parental support is a particularly salient component of social support (Cho & Haslam, 2010; Thomas & Choi, 2006).

In accordance with prior literature on the acculturative processes of immigrants, harmonious associations with both heritage and host cultures present as an optimal transitional style for later well-being (Berry, Phinney, Sam, & Vedder, 2006). For immigrant minority adolescents, the retention of just one aspect of their heritage culture (i.e., language) has been shown to significantly reduce the potential of health risk behaviors in adolescence (Schwartz et al., 2011). Thus, it is conceivable that retention of heritage language for children of immigrants represents a unique psychosocial resource for immigrant minority youth. The protective effect of this unique psychosocial resource of immigrant adolescents is consistent within a stress process perspective in that such resources enable individuals to avoid health risk behaviors and engage in health promoting behaviors, despite exposure to multiple early stressors (Pearlin et al., 2005). For immigrant adolescent youth, the protective effect of heritage language retention may operate through several different mechanisms, such as stronger associations with heritage cultural values or behaviors that prevent health risk behaviors (Schwartz et al., 2011), engaged communication about health behaviors between parent and child (Litrownik et al., 2000; Ornelas, Perreira, & Ayala, 2007), and improved cognitive abilities that allow for optimal decision making abilities (Barac & Bialystok, 2011; Benet-Martínez, Lee, & Leu, 2006; Yoshida, 2008).

Accumulation and proliferation of contextual stressors

Prior studies documenting the impact of early adversity on later health highlight the importance of research that is both longitudinal and multicultural; that is, the investigation of the influence of early adversity on adult health must account for the long-term influence (i.e., across developmental stages) of different types of stressful contexts (i.e., minority group status,

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socioeconomic class, abusive environments; Adler & Stewart 2010; Williams et al., 2010; Hankivsky, 2014). Life course theory highlights the need for research to consider development as a nested life-long process that unfolds through cumulative mechanisms that link across developmental stages (Conroy et al., 2010; Elder, 1998; Elder, Johnson, & Crosnoe, 2003). The implication here is that the contextual influences in childhood precipitate mechanisms that carry forward into adolescence and adulthood. The unfolding of the contextual influence of early adversity is cumulative. For example, living in poverty can delay a child's academic development, which in turn, can affect the level of educational attainment, and related socioeconomic attainment, in adulthood—which has direct effects on health in adulthood (Leventhal & Brooks-Gunn, 2000; Turrell et al., 2002).

The effect of adversity on development can be understood as additive, accumulating additional damaging repercussions as an individual goes through succeeding life stages. While these stressful early experiences can have direct effects on later adult health (i.e., through the lasting threat of 'living on the edge'; Ross & Huber, 1985, p.313), these early experiences also likely set individuals on specific life trajectories that are likely to accumulate disadvantages (or conversely, advantages; i.e., 'the rich get richer or the poor get poorer') (O'Rand, 2009). This stressful environment may present as psycho-social stressors and/or structural risks. For example, low family SES has been associated with living in poorer communities that may present multiple structural risks (i.e., increased exposure to toxins, increased exposure to violence; a less language-rich environment; Conroy et al., 2010; Evans & Kantrowitz, 2002). Prior studies have also shown that low family SES to predict psychosocial stressors such as harsh parenting, which lead to an increase in child externalizing problems (Scaramella, Neppl, Ontai, & Conger, 2008). Indeed, prior research has repeatedly documented the harming influence of

adverse socioeconomic environments in childhood across multiple developmental domains (psychological; Goosby, 2007; Najman et al., 2010b; physiological; Cohen, Janicki-Deverts, Chen, & Matthews, 2010; Hanson & Chen, 2007; Wickrama, Conger, Wallace & Elder, 1999).

Adverse environments early in the life course, such as poverty or child maltreatment, can create developmental contexts that are chronically stressful and potentially toxic (Evans, 2004; Evans & Kim 2007; Shonkoff, Boyce, & McEwen, 2009; Taylor et al., 2011). When these stressors are experienced during sensitive periods in early childhood, significant disruptions to developing physiological systems may cause functional and structural dysregulations that contribute to health compromising behaviors and higher incidences of illness in later life (Shonkoff et al., 2009). When the stress response system becomes dysregulated, this sets a child to be particularly vulnerable or unable to cope with expected stressors across life stages (e.g., academic challenge or interpersonal relationships) (Evans & Kim, 2012). Thus, not only does the adverse childhood environment of poverty impact an adolescent's ability to choose healthy coping mechanisms due to disrupted psychosocial self-regulatory processes (Evans & Kim, 2013), but also may dysregulate a person's physiological stress-response system (i.e., elevated HPA activities; Evans & Kim, 2007); that is, childhood poverty can increase the vulnerability of an individual to develop maladaptive health habits and poor health.

In accordance with the stress process perspective (Pearlin, 2005), early disadvantages beget a process of stress proliferation, or series of developmental mechanisms, that can ultimately impact health risk behaviors and health outcomes. For example, African American young adults who experienced more stressful life events and racial discrimination had higher levels of negative emotionality, which, in turn, was predictive of more deviant social affiliations, which ultimately were predictive of increased health risk behaviors, such as sexual activity under

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the influence of substances, increased risky alcohol use, and increased cannabis use (Brody, Chen, & Kogan, 2012).

Accumulated stressors in childhood can impact health and health behaviors in adolescence through additional related stressors or secondary stressors (e.g., harsh parenting, a language-sparse environment), as well as through direct stressors (e.g., increased exposure to environmental toxins).As adolescence is a period characterized by much physiological, social, and psychological change and the life stage at which the rate of risk–taking behaviors reaches a lifetime peak (Schulenberg, Maggs, & Hurrelmann, 1997; Steinberg, 2008), the previously experienced early adversities may prime youth to engage in poor health habits as coping mechanisms. Health habits (e.g., physical activity, smoking) developed in adolescence are expected to persist throughout the life course (Latendresse, Rose, Viken, Pulkkinen et al., 2008; Lohaus, Vierhaus, & Ball, 2009; Paavola, Vartiainen, & Haukkala, 2004; Maggs, Schulenberg, & Hurrelmann, 1997; Raposa, Bower, Hammen, Najman, & Brennan, 2014; Umberson et al., 2010). Thus, identifying protective or exacerbating factors are central to preventing the development of maladaptive health behaviors from adolescence into adulthood.

The effect of poverty on development may also be dynamic; that is, different facets of the early environment may precipitate multiple trains of accumulating influence across the life course and across life domains. For example, specific to immigrant adolescents, the transition to adolescence from childhood may further be burdened by the life course concept of 'structural lag' (Jackson & Sellers, 1997), which illustrates how as one ages, she or he is met with changes in role opportunities and societal expectations. As development is life-long, structural lag will always be in flux; that is an individual's age and his or her respective roles and expectations will often be asynchronous. Foreign origin youth (i.e., immigrant adolescents) who were concurrently

enculturated or acculturated to a host society with their parental figures, may be particularly ill-equipped to handle such structural lags as they may lack the bridge that parents often provide through these transitions; thus, leaving open the potential for immigrant youth to be vulnerable to be primed for the development of maladaptive health behaviors.

Applying Intersectionality

The most distinguishing tenet of the intersectional paradigm is the call for understanding human behavior across multiple aspects of one's social identity; considering a single social identifier to understand a behavior does not sufficiently represent the experiences of an individual that are influenced by multiple social identifiers (Crenshaw, 1989). A person's 'social location' then is determined by the multiple intersections of a set of social identifiers (Crenshaw, 1989). For example, of the 42 million foreign-born individuals living in the U.S., 81% also identify as a person of color (Colby & Ortman, 2014); thus, for these ethnic minority immigrants, the experience of acculturating in the U.S. is not only informed by their immigrant generation and departure/arrival conditions, but also by the absolute and relative social context around race and ethnicity in the United States compared to the country they had emigrated from. For immigrant youth, living in poverty is much more likely (DeNavas-Walk et al., 2012; Kids Count, 2015) when compared to their native-born counterparts; these immigrant youth living in poverty are also much more likely to be persons of color, which pinpoints a specific demographic group likely to experience socioeconomic adversity and its related adult health impacts (Kids Count, 2015; Grieco et al., 2012).

Historically rooted in the feminist movement in response to the lack of acknowledgement of the racialized experiences of women of color, the concept of intersectionality assumes that the different social identities of an individual are inextricable (Hankivsky & Cormier, 2010). The

intersection of key social identifiers, such as race, immigrant generation, and gender, is an individual's social location, which may move as an individual develops. Thus, no single category assumes priority over another; methodologically speaking, a focus on only gender or only race contradicts this tenet of intersectionality. As such, an intersectional approach calls for addressing the multiplicity of an individual's social location. These socially constructed categories that are interpersonally and systemically invoked (Hankivsky & Christofferson, 2008) can be understood as categories of difference to explore health differentials across and within social groups (McCall, 2005). Utilizing an inter-categorical method would consider the interactions of such pre-existing categories of difference (i.e., social categories) in examining health outcomes. In the present study, application of an intersectional inter-categorical approach calls for examining the consistencies and differences across race/ethnicity and immigrant generation in the linkages from early adversity to health behavior outcomes by using interactive or grouping terms. Research that considers the mutually informed categories of race and immigrant generation has the potential to allow for policy recommendations and preventative intervention programming that is sensitive to the intersectional lived experiences of a demographic group in the U.S. that is expected to grow significantly over the next several decades (Colby & Ortman, 2014; Mullings & Schulz, 2006).

The Impact of Early Adverse Experiences on Later Health

The toxic impact of early adverse experiences has been tied to a wide range of health disorders and health compromising behaviors in adolescence and adulthood. Specifically, early adversity is linked to poor health outcomes like poor cardiovascular health (Taylor et al., 2011; Wickrama, Conger, & Abraham, 2005), an increased risk of having rheumatoid arthritis in adulthood (Parks et al., 2013), an increased risk of severe adult periodontal disease and caries (Poulton et al., 2002), accelerated weight gain (i.e., steeper BMI trajectories) from childhood into

adulthood (Wells, Evans, Beavis, & Ong, 2010; Wickrama, Kwon, Oshri, & Lee, 2014), an increased susceptibility to colds and acute respiratory infections (Cohen, Doyle, Turner, Alper, & Skoner, 2004), and is further tied to increases over time in the total number of physical illnesses experienced (Wickrama, Conger, & Abraham, 2005). Early adverse experiences are also associated with less nutritious diets, more sedentary lifestyles, more cigarette smoking in adolescents (Hanson & Chen, 2007; Raposa, Hammen, Brennan, O'Callaghan, & Najman, 2014), impulsive behaviors that foster potentially health compromising decisions (Lovallo, 2013), and risky alcohol use behaviors (i.e., early initiation, heavy alcohol consumption, social problems related to alcohol use; Enoch, 2012; Young-Wolff, Kendler, & Prescott, 2012).

Though many of these studies examining the impact of early adversity on later health outcomes consider the contributions of race and immigrant status, the models examining the effects of early adversity may differ by the co-constructed groups of race/ethnicity and immigrant status (i.e., first-generation Hispanic youth). The detrimental impact of early adversity on adolescent development has been replicated across Black, Hispanic, and Asian American samples in the U.S. (Barrera et al., 2006; Benner & Kim, 2010; Conger et al., 2002; Chartier, Walker, & Naimark, 2007); differences in rates of illness and stress across race/ethnicity and the immigrant paradox may suggest differential effects of early adversity across race/ethnicity and immigrant generation (Thoits, 2010; Williams, Mohammed, Leavell, and Collins, 2010). This may be influenced by the increased likelihood of immigrant and ethnic minority children to experience social immobility when compared to native-born youth, and therefore, the increased likelihood of experiencing chronic economic hardships throughout the life course (Beiser, Hou, Hyman, & Tousignant, 2002; Conger et al., 2002; Kids Count, 2015; Grieco et al., 2012).

Ethnic minority immigrant children are also likely to experience a unique set of early adversities related to the experience of immigration, such as barriers to education, threat of deportation to family members, and perceptions of marginalization and discrimination (Andoff et al., 2011). These unique exposures are in addition to those that have also impacted non-immigrant families, such as more financial hardships, a higher likelihood of poor parental mental health (potentially leading to decreases in family cohesion and increases in poor parenting), and greater material deprivation (Beiser et al., 2002; Devine, Plukett, & Wright, 1992). Additionally, the experience of immigration during sensitive periods of childhood can be a significant stressor in and of itself (Rutter, 1996). Prior research also documents that immigrant families may experience specific exposures that may also beget specific vulnerabilities to socioeconomic adversity. While indicators of adversity differentially accounted for adverse effects on mental health outcomes in immigrant families when compared to non-immigrant families, adversity did not account for the additional variance in this linkage (Beiser et al., 2002). This suggests that the material deprivation experienced due to socioeconomic disadvantage may impact immigrant families more strongly. Therefore, immigrant families may face both increased vulnerabilities and increased exposures to the experiences of socioeconomic hardship.

Physiologically, early disadvantages may result in the biological embedding of experienced stresses. When the body's stress system is chronically or continuously activated, the physiological systems (i.e., cardiovascular, immunological, neurological) activated in the stress response may become permanently dysregulated (Hertzman, 1999). The continuous and heightened 'wear and tear' on the body due to the activated physiological stress response can cause changes in the body that lead to disease (McEwen & Seeman, 1999). Stress systems are developmentally programmed. When an individual's stress systems are overloaded, as they may

be when living in chronic socioeconomic disadvantage (Repetti et al., 2002), the body develops inefficiencies in processing the physiological reactions to a stressful environment—inefficiencies which carry forth through the life course and beget further exposures to stressors which can beget further inefficiencies.

Disadvantaged early experiences impact later health in three possible processes: latent effects through which early adversity direct impacts later health, pathway effects, through which early adversity influences later health via the proliferating stressful experiences initiated by early adversity, and through cumulative effects, through which the accumulated experiences of early adversity and the following life course experiences as well as the duration to these adverse experiences impact later health in a dose-response type relationship (Hertzman, 1999). The latency model suggests that specific effects related to the cause of early disadvantages (i.e., low birth weight, inadequate exposure to lingual stimuli at critical or sensitive periods) result in lifelong impacts on adult health regardless of the intermediary circumstances. This model is popularly supported by the studies on Romanian orphans who had spent a significant portion of their early years in destitute Romanian orphanages with little to no nourishing interactions showing significant developmental delays throughout their lives (i.e., Rutter et al., 1998). The pathway model suggests that disparities early in the life course permanently set individuals on a course that result in disparities in adulthood, which may operate through multiple mediating and moderating mechanisms in adolescence (i.e., development of mastery; Kwon & Wickrama, 2014). Latent and pathway effects are difficult to disentangle as the effects they theoretically model are structurally nested within the same model. For example, lack of developmentally appropriate levels of cognitive stimulation in early childhood may have direct and mediated effects on later adult health (Cohen et al., 2010; Pechtel & Pizzagalli, 2011). Finally, the

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cumulative disadvantage model considers how early life events are linked through the life course, and additively impact health in adulthood through multiple pathways (i.e., mental, social, financial). Importantly, these additive effects may be linked to multiplicative effects that are resultant of the multiple domains that an individual experiences–for example, across life domains or social identities during a single developmental time period.

Perceived Discrimination and Health Behaviors

One mechanism through which early adversity may impact later health in ethnic minority youth is through perceived discrimination. Perceptions of discrimination are an established social stressor, particularly of individuals who may identify with more than one disadvantaged social status (ie., an African American woman) (Thoits, 2010). Experiencing relatively higher levels of early adversity (i.e., maltreatment or poverty) has been associated with heightened perceptions of discrimination (Bombay, Matheson, & Maisman, 2011; Grollman, 2012). Heightened levels of perceived discrimination during adolescence, which may be reflective of the negative impact of racially constrained trajectories of socioeconomic attainment (Brondolo, Libretti, Rivera, & Walsermann, 2012), are linked to poorer self-rated health (Grollman, 2012) and to health compromising behaviors (i.e., substance use; Gibbons et al., 2012; Ra, Cho, & Hummer, 2013; Verissimo, Grella, Amaro, & Gee, 2014).

Early adversity may influence perceptions of discrimination via increased sensitivities to prejudices based on earlier stressful experiences. Physiologically, experiencing greater adversity may lead to a high allostatic load (McEwen & Gianoros, 2010), which may lead to chronically heightened states of stress, during which individuals perceive higher incidences of discrimination when compared to individuals whose stress systems deactivate adaptively. Psychologically, heightened exposure to systems of oppression (ie., racism, classism) increases the likelihood that

an individual views a biased interaction as discriminatory and prejudiced (Bombay et al., 2014; Miller & Major, 2000). In accordance with the minority stress theory (Meyer, 1995), individuals who experience multiple systems of oppression (i.e., women, people of color, socio-economically disadvantaged persons) are more likely to report more frequent discrimination (Grollman, 2012; Schmitt, Branscombe, Postmes, & Garcia, 2014).

Perceptions of discrimination are a particularly salient marker of psychological distress for ethnic minority and immigrant youth because of the increased likelihood of incidence (Schmitt et al., 2014; Noh, Kaspar, Wickrama, 2007). Perceived discrimination, are self-reported levels of unfair and unjust treatment on the basis of prescribed social categories (i.e., gender, race/ethnicity, age, social class, health/unhealthy; Thoits, 2010). Interpersonal interactions colored by discrimination and prejudice foster negative emotional reactions and stresses in the individual who is being mistreated by disrupting feelings of social connectedness (e.g., Sandler, 2001) and prescribing unfounded characteristics to an individual based on societally-determined categories, often attributed on the sole basis of physical attributes (Grollman, 2012). Prejudiced behaviors can range from general interpersonal interactions (i.e., customer service; King, Shapiro, Hebl, Singletary, & Turner, 2003) to more major life events, such as being refused a home loan or experiences with prejudice in the work environment (Gee, Walsermann, & Brondolo, 2012). Accordingly, members of disadvantaged social statuses (i.e., women, ethnic minority individuals, individuals with obesity, immigrants) report higher incidences of discrimination (Kessler, Mickelson, & Williams, 1999; Thoits, 2010).

Though much of the literature examining antecedents and correlates of perceived discrimination consider racial discrimination, discrimination on the basis of other social categories (i.e., gender, social class) has also been shown to be a linked to poorer mental and

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physical health (Fuller-Rowell, Evans, & Ong, 2012; Schmitt et al., 2014). Further, individuals who identify with more than one disadvantaged social status, (e.g., ethnic minority immigrant youth) likely experience multiple forms of discrimination (i.e., on the basis of race and gender vs. on the basis of race) and are exposed to more frequent discrimination (Grollman, 2012; Yip, Gee, & Takeuchi, 2008). These increased levels of perceived discrimination in adolescence are predictive of lower levels of self-rated health (Grollman, 2012). These findings support the salience of considering multiple social identifiers in examining the link between perceived discrimination and later health.

Perceptions of discrimination have been shown to change across the life course. Children as young as 3 being to recognize differential treatment of people based on social categories (Van Ausdale & Feagin, 2001), and levels of perceived discrimination rise in adolescence (Greene, Way, & Pahl, 2006). Changes over time of perceived discrimination also varied by ethnicity; Asian-American and Hispanic adolescents reported relatively higher levels of perceived discrimination compared to African American adolescents, though, African American adolescents showed faster growth of perceived discrimination from adolescence to adulthood (Greene et al., 2006).

Increasing perceptions of discrimination may also be a result of age-patterned exposures (Gee et al., 2012), a life course concept that emphasizes how as individuals age, the social context shifts accordingly. For example, as adolescents graduate high school and begin to consider career opportunities, they may have more interactions that are laden with prejudice, particularly if an individual holds a disadvantaged social status (i.e., African American; Brondolo et al., 2012). Biased employment opportunities impact socioeconomic statuses, which are linked to physical health outcomes via increased levels of stress, health compromising

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behaviors, and limited health resources (Williams & Mohammed, 2009). These findings suggest the salience of assessing perceived discrimination in adolescence, a significant period of change for individuals shifting into new social contexts.

Even perceptions of discrimination that do not necessarily reflect negative prejudices can have negative consequences for those experiencing the discrimination. For example, the Asian American stereotype of the "model minority," a positive stereotype of the academic successfulness of Asian American youth, can bear a negative psychological burden on Asian American youth. While the reality of the educational attainment of Asian American youth is significantly impacted by contextual opportunities and potential for social mobility (Duncan & Trejo, 2015) and not just cultural emphases placed on educational attainment, the perception of how Asian American youth should fare in educational settings can create unequal expectations on Asian American immigrant youth (Conchas & Perez, 2003). These biased expectations negatively impact Asian American youth, a heterogeneous demographic whose variation academic achievement varies (Conchas & Perez, 2003). While the differential expectations of a student's success based on his or her ethnicity may encourage a student to fulfill these expectations academically, the strain of having to navigate the dissonance between others' expectations and individual desires has the potential to disrupt identity consolidation and prime these youth towards substance use (e.g., alcohol use; Oshri et al., 2014; Schwartz & Montgomery, 2002; Schwartz, Unger, Zamboanga, & Szapocznik, 2010).

Alternatively, feeling unjustly treated based on negative biases or prejudices also contributes to health compromising behaviors in ethnic minority and immigrant youth. African American youth who perceived teachers to grade unfairly or to otherwise treat students differentially also reported greater alcohol and marijuana use (Sanders-Phillips et al., 2014).

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General interpersonal perceived discrimination was also significantly predictive of early alcohol use in African American youth (Gibbons et al., 2012). Perceived discrimination was also found to be predictive of increased nicotine use in Hispanic immigrant youth, though this relationship was significant for Hispanic females but not for Hispanic males (Lorenzo-Blanco, Unger, Ritt-Olsen, Soto, & Baezconde-Garbanati, 2011). Importantly, and in line with an intersectional lens, the link between perceived discrimination and health in adolescence shows a graded relationship. Youth who experience multiple forms of discrimination (i.e., experience multiple systems of oppression; sexism, racism, classism) report incrementally worse general health; that is, considering intersecting social identities illustrates the additive impact of perceived discrimination for youth who identify with more than one disadvantaged social status (Fuller-Rowel et al., 2012; Grollman, 2012).

Association between perceived discrimination and parental support. Changes over time in perceptions of discriminations may be impacted by other salient intermediary factors, such as parental support. Recent studies have shown that parental support may buffer the exacerbating influence of perceived discrimination on adolescent health behaviors. Phinney and colleagues (1998) emphasized the importance of understanding how psychosocial variables impact perceptions of perceived discrimination in immigrant adolescents, with characteristics like mastery and self-esteem showing protective effects. Recent studies examining Black and Hispanic youth have shown that parental support, especially in conjunction with other types of social support (e.g., community, peer) can protect from the negative ramifications of experiences of discrimination (DeGarmo & Martinez, Jr., 2006). Parental support has been modeled as a buffer (e.g., Zapolski, Fisher, Hsu, & Barnes, 2016) of the effect of perceived discrimination on adolescent drug use, as well as a predictor of perceived discrimination, such that more parental

support enabled adolescents to refrain from drug use as a coping mechanism from experiencing discrimination (Gibbons, Etcheverry, Stock, Gerrard, Weng, Kiviniemi et al., 2010). Conversely, it is possible that perceived discrimination may influence the change over time of parental support experienced given the research showing that the parent-child relationship is likely bidirectional, rather than a one-way street (Shaffer, Lindhiem, Kolko, & Trentacosta, 2013). Adolescents who experience high levels of perceived discrimination may react with negative affect (e.g., depression, anger; Hartshorn, Whitbeck, & Hoyt, 2012; Noh, Kaspar, & Wickrama, 2007). In turn, prior research has shown that in response to an adolescent's negative affect resulting from perceived discrimination, a parent may react with minimizing or dismissive responses, rather than supportive responses (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009). Further research is needed to understand how this pathway operates across race x immigrant generation given that the structural pathway between the two constructs of parental support and perceived discrimination are not fully understood nor been studied in all relevant samples (e.g., Asian American groups).

Parental support and Heritage language retention: Protective factors

In accordance with the stress process perspective, specific protective resources may prevent or inhibit the process of stress proliferation, during which primary stressors (i.e., early adversities) eventuate in secondary and tertiary stressors (Pearlin, 1999). Conceptually, these resources are framed as protective to reflect the capacity to buffer the influence of stress on later developmental outcomes. Pearlin (1999) notes that these resources may empirically operate as mediators depending on the dynamic and temporally constrained nature of the social context within which the resource is expected. Given the temporally constrained linkages between the intermediary links from early adversity to adult health behaviors, it is expected that while

parental support and heritage language retention are identified as key protective resources for

ethnic minority immigrant youth, they are modeled as either direct effects or as mediators.

The Role of Parental Support

During adolescence, social support from parental figures presents as a particularly

important buffer for ethnic minority and immigrant youth (Cho & Haslam, 2010; Harker, 2001;

Thomas & Choi, 2006; Phinney & Chavira, 1995). Parents are the main socializing agent of the

heritage culture and race/ethnicity for children; thus lack of support from parents may be

particularly debilitating for ethnic minority and immigrant youth, who are then tasked with

navigating their own understanding of their ethnic identity (Phinney & Chavira, 1995; Harker,

2001; Schwartz et al., 2010). Further, early socioeconomic adversity has been shown to be linked

to maladjustments (i.e., negative affect, low academic achievement) in adolescent development

via reduced quality of parenting largely through the literature testing the Family Stress Model

(FSM) (Conger et al., 1992; 1993; 2002).

According to the family stress model (Conger et al., 2002), the stresses associated with

socioeconomic disadvantage (i.e., family economic pressure) can indirectly impact adolescent

adjustment through ineffective parenting. Increased economic pressure is an established link to

poor parenting characteristics (i.e., low supportive parenting, low involvement) (Conger et al.,

1994; Lee, Wickrama, & Simons, 2012). Further, poor parenting characteristics have been linked

to poorer eating habits (i.e., diets with low nutrition), lack of physical activity, and higher levels

of substance use (i.e., alcohol and cigarette use; Lohaus et al., 2009). Recently, a study by Kwon

and Wickrama (2014) established the indirect link from socioeconomic adversity to adolescent

health compromising behaviors via supportive parenting behaviors. The influence of

socioeconomic adversity on later adolescent development via parenting behaviors has been

established in Mexican American families (Parke et al., 2004), Chinese American families (Brenner & Kim, 2010), African American families (Conger et al., 2002), and across a nationally representative sample in the U. S. (Gershoff, Aber, Raver, & Lennon, 2007). Further, prior research has found lack of parental support to contribute to poorer mental health outcomes for Korean-American immigrant adolescents (Cho & Haslam, 2010). Studies have also shown generational consistencies in the link from parenting to adolescent health behaviors; disengaged parenting (i.e., low involvement) was predictive of increased alcohol use across first, second, and third generation immigrant youth (Driscoll, Russell, & Crockett, 2008). However, as levels of family economic pressure may differ across race/ethnicity as ethnic minority and immigrant families are overrepresented in low socioeconomic classes (Beiser et al., 2002; Conger et al., 2002; Kids Count, 2015; Grieco et al., 2012), the indirect effect from socioeconomic adversity to supportive parenting may differ across ethnicities.

The Role of Heritage Language Retention

For ethnic minority immigrant adolescents, retaining elements of both heritage and host cultures, is theorized to promote optimal psychological functioning and development (i.e., biculturalism; Benet-Martinez & Haritatos, 2005). Theoretically, aligning with a bicultural style of acculturation fosters a better understanding and integration of aspects of the cultures they are exposed to (Schwartz et al., 2010; Tadmor, Tetlong, & Peng, 2009). Heritage language retention, that is, speaking both heritage and host culture languages (i.e., bilingualism), represents a behavioral domain of acculturation whereby engaging in the behavior of using and maintaining the ability to speak one's heritage language represents the retention of this aspect of one's heritage culture (Kim & Abreau, 2001; Schwartz et al., 2010). Further, retaining heritage cultural values and behaviors have been shown to prevent health risk behaviors (i.e., sexual risk

behaviors, substance use; Schwartz et al., 2011, and use of English over heritage language has been linked to increased levels of illness in a diverse sample of adolescents (Wickrama, Elder, Jr., & Abraham, 2007). Of note, the buffering effect of heritage language retention shows differences across ethnicity; the retention of heritage language significantly reduced the risk of drinking while driving for African American and Hispanic immigrant youth, but the same effect was not observed for Asian immigrant youth (Schwartz et al., 2011). The differential impact of ethnicity is reflective of the familial roles that immigrant youth may be expected to fill as translators through the act of language brokering (Kam, 2011). Studies have shown that positive perceptions of language brokering between one's parents and others is linked to reduced levels of risky behaviors for Hispanic youth (Kam, 2011) and a sense of self-efficacy for Chinese immigrant youth (Wu & Kim, 2009); whereas a negative perception of one's role as the language broker was associated with increased substance use (Kam, 2011) and a sense of burden (Wu & Kim, 2009), respectively.

The protective role of heritage language retention for immigrant adolescents may operate through several different mechanisms, such as more engaged communication about health behaviors between parent and child (Litrownik et al., 2000; Ornelas et al., 2007) and improved cognitive abilities that allow for optimal decision making (Barac & Bialystok, 2011; Benet-Martínez, Lee, & Leu, 2006; Yoshida, 2008). High levels of parent-child communication have been shown to promote positive health behaviors, such as physical activity (Ornelas et al., 2007). For immigrant adolescents, heritage language retention likely improves parent-child communication, as immigrant parents may be faced with stresses associated with host culture language ability. Increased parent-child communication, fostered by heritage language retention, has been found to be significantly predictive of decreases in adolescent tobacco and alcohol use

in Hispanic immigrant adolescents (Litrownik et al., 2000). Additionally, heritage language retention (i.e., bilingualism) has been found to be linked to improved executive functioning in children (Barac & Bialystok, 2011; Yoshida, 2008), as well as improved cognitive flexibility in young adults (Benet-Martinez et al., 2006). These cognitive benefits of bilingualism may prevent immigrant youth from engaging in risky levels of substance use (Aytaclar, Tarter, Kirisci, & Lu, 1999; Wilens et al., 2012).

The Present Study

Given the established influence of early adversity on adolescent and adult health behaviors, the current study draws on the synthesis of the life course perspective and the stress process perspective through an intersectional lens to examine the structural paths that delineate the development of health compromising behaviors in ethnic minority immigrant youth. This study will examine the direct and indirect pathways to maladaptive health behaviors from early adversity through meaningful mediators for ethnic minority and immigrant youth. Further, this study will consider how the full model differs across race/ethnicity and immigrant generation. The conceptual model being tested is presented in Figure 2.1.

Specifically, this study will examine the pathway from early adversity to health compromising behaviors in early adulthood via perceived discrimination and parental support in adolescence. The research hypotheses are as follows:

1) it is expected that early adversity be associated with later health behaviors directly and indirectly.

2) given the noted salience of perceived discrimination and parental support for ethnic minority and immigrant youth in predicting later maladaptive health behaviors (Harker, 2001; Phinney & Chavira, 1995; Prado et al., 2005; Williams & Mohammed, 2009; Verissimo et al., 2014), these two constructs are expected to significantly mediate the detrimental impact of early adversity on adolescent health behaviors. Given the protective vs. exacerbating mechanisms of parental support and perceived discrimination on levels of health compromising behaviors, it is expected that parental support will behave as a protective factor on the relationship between family economic pressure and health compromising behaviors, whereas perceived

discrimination will exacerbate the impact of family economic pressure on increased

health compromising behaviors. Furthermore, it is expected that parental support and

perceived discrimination will show cross-lagged effects such that parental support

will predict a decline in the change in perceived discrimination from time 1 to time 2,

and vice versa.

3) Retention of heritage language, noted as a having a potential protective role

representing congruence across the multiple cultures foreign origin youth exist within

(Schwartz et al., 2010; Tadmor et al., 2009), is expected to behave as a protective

factor unique to immigrant youth (vs. native youth).

4) Finally, this structural model will be tested across three different ethnic minority

groups (Asian, Hispanic, Black), each further grouped by immigrant/native status to

examine the structural model across race/ethnicity and immigrant generation. I expect

that I will find significant differences across the two immigrant generation sub-groups

within each race-specific structural model as support for understanding the etiology

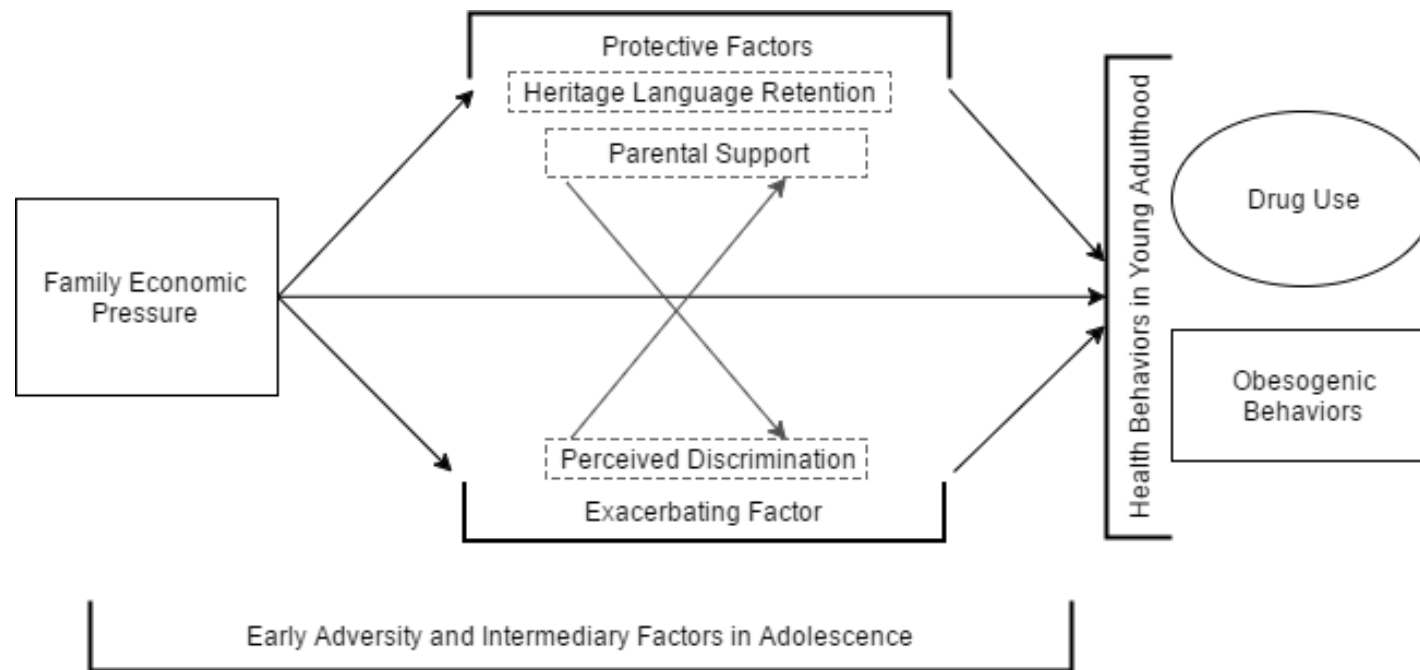of health compromising behaviors through an intersectional lens.

Figure 2.1 Hypothesized pathways from family economic pressure to health behaviors in young adulthood.

Methods

Sample.

Data for this study also comes from the National Longitudinal Study of Adolescent to Adult Health (Add Health). The same stratified sample was used to test the hypotheses. Data were initially collected in 1994 – 1995 from a stratified cluster-sampling of middle and high school students with a sample size of 20,745 participants (M_{age} =15.3 years, range = 11 to 21) from 134 schools in the United States. Parents of participating students were also asked to complete questionnaires only at baseline. Parent-report data from wave 1 were used and adolescent-report data from waves 2 to 4 were used. Data was collected again in 1995 – 1996 (wave 2, M_{age} =16.2 years, range = 11 to 23), 2001 – 2002 (wave 3, M_{age} =21.6 years, range = 18 to 27), and 2007 – 2008 (wave 4, M_{age} =28.2 years, range = 24 to 33). The final sample size included all participants from all waves (N=20,745), and the grand sample weights at wave 1 were used to correct for oversampling. Missing data were handled using Full Information Maximum Likelihood (FIML) estimation, which 1) estimates missing values based on all other available data, and 2) estimates parameters on all these "imputed" and available data (Enders & Bandalos, 2001).

Measures

Family economic pressure was assessed via parent-reports of family economic pressure at wave 1 (1994). These items reflected economic hardship for parents and reported whether any member of the household had received: social security, supplemental security income, food stamps, housing subsidies, or aid to families with dependent children. These items were summed to create an index where higher scores reflected greater socioeconomic adversity and had an

internal consistency of .85. These indicators have been used in previous studies to represent socioeconomic hardship (Wickrama & Bryant, 2003; Wickrama et al., 2014).

Race and Immigrant Generation. Immigrant generation was assessed at wave 1 by a binary variable that asked the adolescent participant whether he/she was born in the United States, and a binary variable that as the participant's parent whether he/she had been born in the United States. Three additional dummy variables were created reflecting first generation immigrant participants (5.8% of whole sample), second generation immigrant participants (12.2%), and native-born participants. *Race or ethnicity* was indicated at wave 1 by 3 binary items that identified participants as Hispanic (17% of whole sample), African American (23%), or Asian (7.7%). Six additional dummy variables were created to represent the intersection of race and immigrant generation as the following groups: first generation Hispanic (3.3% of the whole sample), second generation Hispanic (6.8%), first generation Black (0.4%), second generation Black (1.2%), first generation Asian (1.9%), and second generation Asian (2.4%).

Perceived Discrimination. Perceived discrimination was assessed at wave 1 (1994) and 2 (1995) using 5 self-reported items that conceptually captured elements of perceived discrimination in the school environment, a salient social context for adolescents (i.e., rejection by majority group: 'I feel a part of my school', prejudiced or biased interactions: 'students at the school are prejudiced', unfair treatment 'teachers treat students unfairly', and invisible threat 'I feel safe in my school'). These items showed high internal consistency ($\alpha = .91$) and were on a frequency scale of 0 (never) to 4 (every day) or an agreement scale from 1 (strongly disagree) to 5 (strongly agree). These items were summed to reflect perceived discrimination at waves 1 and 2.

Parental Support. Parental support was assessed using adolescent reports of 5 items at wave 1 and 2 reflecting paternal and maternal closeness (i.e., 'you feel you can really trust him [your father]'; $\alpha = .80$) scaled from 1 (strongly disagree) to 5 (strongly agree). If appropriate, items were re-coded so that the items mathematically retained directional consistency. These items were summed to create a final score with higher scores representing greater parental support at wave 1 and wave 2.

Heritage Language Retention. Heritage language retention was assessed at wave 2 using a sum of 2 items indicating heritage language use (i.e., 'what language do you use most with your family and close relatives?'; 'what language do you use most with your close friends?'). These two items were not available at wave 1. Responses were coded to identify heritage language use based on self-reported race/ethnicity; for example, Hispanic individuals who spoke Spanish most were coded as retaining their heritage language. A binary indicator was created to reflect youth who expressed preference for using their heritage language for either friends or family, or with both (1), and youth who expressed preference for English with both their friends and family (0).

Health compromising behaviors were assessed at wave 3 (2001) and 4 (2007) with self-report items assessing frequency of activity. *Cigarette and cannabis use* were assessed using a single item reporter of the number of days within the past month the participant used cigarettes. *Alcohol use* was assessed with a sum of three items assessing the number of days (on a 6-point scale) within the past year that the participant had 1) consumed any alcohol, 2) consumed more than 5 (4 for females) drinks in one sitting, and 3) felt 'drunk or high' from consuming alcoholic beverages. *Sedentary lifestyle* was assessed with 3 items measuring the number of hours spent watching television, watching videos, or playing computer games in a usual week. These items

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showed acceptable internal consistency ($\alpha = .81$), and were averaged to create a mean of weekly hours spent being sedentary. *Fast Food Consumption* was assessed with one item asking frequency of fast food consumption within the past week: "on how many of the past seven days did you eat food from a fast food place, McDonalds, Kentucky Fried Chicken, Pizza Hut, Taco Bell, or a local fast food restaurant?" The item was scaled from 0 (no days) to 7 (seven days). The health compromising behaviors at wave 3 were used as a control for the health compromising behaviors at wave 4. Substance use related health compromising behaviors were analyzed in a measurement model to represent a latent construct of drug use. Sedentary lifestyle and fast food consumption were summed to create an index of obesogenic health behaviors.

Analytic Technique. For all analyses, MPlus v. 7.14 was used (Muthén & Muthén, 2008-2012). Adolescent age, gender, and ethnicity were included as covariates in these analyses. This study used structural equation modeling (SEM) to test the study hypotheses using the recommended fit criteria set by Hu & Bentler (1999): the Root Mean Square Error of Approximation (RMSEA < .08), the Comparative Fit Index (CFI) > .95, the standardized root mean square residual (SRMR) < .07. To examine the cross-lagged effects between parental support and perceived discrimination, relatively equivalent stability coefficients and cross-lagged covariances of parental support and perceived discrimination are needed to determine interpretability of the cross-lagged effects (Lorenz, Conger, Simons, & Whitbeck, 1995). With relatively equal stability estimates and cross-lagged covariances, significant cross-lagged effects observed in effect then explain the residual change across a relatively short time period of a construct. That is, parental support may explain an increase or decrease in perceived discrimination from time 1 to time 2, given the stability of perceived discrimination and its

covariance with parental support at time 1, as well as any variance explained by exogenous variables in the study model (i.e., family economic pressure).

To examine the significance of indirect effects, I tested the indirect effects' product coefficients using bootstrapping with 5,000 replicates (MacKinnon, 2008). To examine differences between immigrant youth and native youth of specific ethnicities, I used equality constraint tests (Wickrama et al., 1999; Kwon & Wickrama, 2014). In an equality constraint test, the hypothesized path is constrained across comparison groups to be equal. The resulting changes in model fit (i.e., $\Delta\chi^2(\Delta df)$) are used to infer whether the path significantly differs across the tested groups.

<center>**Results**</center>

Table 2.1 presents the bivariate correlations with means and standard deviations of the study variables. Overall, the variables were associated in the expected directions, with the exception of a few associations between parental support and substance use indicating a counterintuitive correlation: for example, fathers' parental support at wave 1 is positively correlated with cannabis use at waves 3 and 4 ($r = .06$, $p < .01$, $r = .09$, $p < .01$, respectively). However, the majority of the correlations are in the expected direction. For instance, Family economic pressure at wave 1 is negatively associated with all parental support variables at wave 1 and 2.

To test the study hypotheses, I examined a measurement model and a structural equation model, the latter of which was then analyzed separately for Asian, Hispanic, and African ethnicities, each grouped for immigrant and native youth. These three structural equation models were assessed separately to adjust for what was computationally feasible given the complexity of the tested model. Model fit was assessed using the recommended fit statistics by Hu & Bentler (1999): the chi-square index, the root mean square error of approximation, the comparative fit index, and the standardized root mean residual. Three indices are used to account for the differing advantages across the three fit indices: for example, the chi-square index is sensitive to sample size, whereas the squared root mean residual is sensitive to model complexity.

Pathways to Substance Use and Obesogenic Behaviors

To first determine the structural pathways to substance, use and obesogenic behaviors, I tested two structural equation models: a measurement model for a latent factor of substance use behaviors and a structural model linking family economic pressure, parental support, perceived discrimination, heritage language retention, substance use behaviors, and obesogenic behaviors.

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Table 2.1. Bivariate correlations and descriptive statistics of study 2 variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	--													
2. Family Economic Press W1	.03**	--												
3. Paternal Support W1	-.17**	-.06**	--											
4. Paternal Support W2	-.11**	-.04**	.62**	--										
5. Maternal Support W1	-.15**	-.04**	.43**	.30**	--									
6. Maternal Support W2	-.06**	-.02**	.29**	.45**	.50**	--								
7. Perceived Disc W1	.08**	.06**	-.28**	-.23**	-.24**	-.18**	--							
8. Perceived Disc W2	.01	.05**	-.22**	-.22**	-.18**	-.23**	.56**	--						
9. Heritage Lang Ret W2	.10**	.05**	-.04**	-.04**	.00	-.05*	-.05**	-.04**	--					
10. Sed Act Hours W3	.00	.07**	.00	.00	.02*	.02	.05**	.05**	-.02*	--				
11. Sed Act Hours W4	-.01	.05**	-.02*	-.02*	.00	-.01	.05**	.05**	-.03**	.28**	--			
12. Fast Food W3	.00	.06**	-.03*	-.03*	.01	-.01	.06**	.06**	.02*	.10**	.07**	--		
13. Fast Food W4	.01	.06**	-.01	-.01	.01	-.01	.05**	.05**	.01	.08**	.06**	.22**	--	
14. Cigarette Use W3	-.01	.01	-.04**	-.04**	-.04**	-.05**	.13**	.14**	-.11**	.08**	.07**	.04**	.02*	--
15. Cigarette Use W4	-.02*	.06**	-.05**	-.05**	-.03**	-.04**	.14**	.14**	-.11**	.11**	.09**	.05**	.05**	.63**
16. Alcohol Use W3	.03**	-.15**	-.02	-.02	-.04**	-.03**	.03**	.03**	-.09**	.03**	.03**	.00	-.05**	.23**
17. Alcohol Use W4	-.07**	-.14**	.01	.02	-.01	-.02**	.01	.00	-.09**	.01	.02**	-.04**	-.03**	.10**
18. Drunk W3	-.06**	-.13**	.00	.00	-.02	-.03**	.04**	.03**	-.11**	.04**	.03**	-.01	-.04**	.24**
19. Drunk W4	-.09**	-.09**	-.01	-.01	-.01	-.04**	.05**	.05**	-.20**	.04**	.07**	.00	.00	.19**
20. Binge Drinking W3	-.02*	-.11**	.00	-.01	-.02	-.03**	.06**	.04**	-.08**	.05**	.05**	.01	-.01	.24**
21. Binge Drinking W4	-.05**	-.07**	.00	-.01	-.01	-.03**	.05**	.05**	-.07**	.05**	.06**	.00	.00	.20**
22. Cannabis Use W3	-.01	.01	.06**	-.04**	-.02*	-.03**	.06**	.05**	-.03**	.05**	.04**	.06**	.02**	.12**
23. Cannabis Use W4	-.04**	.03**	.09**	-.05**	-.03**	-.04**	.09**	.09**	-.07**	.07**	.10**	.06**	.05**	.21**

Note. W = wave of data. Family Economic Press = Family economic pressure. Perceived Disc = Perceived discrimination. Heritage Language Ret = Heritage language retention. Sed Act = Sedentary Activity.

$* p < .05.$ $** p < .01$

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Table 2.1 *Continued*

	15	16	17	18	19	20	21	22	23	Mean	SD
1. Age										15.22	1.64
2. Family Econ Press W1										.67	1.04
3. Paternal Support W1										20.17	4.48
4. Paternal Support W2										19.99	4.32
5. Maternal Support W1										18.57	2.71
6. Maternal Support W2										21.16	3.46
7. Perceived Disc W1										18.41	5.00
8. Perceived Disc W2										18.21	4.84
9. Heritage Lang Ret W2										.11	.32
10. Sed Act Hours W3										22.89	21.75
11. Sed Act Hours W4										16.20	16.55
12. Fast Food W3										2.48	2.08
13. Fast Food W4										2.45	3.60
14. Cigarette Use W3										7.76	12.57
15. Cigarette Use W4	--									7.88	12.52
16. Alcohol Use W3	.14**	--								2.16	1.75
17. Alcohol Use W4	.10**	.47**	--							2.23	1.81
18. Drunk W3	.16**	.72**	.40**	--						1.18	1.43
19. Drunk W4	.20**	.41**	.67**	.47**	--					1.04	1.33
20. Binge Drinking W3	.17**	.73**	.38**	.78**	.43**	--				1.25	1.57
21. Binge Drinking W4	.21**	.41**	.70**	.44**	.79**	.45**	--			1.21	1.55
22. Cannabis Use W3	.12**	.11**	.08**	.13**	.11**	.12**	.10**	--		1.95	12.70
23. Cannabis Use W4	.26**	.15**	.17**	.17**	.23**	.15**	.19**	.28**	--	3.63	19.31

Note. W = wave of data. Family Economic Press = Family economic pressure. Perceived Disc = Perceived discrimination. Heritage Language Ret = Heritage language retention. Sed Act = Sedentary Activity.
* $p < .05$. ** $p < .01$

These results are displayed in Table 2.2 and Figure 2.2. The latent factor for substance use showed good model fit ($\chi^2(31) = 551.91$, $p < .01$, CFI = .97, RMSEA = .03, SRMR = .04) with acceptable factor loadings ($.32 < \lambda < .91$). The structural model also showed good model fit ($\chi^2(75) = 1267.85$, $p < .01$, CFI = .91, RMSEA = .03, SRMR = .04), and the findings are discussed below.

Family economic pressure at wave 1 significantly influenced all model variables. Higher levels of family economic pressure contributed to declines in parental support (B = -.43, $p < .01$), increased perceived discrimination (B = .29, $p < .01$), and was correlated with a slight increased likelihood of retaining a heritage language ($r = .06$, $p < .01$). Increases in family economic pressure also contributed to increases in obesogenic behaviors (B = 1.04, $p < .01$), but was inversely associated with substance use behaviors at wave 4 (B = -.14, $p < .01$).

Parental support and perceived discrimination showed significant cross-lagged effects from wave 1 to wave 2. Firstly, the structural model indicated that parental support and perceived discrimination both showed similar levels of stability from wave 1 to wave 2 ($\beta = .59$, $p < .01$ for parental support; $\beta = .55$, $p < .01$ for perceived discrimination; Figure 2), as well as significant cross-lagged covariances with the covariance of perceived discrimination at wave 2 and parental support at wave 1 being .65, and the covariance of parental support at wave 2 and perceived discrimination at wave 1 being .71. Parental support at wave 1 predicted a decline in perceived discrimination at wave 2 (B = -.06, $p < .01$), perceived discrimination at wave 1 predicted a decline in levels of parental support at wave 2 (B = -.07, $p < .01$). Bootstrapped indirect effect analyses indicated that parental support and perceived discrimination also behaved as significant mediators. That is, family economic pressure influenced parental support at wave 2 through both parental support at wave 1 (B = - .27, $p < .01$, 95% CI = [-.43, -.19]) as well as

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Table 2.2. Measurement and direct and indirect structural model estimates of study variables

Measurement Model	λ (SE)	R^2	95% CI
Substance Use			
← Alcohol Use W4	.781 (.007) **	.610	[.768, .795]
← Cigarette Use W4	.343 (.020) **	.090	[.204, .299]
← Binge Drinking W4	.909 (.006) **	.827	[.897, .922]
← Drunk W4	.883 (.009) **	.779	[.866, .900]
← Cannabis Use W4	.301 (.018) **	.060	[.215, .299]

Direct Effect → Dependent Variable	β (SE)	B	95% CI
Family Economic Pressure W1 (FEP) →			
Parental Support W1	-.072 (-3.383) **	-.432	[-.655, -.290]
Perceived Discrimination W1	.056 (3.478) **	.293	[.124, .340]
Substance Use W4	-.100 (-6.036) **	-.141	[-.156, -.091]
Obesogenic Behaviors W4	.062 (3.968) **	1.035	[.197, 1.028]
Parental Support W1→			
Parental Support W2	.588(6.935) **	.642	[.632, .686]
Perceived Discrimination W2	-.073 (-3.650) **	-.062	[-.078, -.037]
Perceived Discrimination W1 →			
Perceived Discrimination W2	.549 (6.592) **	.535	[.521, .565]
Parental Support W2	-.061 (3.456) **	-.076	[-.115, -.053]
Parental Support W2 →			
Substance Use W4	-.077 (-3.268) **	-.017	[-.018, -.007]
Obesogenic Behaviors W4	-.019 (-1.116)	-.047	[-.122, .011]
Perceived Discrimination W2 →			
Substance Use W4	-.010 (-.476)	-.003	[-.006, .009]
Obesogenic Behaviors W4	.040 (2.378) *	.131	[.097, .262]
Heritage Language Retention W2 →			
Substance Use W4	-.089 (-6.042) **	-.495	[-.483, -.290]
Obesogenic Behaviors W4	-.006 (-.418)	-.380	[-2.019, .220]

Table 2.2 *Continued.*

Indirect Effects	B	SE	95% CI
On Parental Support W2			
FEP → Parental Support W1	-.278**	-3.382	[-.435, -.191]
FEP → Perceived Discrimination W1	.027**	3.642	[-.033, -.010]
On Perceived Discrimination W2			
FEP → Parental Support W1 →	-.019**	-3.276	[.015, .044]
FEP → Perceived Discrimination W1	.126**	4.216	[.067, .185]
On Substance Use			
FEP→ Parental Support W1→ Parental Support W2	.004**	3.098	[.002, .007]
FEP→ Perceived Discrimination W1→ Parental Support W2	.000 *	2.531	[.000, .001]
On Obesogenic Behaviors			
FEP→Perceived Discrimination W1→ Perceived Discrimination W2	.023**	2.911	[.010, .041]
FEP→ Parental Support W1→ Perceived Discrimination W2	.005**	2.711	[.002, .009]

Covariates	β (SE)	B	95% CI
Age → Parental Support W1	-.201(-3.630) **	-1.943	[-2.110, -1.656]
Age → Perceived Discrimination W1	.102 (4.574) **	.855	[-.096, .007]
Age → Substance Use W4	-.090 (-5.166) **	-.075	[-.096, -.059]
Age → Obesogenic Behaviors W4	.004 (.269)	.043	[-.265, .176]
Gender → Parental Support W1	-.092 (-5.405) **	-.268	[-.396, -.257]
Gender → Perceived Discrimination W1	-.013 (-.804)	-.033	[-.096, .007]
Gender → Substance Use W4	-.212 (-4.206) **	-.585	[-.617, -.488]
Gender → Obesogenic Behaviors W4	-.104 (-7.344) **	-3.364	[-3.977, -2.545]
Substance Use W3 → Substance Use W4	.273 (9.417) **	.015	[.196, .252]
Obesogenic Behavior W3 → Obesogenic Behaviors W4	.287 (2.264) **	.220	[.196, .252]

Note. Model fit was as follows: $\chi^2(75) = 1267.85$, $p < .01$; CFI = .91; RMSEA = .03; SRMR = .04.

W = Wave of data. Estimates of indirect effects and 95% confidence intervals (95% CI) results from 5000 bootstraps.
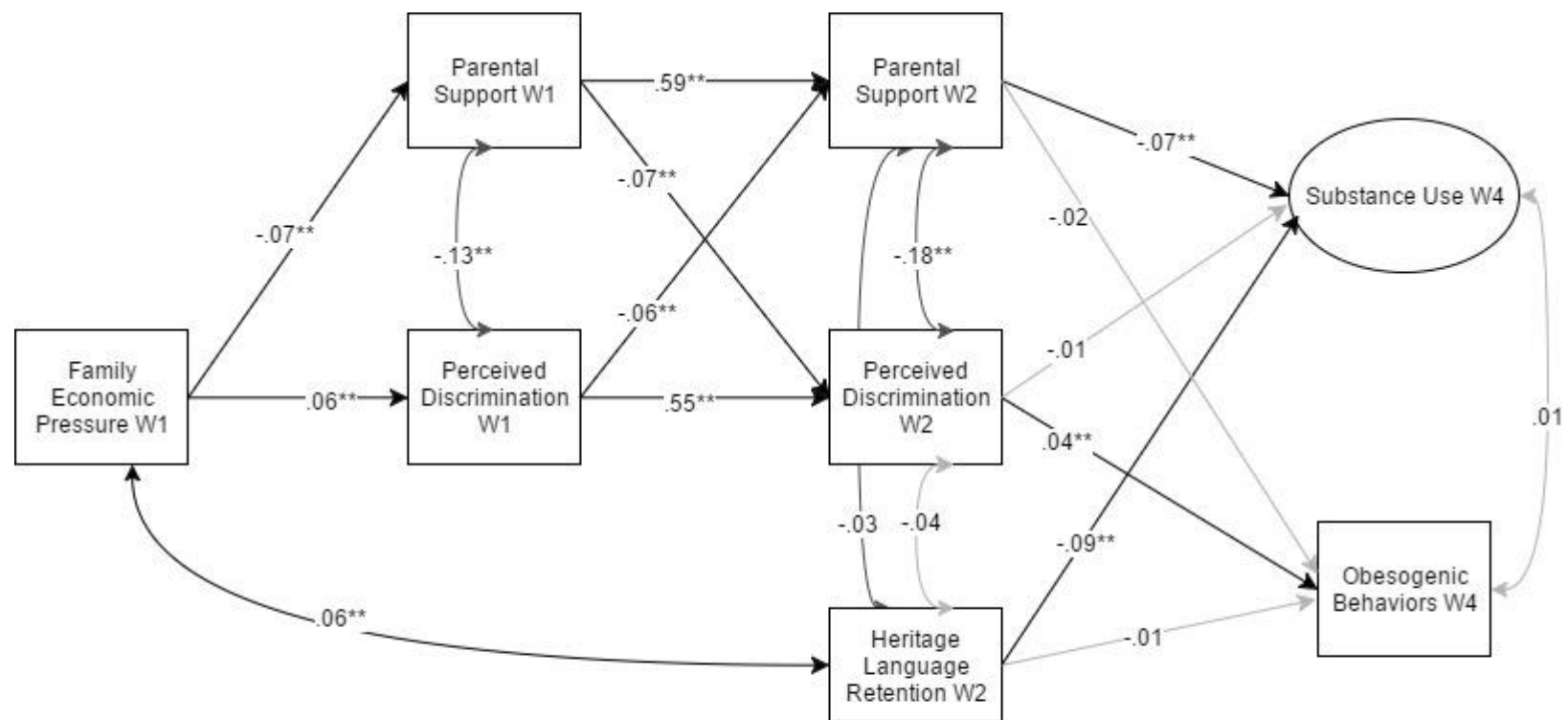
* $p < .05$. ** $p < .01$.

Figure 2.2. Structural equation model of the direct and indirect effects on substance use and obesogenic behaviors. *Note.* Model fit was as follows X^2 (75) = 1267.85, *p* <.01; CFI = .91; RMSEA = .03; SRMR = .04. Standardized estimates shown. Model covariates not shown for clarity and are available in Table 2.2: age, gender, race, prior substance use at wave 3, and prior obesogenic behaviors at wave 3. Non-significant pathways shown in gray.

through perceived discrimination at wave 1 (B = .3, p <.01, 95% CI = [-.03, -.01]). Family economic pressure influenced perceived discrimination 1 (B = .13, p <.01, 95% CI = [.07, .18]) at wave 2 via both perceived discrimination as well as through parental support1 (B = -.02, p <.01, 95% CI = [.02, .04]).

Substance Use. Heritage language retention and parental support were observed as protective factors for substance use, whereas perceived discrimination appeared to have no influence on the latent factor of substance use. Youth who reported speaking both their heritage language as well as English at wave 2 were less likely to engage in substance use behaviors at wave 4 (B = -.49, p <.01). Youth who reported higher levels of parental support at wave 2 also engaged in less substance use behaviors at wave 4 (B = -.02, p <.01). Perceived discrimination had no effect on substance use. The indirect effect from family economic pressure through parental support at waves 1 and 2 on substance use was significant (B = -.004, p <.01, 95% CI = [.002, .007]); that is, higher levels of family economic pressure has a continuing negative influence on parental support, which, in turn, influenced the extent to which parental support behaved as a protective factor for adolescents in engaging with substances.

Obesogenic Behaviors. Perceived discrimination was observed as the only significant direct effect on obesogenic behaviors in the structural model I tested. Higher levels of perceived discrimination predicted greater obesogenic behaviors (B = .13, p < .05). Neither parental support nor heritage language retention was significantly associated with obesogenic behaviors. The indirect effect from family economic pressure to obesogenic behaviors operated through two pathways: the pathway from perceived discrimination at wave 1 to perceived discrimination at wave 2 (B = .02, p <.01, 95% CI = [.01, .04]), as well as from parental support at wave 1 to perceived discrimination at wave 2 (B = .01, p <.01, 95% CI = [.002, .01]). That is, the influence

of family economic pressure contributed to obesogenic behaviors through perceived discrimination most proximally, but also through parental support, one layer removed.

For Asian Native and Immigrant Youth. Table 2.3 presents structural path estimates for all race/ethnicity specific structural models, with equality constraint test results. Equality constraint tests were only conducted when the same pathway indicated significance for one or both groups to examine differences in effect size or presence. This rule was applied for all race/ethnicity specific structural models tested in this study.

The Asian heritage sub-group was comprised of 415 adolescents, 259 of whom were either first or second generation immigrants, and 156 of whom were native born youth. Regardless of immigrant generation, the stability of parental support and perceived discrimination were maintained, however, no cross-lagged effects were observed between parental support and perceived discrimination. Overall, the structural model differed in two key ways: 1) family economic pressure at wave 1 did not significantly predict parental support, perceived discrimination, substance use, or obesogenic behaviors, and 2) only heritage language retention remained significantly associated with substance use, though differentially (for native youth: B = .12, $p < .01$; for immigrant youth: B = -.18, $p < .01$). Family economic pressure was significantly correlated with heritage language retention differentially as well; for native youth, family economic pressure was positively correlated with heritage language retention ($r = .12$, $p < .05$), whereas for immigrant youth, family economic pressure was negatively correlated with heritage language retention ($r = -.12$, $p < .05$). This was a significant difference across these groups, as indicated by a chi-square difference of over 3.84 resulting from an equality constraint test. While portions of the structural model were not replicated with a sub-sample of Asian

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Table 2.3. Path estimates for Asian, Hispanic, and Black native and immigrant youth

Ethnicity & *Original Chi-Square Model Fit:*	Asian: χ^2 (158)= 436.04			Hispanic: χ^2 (158)= 438.46			Black: χ^2 (158)= 571.97		
	Native β	Immig β	$\Delta\chi^2$	Native β	Immig β	$\Delta\chi^2$	Native β	Immig β	$\Delta\chi^2$
Family Economic Pressure W1 →									
Parental Support W1	-.08	-.11	0.37	-.08	-.01	--	-.01	-.01	--
Perceived Discrimination W1	.12	-.15*	1.04	.07*	-.03	51.1**	-.02	.15	--
Substance Use W4	.12	-.06	--	-.11*	-.02	50.0**	-.04	-.13	--
Obesogenic Behaviors W4	-.04	.02	--	.02	-.05	--	.03	.25	--
Parental Support W1→									
Parental Support W2	.65**	.67**	2.00	.57**	.59**	46.94**	.62**	.86**	1.17
Perceived Discrimination W2	.00	-.09	--	-.04	-.05	--	-.05	-.51**	1.97
Perceived Discrimination W1 →									
Perceived Discrimination W2	.49**	.46**	2.50	.54**	.55**	45.51**	.50**	.06	20.30**
Parental Support W2	.01	.01	--	-.02	-.06	--	-.11**	.24	NC
Parental Support W2 →									
Substance Use W4	.03	-.03	--	-.06	-.06	--	-.02	-.07	--
Obesogenic Behaviors W4	-.14	-.17	--	-.11*	-.02	49.06**	-.01	.00	NC
Perceived Discrimination W2 →									
Substance Use W4	-.08	-.02	--	.06	.03	--	.04	-.13	--
Obesogenic Behaviors W4	-.07	-.03	--	.09*	-.05	50.17**	.06*	.14	2.14
Heritage Language Retention W2 →									
Substance Use W4	.12**	-.18**	2.42	-.14**	-.17**	46.12**	.03	-.23	--
Obesogenic Behaviors W4	-.04	-.01	--	-.06	.00	--	.02	.19	--

Note. For all models tested, CFI > .90, RMSEA > .05, SRMR > .05. W = Wave of data. Constraint test $\Delta\chi^2$ indicates the difference from the original model chi-square estimate to the constrained chi-square estimate to indicate significance of estimates between immigrant and native youth. A $\Delta\chi^2$ of more than 3.841 indicates 95% confidence of significance. Each constraint test was run separately, such that the degrees of freedom of the change in chi-square = 1. *NC*: This equality constraint test ran into computational convergence issues, likely caused by the small sample size of the Black immigrant youth group ($n = 49$). 10,000 iterations were attempted.

* $p < .05$. ** $p < .01$.

heritage youth, these results provide greater clarity of the role of heritage language retention in native v. immigrant youth of Asian heritage.

For Hispanic Native and Immigrant Youth. Table 2.3 presents structural path estimates for all race/ethnicity specific structural models, with equality constraint test results. The Hispanic heritage sub-group was comprised of 986 adolescents, 398 of whom were either first or second generation immigrants, and 588 of whom were native born youth. Similar to the Asian sub-group model, the stability of parental support and perceived discrimination were maintained, but no cross-lagged effects were observed. Overall, the structural model differed in two key ways: 1) family economic pressure at wave 1 did not significantly predict parental support or obesogenic behaviors, and 2) notable differences across immigrant generation group emerged in relation to the proximal influences on obesogenic and substance use behaviors. All equality constraint tests with the Hispanic-specific structural model indicated significance with chi-square differences well over 3.84 ($45.5 < \Delta\ \chi^2(1) < 51.1$).

Firstly, family economic pressure was significantly predictive of perceived discrimination for native youth, but not for immigrant youth. Family economic pressure was also directly and negatively associated with substance use for native youth, though not for immigrant youth. Both stability pathways for parental support and perceived discrimination (from wave 1 to 2) showed significant differences across the two immigrant generation groups, suggesting that the stability for both constructs for immigrant youth was slightly stronger than that of native youth.

Parental support behaved as a protective factor for obesogenic behaviors for native Hispanic youth (B = -.11, $p < .05$), but was a significant factor for immigrant Hispanic youth (B = -.06, $p = n.s.$). Perceived discrimination was a risk factor for native Hispanic youth (B = .09, $p < .05$), but not for immigrant Hispanic youth (B = -.05, $p = n.s.$). Parental support and perceived

discrimination were unrelated to substance use behaviors for Hispanic heritage youth. Finally, heritage language retention was observed as a protective factor for both Hispanic immigrant and native youth. For native and immigrant Hispanic heritage youth, the structural model was notably different from the whole-sample structural model, specifically in relation to the proximal predictors of obesogenic behaviors, and also shed further light on the important role heritage language retention plays for both immigrant and native born Hispanic youth.

For Black Native and Immigrant Youth. The Black heritage sub-group was comprised of 1,881 adolescents, only 49 of whom were first or second generation immigrants, and 1832 of whom were native born youth. This discrepancy in group size limited one of the equality constraints tests (noted in Table 2.3), as the statistical software ran into computational convergence issues, even after over 10,000 iterations. Overall, the structural model was unique in three notable ways: 1) family economic pressure was not significantly associated with any of the study constructs, 2) some cross-lagged effects were seen, contrary to the two other race-specific structural models analyzed, and 3) heritage language retention was unrelated to either substance use behaviors or obesogenic behaviors for both immigrant and native Black youth. Parental support showed stability from wave 1 to wave 2, with no differences across immigrant and native born Black youth, whereas perceived discrimination showed stability for only native Black youth (B = .50, p <.01) and not for immigrant Black youth (B = .06, p = $n.s.$; $\Delta \chi^2(1)$ = 20.30, p < .01). Furthermore, for immigrant Black youth, parental support at wave 1 influenced perceived discrimination at wave 2 (B = -.51, p <.01), the pathway was not significant for native Black youth ($\Delta \chi^2(1)$ = 1.97, p = $n.s.$). Interestingly, the alternate was true: perceived discrimination at wave 1 influenced parental support at wave 2 (B = -.11, p <.01) for native Black youth, but not for immigrant Black youth; the equality constraint test for this pathway was not able to be

computed due to sample size constraints mentioned earlier. Finally, parental support was significantly predictive of obesogenic behaviors for immigrant Black youth (B = .52, $p < .01$), but not for native Black youth (B = -.01, $p = n.s.$; $\Delta\chi^2(1) = 6.24$, $p < .01$).

Discussion

The present study builds upon extant research on the structural pathways from early adversity to adult health behaviors. The study highlights processes unique to ethnic minority immigrant youth, and the results provide nuance and detail of the pathway from adversity to health for this growing demographic group in the United States via intermediary processes unique or salient for ethnic minority immigrant youth (i.e., heritage language retention). These unique findings below provide basis for preventive intervention programming to focus on specific constructs as protective or exacerbating factors to consider in their curricula. Findings by race x immigrant generation are discussed within each structural section below.

The direct effect of family economic pressure. First, in the first model testing the structural pathways, hereto forth referred to as the base model, family economic pressure (FEP) was significantly predictive of parental support, perceived discrimination, substance use, and obesogenic behaviors, and was associated with heritage language retention. This result adds to the existing literature evidencing the large and pernicious influence of early socioeconomic adversity. When the base model was tested with the Asian, Hispanic, and Black sub-groups, family economic pressure did not show the same strength. FEP showed significant effects for Asian immigrant youth and Hispanic native youth. Greater FEP was associated with less perceived discrimination for Asian immigrant youth; this can be explained as a reflection of the potential ethnic enclaves that Asian immigrant youth may reside in. Ethnic enclaves are likely to have a concentration of poverty, as well as greater diversity or representation of Asian races, thereby reducing the prejudices or discrimination these youths may face (Perez, Fortuna, & Alegria 2009).

For Asian and Black native-born youth, FEP was unassociated with parental support, perceived discrimination, substance use, or obesogenic behaviors. While this finding may appear initially counterintuitive, recent research has indicated that the effects of early socioeconomic adversity may be more pronounced for Whites than for persons of color, in relation to body mass index (Bae, Wickrama, & O'Neal, 2014). Additionally, one limitation of this study is that it only accounts for a single source of adversity: socioeconomic disadvantage in early adolescence. Future research should consider replication using multiple sources of adversity (e.g., refugee status, child abuse reports, early stressful life events) in early childhood to explore the dynamic relationship between early adversity and later health outcomes.

The positive significant correlation between family economic pressure and heritage language retention presents as an interesting area for future research. While prior literature indicates that socioeconomically disadvantaged environments may be less language rich, insufficiently preparing children growing up in poverty for academic success (Leventhal et al., 2000), the positive correlation may indicate a different process for youth who retain their heritage language. Alternatively, this correlation may be an artifact of the increased likelihood of ethnic minority immigrant youth being at an increased odds of experiencing socioeconomic adversity. Further research and exploration of potential intermediary pathways from family economic pressure to heritage language retention, as well as the acculturative processes in-between would elucidate this finding.

Substance Use

The present study tested the effects of parental support and perceived discrimination as mediators of FEP, and tested heritage language retention as a unique protective factor of ethnic minority immigrant youth on developing maladaptive health behaviors. In the base model,

parental support and heritage language retention surfaced as significant direct predictors of substance use such that both constructs were negatively associated with substance use in early adulthood. Further, the influence of FEP on substance use operated through parental support, but not through perceived discrimination. This finding provides further support for the strong influence of FEP on substance use outcomes.

This same mediation was not observed for any race x immigrant group tested, largely because the effect from family economic pressure to parental support was not significant for any subgroup. This finding reflects the need to culturally contextualize which aspects of the parent-child relationship are most optimal or protective as the this can change across races and cultures. For example, Black parents tend to employ stricter parenting practices compared to White parents, (Zapolski et al., 2016), whereas Asian parenting styles may further reflect their heritage culture. In addition, parenting within the immigrant family may be more in flux than in non-immigrant families as parents themselves acculturate to Western cultures (Huang, Calzada, Cheng, Barajas-Gonzalez, & Brotman, 2016).

When comparing groups across race x immigrant generation, heritage language retention was observed to show strong protective effects on substance use at wave 4 (2007) for native and immigrant Asian and Hispanic origin youth, but not for Black youth (immigrant or native). These results highlight three important findings: parental support and heritage language retention served as protective effects between FEP and substance use in the base model, indicating that heritage language retention may have positive protective effects for any youth that engages with a heritage language, perhaps as reflective of positive family cultural socialization practices; heritage language retention also showed these protective effects for Asian and Hispanic immigrant and native youth, but not for Black youth; parental support as modeled largely after a

WEIRD lens (Western, Educated, Industrialized, Rich and Democratic; Henrich, Heine, & Norenzayan, 2010) was found to not be the protective support buffer that was originally hypothesized for ethnic minority youth and ethnic minority immigrant youth.

These findings are reasonably consistent with prior research, with the base model showing the expected linkages based on prior research and are in support of the ideas of accumulation of disadvantage. The present study contributes to the literature by highlighting clear needs and next steps in the research on the types of parental support most meaningful across race/ethnic and immigrant generation groups and the role of heritage language retention not only in immigrant groups, but also in families of third-generation immigrants as well as native born families. It may be that the beneficial effects of speaking multiple languages on improved cognitive abilities may prevent poor coping mechanisms that prime youth to engage in substance use, and instead, make health conscious decisions (Barac & Bialystok, 2011; Benet-Martínez et al., 2006; Yoshida, 2008).

Obesogenic Behaviors

Family economic pressure and perceived discrimination were observed as the main predictors of obesogenic behaviors in the present study. Family economic pressure was directly associated with obesogenic behaviors, and also operated through perceived discrimination. This is consistent with prior research showing perceived discrimination to be strongly associated with a higher likelihood of being obese in adulthood (Hunte & Williams, 2009; Stepanikova et al., 2017). This pathway represents the compounding nature of early stressors leading to poor health outcomes. Specific to perceived discrimination, when youth experience higher levels of perceived discrimination (i.e., increased stressors) and may engage in poor health choices or in overeating as a coping mechanism. Further, experiencing higher levels of perceived

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discrimination may also encourage youth to disassociate with a rejecting social environment, and elect to stay indoors (Womack et al., 2014). Individuals experiencing high levels of perceived discrimination may also experience negative psychological ramifications, such as depression, which may further prime s/he to stay sedentary (Brodish, Cogburn, Fuller-Rowel, Peck, Malachuk, & Eccles, 2011).

When examining predictors of obesogenic behaviors across race x immigrant generation, two key findings were observed: parental support was observed as a protective factor, specifically for Hispanic native youth; and perceived discrimination as observed as an exacerbating factor specifically for native Hispanic and Black youth, but not for Asian youth. These three findings highlight key considerations for practitioners. Firstly, addressing coping mechanisms for perceived discrimination is a particularly salient set of information that native Hispanic and Black youth would benefit from learning. Perceived discrimination may not be salient for immigrant Hispanic and Black youth for a variety of reasons. Immigrant families are more likely to reside in ethnic enclaves, where discriminatory experiences may be fewer. Strong ethnic identity in immigrant youth may be buffering the impact of discriminatory or prejudiced interactions. Asian native and immigrant youth, on the other hand, while they may face discrimination and prejudice, may engage in less fast food consumption due to cultural norms or may be physiologically less prone to obesity as indicated by lower rates of obesity when compared to other ethnicities (11% compared to 33%; Fryar, Carroll, & Ogden, 2016). Secondly, parental support, while not a specifically protective factor against obesogenic behaviors for the base model, was observed as a protective factor for native Hispanic youth. Programs that already use the parent-youth association, such as Familias Unidas (Jacobs et al., 2016), may benefit from considering targeting reduction in obesogenic behaviors.

Different Paths to Substance Use v.s. Obesogenic Behaviors

The base model investigated the relationship between parental support, perceived discrimination on substance use and obesogenic behaviors. Heritage language retention was also included in the model. The results showed that perceived discrimination was associated negatively with obesogenic behaviors, whereas parental support and heritage language retention buffered the effects of economic pressure on substance use. Prior parental support was found to buffer the effect of economic pressure on perceived discrimination as well, and the subsequent indirect pathway from economic pressure to perceived discrimination to substance use via parental support suggests that while parental support did not exhibit a direct effect, parental support did impact obesogenic behaviors indirectly. When comparing the effect of parental support on perceived discrimination across race x immigrant generation, this pathway was found to be significantly only for Black immigrant youth, suggesting the importance of this structural path specifically for these youth. By contrast, parental support was directly protective of obesogenic behaviors for Hispanic native youth. These nuances indicate that the multiple constructs that may predict substance use and/or obesogenic behaviors may also be temporally ordered differentially across race x immigrant generation. More generally, the differential pathway from FEP to substance use v.s. obesogenic behaviors suggest that the prevention of developing maladaptive health behaviors requires varied methods targeting specific constructs within the adolescent's social context to press or push key levers that will have success; further, determining which key lever to use must be informed by the race x immigrant group being aided.

Limitations

Although the present findings contribute meaningful information for practitioners in understanding the structural pathways from family economic pressure to maladaptive health

behaviors, as well as the nuances across race x immigrant generation, these findings must be considered with several caveats. First, race/ethnicity was treated globally due to the limitations of sample size when drilling further into the sample size by race and immigrant generation. The difficulty here is that treating race/ethnicity globally homogenizes a diverse group of cultures into a single monolithic representation (e.g., Costa Rican immigrants with Cuban immigrants). Future studies should consider incorporating country of origin or heritage culture as a proxy for grouping races/ethnicities such that the effects of race or ethnicity can be linked to cultural values or interpretation. Second, the study used self-report measures for health behaviors. While these measures have been shown to have validity, the optimal methodology for collecting health data would be observational or diaries, which can give the most accurate count or frequencies of specific behaviors.

Thirdly, the study was limited to the number of intermediary factors being considered in the structural model, given the model complexity already with investigating 6 race x immigrant generation sub-populations of various sizes. Other meaningful mediating constructs should consider the different domains of life, such as peer, romantic relationships, religiosity, etc. Further, gender and sexual orientation further color the lived experiences of ethnic minority immigrant youth and can further contribute accumulating and dynamic stressors in an adolescent's environment, though this potential was not tested in the present study. Finally, the health behaviors in early adulthood were not linked to health outcomes in later adulthood due to dataset limitations of 4 time points. Future research could build on this research by observing how health behavior trajectories or transitions from adolescence into adulthood are linked to health outcomes in later adulthood to understand where sensitive periods for intervention may be.

Despite these caveats, the present study contributes nuanced findings on how the expected model of influence from socioeconomic adversity to health behaviors via parental support and perceived discrimination may differ given race x immigrant generation. This study shines an intersectional lens on the structural pathways that lead to maladaptive health behaviors in early adulthood highlighting key levers for specific race x immigrant generation sub-groups. These findings point to the importance of the parent-child relationship for Hispanic native youth in protecting against obesogenic health behaviors as well as to the important finding of the relevance of heritage language retention for native and immigrant youth alike. Parental support was found to be salient for limiting the damaging effect of perceived discrimination for Black immigrant youth. These findings show the importance of contextualizing structural pathways to understand differences across and within meaningful social intersections to provide salient context for practitioners.

CHAPTER 4. GENERAL CONCLUSION

Summary

The long term consequences of early adversity on adult health outcomes have been documented in prior research to operate across multiple domains (e.g., physiological, psychological) and on the trajectories of health outcomes. The damaging influence of early adversity operates through an accumulation of disadvantages from living in stressful environments that bring increased exposures and beget increased vulnerabilities to the same pervasive influence (Elder et al., 2003; Wickrama et al., 2014). This process disproportionately impacts a growing population of ethnic minority immigrant adolescents in the United States (Grieco et al., 2012).

An intersectional lens provides a framework to understand the development of ethnic minority immigrant adolescents with reference to both their racial group as well as their immigrant generation, as these social contexts may be inextricable, especially given that 81% of immigrants are also persons of color (Colby & Ortman, 2014; Hankivsky & Cormier, 2010). While studies exploring the effect of early adversity often consider effects of race or immigrant generation, few studies structure their methodologies or theoretical foundations to consider that the salience of both sets of social identities. Studies that do consider both race and immigrant generation often limit their studies to a single racial group, frequently due to methodological limitations. In my dissertation, I present two studies that build upon prior research by examining the growth and structural pathways from early socioeconomic adversity to later health behaviors across race x immigrant generation.

The first study examined the heterogeneity of latent trajectories of health behaviors in relation to socioeconomic adversity and race x immigrant generation groups. The results found 3 distinct classes across 2 sets of multidimensional health trajectories of substance use behaviors and of obesogenic behaviors. In each set of health trajectories, 3 latent classes of obesity or cigarette risk, low drug/obesity risk, and early drug/obesity risk recovering classes were found. Early socioeconomic adversity was associated with risk-characterized classes. First-generation immigrants were more likely to belong to the low-risk classes, evidence of the immigrant paradox in growth trajectories. Conversely, Asian immigrants showed no difference from first to second generation in terms of likelihood of belonging to the obesity-risk class, indicating that for certain race x immigrant sub-groups, the immigrant paradox was not found. These findings suggest that the immigrant paradox may hold true for some race x immigrant generation sub-populations, but not all immigrant generational groups. Studying these developmental trajectories with reference to race x immigrant generation highlight detailed nuances that would have not been noticed without consideration of the race x immigrant generation intersection.

The second study investigated the differential structural pathways from early socioeconomic adversity to later health across race x immigrant generation, and inclusive of paths that are salient to race x immigrant generation. This study found several patterns of the direct effect of family economic pressure on subsequent health to dissolve when examining the structures across race x immigrant generation. For Asian, Hispanic, and Black native and immigrant youth, the influence of family economic pressure appears to operate fully through indirect paths. Heritage language retention was observed as a strong protective buffer against substance use behaviors in early adulthood for both native and immigrant youth, indicating that it may be bilingualism and the associated cultural and neurological benefits from speaking two

languages that may protect from choosing maladaptive health behaviors. Parental support also showed as a protective factor, though this protection attenuated differentially across race x immigrant generation groups. Perceived discrimination was observed as priming youth to engage in obesogenic behaviors, specifically for Hispanic and Black native youth, but not for Asian youth. A divergence of structural paths was observed from family economic pressure to substance use v.s. obesogenic behaviors via parental support and heritage language retention v.s. perceived discrimination, respectively. This result highlights key constructs to consider in designing prevention intervention programming. Studying these structural pathways with reference to race x immigrant generation allowed the observation of unique differential paths that have direct implications for policy and prevention intervention programs.

Limitations

Though the contributions to the literature of the two studies presented in this dissertation are meaningful and actionable, they should be considered with a few common limitations. Firstly, race/ethnicity was assessed globally across the two studies. Global assessments of race/ethnicity lump ethnic groups into Asian, Hispanic, Black, and other categories to reduce the number of groupings to analyze. While this aids in computational efficiency of more complex analyses, as was so in these two studies, the potential loss of nuance and detail is great, especially given that these global groups combine a wide array of cultures and ethnic groups with diverse and potentially dissimilar historical legacies into a single monolithic representation. Future studies should consider taking several steps to unpack these global assessments. Using similarities in the culture or historical legacies of countries of origin may lead to more logical groupings in studies with immigrant populations. Alternatively, utilizing a self-reported cultural origin x immigrant generation approach may self-select respondents into more appropriate

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groupings. Exploring cultural value indicators (e.g., individualism/automony and collectivism/relatedness) across an index to bucket demographic groups may also prove fruitful (Kagitcibasi, 2005; Phinney, Ong, Madden, 2000).

Secondly, though class, race, and immigrant generation were considered in both studies, gender, while included as a covariate, was otherwise absent in these analyses. Given the already complex set of analyses done, considering additional interactions of gender rank the risk of computational challenges and lack of clarity or focus in the set of studies, especially given the complex patterning of gender across substance use (Chen & Jacobson, 2012). While the patterning of gender x race across substance use has been documented in prior studies robustly, the patterning of gender x race x immigrant generation across obesogenic behaviors from adolescence into adulthood is less understood. Future research should consider this an area for research as a gender x race x immigrant generation lens would provide meaningful context that is yet to be comprehensively explored in the literature.

Practical Implications

Hankivsky (2014) posits that prevention and intervention programming can be sensitive to the intersecting social identities of the population that is aimed to be served; therefore, the research that supports such programs must also deeply consider how these social intersections inform the documented latent trajectories and structural pathways in the current literature. The two studies presented here highlighted the need for research, policy, and preventive intervention programs aimed at reducing health disparities can begin by understanding how to foster health promoting behaviors in populations at a disproportionate risk for experiencing socioeconomic adversity, a robust and well-studied predictor of poor adult healt (e.g., Wickrama et al., 2014). Familias Unidas is an example of such a program that has taken significant effort to provide

contextually sensitive methodologies targeting the parent-child relationship in an effort to reduce

substance use behaviors in Hispanic youth in the United States (Jacobs et al., 2016). The findings

from these two studies provide nuanced results specific to race x immigrant generation groups

that can help inform methodologies for future research and programs.

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