Community Characteristics and Trajectories of Adolescent Internalizing and Externalizing Behaviors: The Cumulative Advantage/Disadvantage and Subjective Appraisals of Social Support as Mechanisms

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Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
In
Human Development

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September 5, 2012
Blacksburg, VA

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ABSTRACT

Studies examining neighborhood effects on adolescent outcomes have indicated that adolescents growing up in low-income neighborhoods are at higher risk of developing internalizing and externalizing behaviors. However, knowledge of the long-term effects of neighborhood disadvantages on internalizing and externalizing behaviors and the involved mechanisms across adolescence is limited. Using family life course theory and the cumulative advantage/disadvantage perspective, this study examined how community disadvantages in early adolescence accumulate over time to influence later internalizing and externalizing behaviors and the protective effects of subjective appraisals of social support by adolescents and their primary caregivers. I estimated a two-level growth curve model using three waves of data from the Project on Human Development in Chicago Neighborhoods (PHDCN). Results indicated subjective appraisals of social support by both adolescents and caregivers played a protective role to buffer the negative effects of community disadvantages on internalizing and externalizing behaviors across adolescence. These results provide insight for the development of intervention programs at both family and government levels to improve adolescent outcomes.

Dedication

This dissertation is dedicated to my father, Maorong Zhang, who is my best friend and mentor. He motivates and encourages me to pursue my education, seek my dream, and be the person I want to be. He has shared with me his beautiful thoughts about human beings and life through his story telling and daily chats since I was a child, which inspires my research today. Although he did not have the opportunity to go to college, he deserves a PhD as much as I do because of his intellect, passion, and diligence in exploring the truth of life.

Acknowledgements

I want to express my deep appreciation to my family. I am thankful to my husband and my best friend, Kuei-Tsung Shih, for listening to my struggles, comforting me, and being there for me all the time. I appreciate that he has such an understanding and tender heart for me. He makes me laugh and allows me to freely express myself in front of him. I also want to thank my mother and grandmother for tolerating me staying in a country far away from them. Their desire for me to complete my degree here in the United States and being able to go home more often urges me to work hard and speed up. I appreciate my sister, Lei Zhang, for always being joyful and excited about any accomplishments I make.

I want to acknowledge my chair and advisor, Dr. Peggy S. Meszaros, for her guidance and mentoring since the first day I studied at Virginia Tech. I appreciate her desire to help me be successful and all her efforts to keep me on track and help me complete this degree. I am thankful for her professional, gentle, but firm manners in all situations. She is a great role model for me in my future academic career.

I also want to acknowledge my co-chair, Dr. Tina Savla, for walking me through the data analysis of my dissertation research and providing me space to work. Without her, I could not have finished my dissertation. I appreciate that she was willing to share her knowledge, which

helped expand my horizon of advanced statistics. She also helped me build confidence in my quantitative skills. I have learned so much from her.

I also want to acknowledge the help from my committee members. Dr. Katherine Allen's passion about research has always encouraged me. I am really impressed that she has never got tired of reading students' studies or giving feedback. I appreciate the opportunity she allowed me to work with her on different research projects. I appreciate Dr. April Few-Demo for her understanding of my struggles as a foreign student. I appreciate her for providing advice on my professional development, and I am grateful for her encouraging smiles all the time.

I want to acknowledge the support from other Virginia Tech faculty. I want to thank Dr. Yasuo Miyazaki for showing me the beauty of statistics. His phenomenal knowledge of statistics and his humble attitude prompted my passion about statistics. I appreciate Dr. James Hawdon for his wonderful teaching on theories of sociology and answering questions related to my dissertation research in a responsive manner. I appreciate Dr. Martha Ann Bell for spending time with me on an independent study project that opened my eyes to cognitive neuroscience and for giving me the wonderful opportunity to be involved in her research. I appreciate Dr. Alison Galway for allowing me the opportunity to explore research ideas about development of older adults. I appreciate Dr. Lydia Marek for providing me a research assistantship for my last year of the program and the wonderful opportunity to work with a great research team.

I also want to thank my advisor and professors from the University of Florida. I appreciate Dr. Suzanna Smith for her listening to my struggles in a PhD program and continuing to give advice. I appreciate Dr. Mickie Swisher for continuing to share her knowledge about research and urging me to dig further into research methods.

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Chapter 1: Introduction

Background and Significance

Adolescence is a stressful period associated with transitions in the domains of physical, cognitive, and social-emotional development. Internalizing (i.e., symptoms of depression and anxiety) and externalizing behavior problems are prevalent among adolescents (i.e., delinquent and disruptive behaviors) (Negriff & Susman, 2011). In addition to their prevalence, studies have highlighted the continuity of adolescent internalizing and externalizing behaviors, wherein adolescents who have such a history of these behaviors are more likely to have the same issues in the future (Beyers & Loeber, 2003; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Ritakallio et al., 2008). Additionally, research has indicated high rates of co-occurrence of internalizing and externalizing behaviors among adolescents (Beyers & Loeber, 2003; Wiesner, 2003). For instance, conduct problems are more prevalent among adolescents with depression compared to those without depression (Angold, Costello, & Erkanli, 1999). Moreover, researchers have proposed that internalizing and externalizing behaviors reciprocally reinforce each other over time (Beyers & Loeber, 2003; Wiesner, 2003). Developmental stages of adolescents are found to impact the trajectories of adolescent internalizing and externalizing behaviors. Generally, internalizing behaviors increase from early to middle adolescence and stabilize during late adolescence (Overbeek, Vollebergh, Meeus, Engels, & Luijpers, 2001), while externalizing behaviors increase during early adolescence (ages 11-13), peak during middle adolescence (ages 14-16), and decline during late adolescence (ages 17-19) (Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 1998; Overbeek et al., 2001).

In addition to the variation of internalizing and externalizing behaviors contingent on developmental processes, contextual and social processes are involved in and may contribute to

the disparities of adolescent internalizing and externalizing behaviors. The National Institutes of Health defines health disparities as "differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States" (Forsell & Hines, 2005, p. 1). Examining the nature of health disparities, detecting mechanisms contributing to the issues, and eliminating health disparities have become a national priority (Stewart & Nápoles-Springer, 2003). Research has documented that disadvantages in one's early life may lead to health disparities in later life (Willson, Shuey, & Elder, 2007). Studies examining neighborhood effects on adolescent developmental outcomes have indicated that adolescents growing up in low-income neighborhoods are at higher risk of developing internalizing and externalizing behaviors (Kowaleski-Jones, 2000; White & Roosa, 2012; Wickrama & Bryant, 2003). However, empirical studies on the effects of neighborhood disadvantages on child and adolescent outcomes and the involved mechanisms at neighborhood, family, and individual levels are limited (Leventhal & Brooks-Gunn, 2000; Roosa, Jones, Tein, & Cree, 2003). In this study, I therefore examine how neighborhood disadvantages, family dynamics, and personal attributes work together to determine the life course trajectories of internalizing and externalizing behaviors across early, middle, and late adolescence.

Poverty and Adolescent Developmental Outcomes

Because of the concurrent increasing rate of child poverty and unmarried families, child outcomes have been substantially studied in association with poverty and family structures (Brown, 2010; Edin & Kissane, 2010). As the proportion of children living in married families of two biological parents is on the decline, low-income and ethnic minority children are more likely to live outside married families (Brown, 2010). In 2009, 50 percent of Black children and 25 percent of Hispanic children lived in single-mother families (U.S. Census Bureau, 2010).

Research focusing on family structure and child developmental outcomes has argued that the single-parent family structure is a contributing factor to poverty, and in turn, to poor child outcomes. Based on this line of research, the promotion of marriage has been diagnosed as a remedy for poverty and poor child outcomes (Brown, 2010).

The notion that unmarried families have negative effects on child well-being seems to blame single-parent families and ignore reasons why some parents choose to bear and raise children outside of marriage. Usually in low-income neighborhoods, the rate of marriage is lower and divorce rate is higher as women have fewer opportunities to marry men who can provide stable economic support for the family, often due to highly limited job opportunities in low-income neighborhoods (Huston & Melz, 2004). Trail and Karney (2012) indicated that individuals from low-income communities value the role of marriage in parenting and other aspects of their lives as much as those from high-income communities. However, marriages of people from low-income communities are more likely to experience more severe relationship problems due to challenges such as financial strains. The question raised here is whether being raised in a single-mother household contributes to poor child well-being or single-mothers are structurally disadvantaged and constrained by poverty, and as a result have limited access to resources needed for raising children, which contributes to poor child well-being. The answer to this question may decide the direction of government policy formulation: whether welfare funds should be directed to improve child developmental outcomes by promoting marriage and two-parent families, or by alleviating structural factors that disadvantage female-headed households (Brown, 2010; Huston & Melz, 2004).

Additionally, some research has argued that female-headed families are more vulnerable to poverty and are thus less resourceful, causing children to be at higher risk of poor

development (Schuck, 2005). But this argument may be arbitrary, given that it ignores the role of kin networks in providing support to raise children in low-income families among some ethnic groups (Haxton & Harknett, 2009). Along with the deinstitutionalization of marriage in the United States (Cherlin, 2004), these kinship networks have expanded beyond the model of the nuclear family made up of two generations (Allen, Blieszner, & Roberto, 2011). For Black families, the extended family and fictive kin provide significant support networks (Brown, 2008), wherein single-parent households may access help in raising children. Similarly, Hispanic cultures traditionally value the supportive role of extended families. Hispanics generally have frequent contact with their extended families and receive emotional support from these kin networks (Haxton & Harknett, 2009). It is therefore important to consider social support from kin networks when examining associations between family structure and child outcomes among different ethnic groups in the context of poverty.

In summary, research focusing on family structures as the cause of poverty without tackling the wider social contexts may pathologize unmarried families, especially ethnic minority and low-income single-mother families, and deny the fact that structural factors such as barriers to employment and economic mobility may be the cause of poverty and poor child outcomes (Brown, 2010).

Structural Poverty and Child Outcomes

Burton (2007) differentiated different types of economic disadvantages. For example, urban poverty is different from rural poverty, and transitory poverty is different from persistent poverty. As different types of poverty exhibit varying effects on individuals and families (Burton, 2007), how does poverty caused by early life disadvantages due to structural factors influence child developmental outcomes? The term *community structural adversities* (Shaw & McKay,

1942), used to describe structural poverty, is characterized by concentrated poverty, ethnic heterogeneity, and residential mobility. That is, people belonging to certain subgroups such as ethnic minorities and female-headed households are more likely to be economically disadvantaged. From the 1970s to 1990s, poverty became more concentrated in the urban areas of the United States. The residents of these inner-city neighborhoods were mainly poor and female-headed Black families and low-income ethnic minorities (Sampson 2001; Wilson 1987). These disadvantaged neighborhoods also have high rates of unemployment, ethnic heterogeneity, and residential turnover (Elliot et al., 1996). As children growing up in economically disadvantaged neighborhoods have a greater chance of being exposed to crime, violence, and drug use, they are at high risk of experiencing fear, depression, and anxiety (Ross, Reynolds, & Karlyn, 2000). In addition, the effects of socioeconomic disadvantages may increase internalizing and externalizing problems among children through disrupting parenting (Conger, Conger, & Martin, 2010). The configuration of poverty into the 21st century remains similar to that of past decades. Statistics in 2008 have indicated that subgroups including Blacks and Hispanics, female-headed households, non-American citizens, and residents of central city and rural areas still have a disproportionately high poverty rate. Disadvantaged female-headed households and ethnic minority members are also prone to be stuck in poverty as it is hard for them to escape once they slip into poverty (Edin & Kissane, 2010).

Limitations of Previous Literature

This study aims to address three major gaps and limitations of previous studies. First, previous literature examining the effects of community disadvantages on adolescent development draws heavily on the perspective of social disorganization that emphasizes how community disadvantages undermine resources the family can draw upon to provide an optimal

context for child rearing and thus leads to poor child outcomes (Hoffmann, 2002; Roche, Ensminger, & Cherlin, 2007; Wickrama & Bryant, 2003). Although this line of literature provides an insight on the disruptive effects of community structural disadvantages, it ignores the fact that positive adaptations at both family and individual levels could happen in the adverse contexts, which can redirect the developmental trajectories of adolescents and lead to variations in their developmental outcomes. Community disadvantages do not equate to family or individual disadvantages necessarily. Mechanisms about how community disadvantages influence family dynamics and processes and in turn are translated into individual development outcomes need to be further investigated. For example, many studies have emphasized how neighborhood effects lead to ineffective parenting and parent-child conflicts and in turn, poor developmental outcomes (Simons, Johnson, Beaman, Conger, & Whitbeck, 1996; Roosa et al., 2005; Wickrama & Bryant, 2003). In this light, individuals residing in disadvantaged communities are doomed to fail in their development. Indeed, protective factors such as interpersonal ties with families and friends, social support, and individual attributes may buffer the negative effects of community adversities and redirect individual developmental trajectories (Crosnoe & Elder, 2004; Donnellan, Conger, McAdams, & Neppl, 2009; Hatch, 2005). Thus, examinations of protective mechanisms are needed to give a more comprehensive understanding in examining the effects of community structural adversities on individual developmental outcomes.

Second, although a large body of research examining the trajectories of adolescent internalizing and externalizing behaviors has provided great insights into relevant developmental courses and involved mechanisms, very limited research has targeted the cumulative patterns of internalizing and externalizing behaviors during adolescence in the context of structural poverty

in a longitudinal frame. Existing literature has well documented how neighborhood disadvantages are associated with depression, delinquency, and other behaviors problems (Roosa et al., 2005; Wickrama & Bryant, 2003). Yet little is known about the life course effects of neighborhood disadvantages during adolescence (Meich & Shanahan, 2000; Walesman, Gee, & Geronimus, 2009; Wheaton & Clarke, 2003; Wickrama, Noh, & Elder, 2009). Additionally, adolescent coping resources, subjective appraisals, and coping efficacy may change depending on their developmental phases, which can complicate the variations in internalizing and externalizing behaviors. Questions therefore remain unaddressed as to how subjective appraisals and internalizing and externalizing behaviors of adolescents may vary and relate to each other in the context of structural poverty.

A third concern is how structural poverty and parenting are measured. Concentrated poverty has been widely used to assess structural economical disadvantages (Sampson, Raudenbush, & Earls, 1997; Wickrama & Bryant, 2003; Xue, Leventhal, Brooks-Gunn, & Earls, 2005), where it combines a series of indicators such as receiving public assistance, female-headed families, and unemployment into one measure, assuming the effects of different indicators are the same. However, these indictors may vary in their influence on adolescent internalizing and externalizing behaviors because they may have different effects on family processes and thus lead to different consequences. For example, circumstances of female-headed families and male unemployment may have different effects on child outcomes. Research ignoring the role of kin networks in providing social support argues that being raised in a female-headed household may contribute to poor child development as these families are not as resourceful as two-parent families in rearing children (Haxton & Harknett, 2009; Schuck 2005). Yet in fact, Black female-headed families may receive substantial support from their kin

networks to take care of children, and thus being raised in a female-headed household may not always be a factor contributing to poor child outcomes. In contrast, male unemployment undermines a community's ability to exert social control on its residents' behaviors, and as a result, adolescents in a community with a higher percentage of male unemployment may be at a higher risk of delinquent behaviors (Hoffmann, 2002; Wilson, 1996). Overall, the effects of female-headed households on child well-being may not be the same as male unemployment. In this study, therefore, I evaluate the effects of receiving public assistance, female-headed families, and unemployment separately.

Parenting has been an important factor involved in child adjustment in disadvantaged neighborhoods. Warm and supportive parenting has been associated with fewer internalizing and externalizing behaviors, whereas harsh parenting has been identified as a deficit parenting strategy (Armistead, Forehand, Brody, & Maguen, 2002; Brody et al., 2003; Wickrama & Bryant, 2003). Yet this distinction and evaluation of parenting may be arbitrary, given that it does not capture the nuances of different cultures and contexts. Moreover, researchers have argued that how one perceives another's behavior is more influential than the effects of the behavior itself (Acock & Bengtson, 1980). In addition, the interpretation of parental practices may vary across cultures. In a study examining the extent of agreement of parenting practices between mothers and daughters, Gonzales and colleagues (1996) indicated that non-Black American raters were more likely to view communication styles between mothers and daughters of Black families as harsh compared with Black raters. Additionally, parents may adopt harsh parenting as a way to protect their children from the negative influences of disadvantaged neighborhoods. In cultures valuing familism, such as Mexican-origin families, harsh parenting is adopted as a way to fulfill parents' obligation (White & Roosa, 2012). Thus, a measure tapping

how adolescents appraise their parents and family members is more appropriate to capture the nuances of culture and context than the actual parenting behaviors. In this study, I included in the literature review subjective appraisals of social support to evaluate adolescent perceptions of their family.

Purpose of Study

The goal of this study was to examine cumulative mechanisms and family processes underlying the linkage between early life disadvantages of adolescents and their internalizing and externalizing behaviors. This study used a growth curve model to examine how community disadvantages in early life accumulate over time to influence later internalizing and externalizing behaviors of adolescents through the subjective appraisal of social support by adolescents and their primary caregivers.

Theoretical Frameworks

I used the family life course perspective and the Cumulative Advantage/Disadvantage (CAD) Perspective to frame a longitudinal examination to reveal the dynamic effects of community structural adversities on adolescent internalizing and externalizing behaviors and the involved protective mechanisms.

Family Life Course Perspective

The family life course perspective helps conceptualize the contexts and processes of adolescent internalizing and externalizing behavior trajectories. Several important concepts including structural locations, human agency, intergenerational transmission and continuity, and transitions are relevant to these behaviors in the context of poverty.

Structural locations. The family life course theory emphasizes how structural locations shape the life course experiences of families (Bengtson & Allen, 1993; Macmillan & Copher,

2005). For example, family social locations play a big role in stratifying socioeconomic status and developmental outcomes of family members. Research has indicated that people belonging to subgroups such as Blacks and Hispanics, female-headed households, and central city residents are more likely to be economically disadvantaged than others (Edin & Kissane, 2010). Furthermore, the macro level context (poverty) and micro level context (family interaction) interplay to impact individual behavior (Bengtson & Allen, 1993). The context of family interaction and setting determines the opportunities and constraints experienced by parents in providing resources for raising children. Living in high-poverty urban communities shapes day-to-day parenting, which impacts adolescent development.

Human agency. Elder (1994) emphasizes the importance of human agency in deciding developmental outcomes, and proposes human beings actively participate in the process of constructing their life course by planning and making choices. In this light, adolescents play an active role in deciding the effects of community environments on their developmental outcomes. This explains why individuals living in the same community environments may vary in their adaptation to community adversities, and in turn display wide variations in their developmental outcomes. For instance, when facing life adversities such as economic hardships, individual characteristics can facilitate resilience (Donnellan et al., 2009). Individual characteristics are associated with the variability in people's adaptation to life stressful situations and their well-being. In this study, I operationalize human agency as subjective appraisals of social support, as discussed in the literature review.

Intergenerational transmission and continuity. Intergenerational transmission plays an important role in family socialization of children (Acock & Bengtson, 1980; Vollebergh, Iedema, & Raaijmakers, 2001). The family as a whole defines their reality through assigning

meaning to events, and this process shows continuity and stability across generations (Bengtson & Allen, 1993). Specifically, parents' and children's opinions, attitudes, and worldviews show a great degree of congruence (Bucx, Raaijmakers, & Van, 2010). In this sense, parents may transmit their appraisals of social support to their children.

   Transitions. Transitions are associated with the change of role and status (Macmillan & Copher, 2005). As stated by Elder (1994), "Transitions are always embedded in trajectories that give them distinctive form and meaning" (p.5). In the context of human development, research has indicated that transitions from childhood to adolescence and from adolescence to adulthood are associated with demands to adjust to new social contexts, which are often proved to be stressful (Conger & Conger, 2002). Similarly, transitions may exist during adolescence in its early, middle, and late stages. The adjustment demands vary in the course of adolescence and parent-child relationship changes as adolescents navigate between seeking autonomy and maintaining close bonding with parents (Yu, 2011). Transitions during adolescence may thus create new contexts of socialization, which influences intergenerational transmission of attitudes and worldviews from parents to their children (Bucx et al., 2010).

The Cumulative Advantage/Disadvantage (CAD) Perspective

   The Cumulative Advantage/Disadvantage perspective (CAD) is a complementary perspective to the family life course perspective in its emphasis on cumulative life course patterns of the effects of early disadvantages on adolescent internalizing and externalizing behaviors. The CAD adopts basic principles and concepts of life course theory and expands the theory by adding a dimension proposing that early life disadvantages will accumulate to influence later health outcomes.

The CAD, originating from Merton (1968, 1988), has been adopted by life course researchers. Based on Harriet Zuckerman's interviews with Nobel laureates, Robert Merton introduces the concept of cumulative advantage in his essay, "The Matthew Effect in Science" (1968) and his later work (1988). This concept of cumulative advantage describes the inequalities of rewarding systems in scientific careers, wherein scientific recognition tends to favor established scientists. Scientific rewards are more likely to accrue to well-known scientists compared with junior scientists whose reputation is less well-known. This concept has been applied in research of different domains such as educational attainment, labor market and careers, family and neighborhood effects, and criminal careers (DiPrete & Eirich, 2006). Life course researchers adopt the concept of cumulative advantage to examine the intracohort heterogeneity of aging and related institutional inequalities (Dannefer, 1987; Crystal & Shea, 1990; Dannefer, 2003; O'Rand, 2002). According to the CAD perspective, the inequality due to disparity in available resources at an initial point may continue to grow as the initial inequality interacts with individual characteristics over the life course. As a result, this inequality tends to deepen over time.

Integrating Family Life Course Theory and CAD

I integrated family life course theory and the CAD to form an integrative theoretical framework (Figure 1). Based on this framework, I tested a hypothesized model (see Figure 2 in Chapter 2) to explain the process of how community structural adversities influence adolescent internalizing and externalizing behaviors over time. This model included mediating and moderating paths connecting community structural adversities, subjective appraisals of social support, and adolescent internalizing and externalizing behaviors. The model helped reveal how community structural adversities, family dynamics, and personal attributes work together to

determine the trajectories of adolescent internalizing and externalizing behaviors.

Definitions of Terms

Internalizing and externalizing behaviors. Achenbach (1991) has operationalized internalizing behaviors as a sum of problem behaviors including withdrawal, somatic complaints, anxiety, and depression. Externalizing behaviors include delinquent and aggressive behaviors.

Subjective appraisals of social support. Vaux et al. (1986) conceptualize social support as a meta-construct consisting of support networks, supportive acts, and subjective appraisals of social support. Subjective appraisals of social support describe "perceptions/beliefs that one is involved, cared for, respected and/or having one's social needs met" (Vaux, Riedel, & Stewart, 1987).

Community structural adversities. Community structural adversities, such as concentrated poverty, ethnic heterogeneity, and residential mobility, may hinder the formation of social networks in communities (Ross, Mirowsky, & Pribesh, 2001). The disruption of social networks may in turn hinder the formation of common goals, values, and norms in communities, which can erode social control and lead to the increase of crime and delinquency (Sampson & Groves, 1989).

Cumulative mechanisms. Cumulative mechanisms are an important concept of CAD, as introduced by Robert Merton's (1968) essay, "The Matthew Effect in Science" and his later work two decades later (1988). CAD suggests that disadvantages associated with initial structural locations will accumulate over the life course to stratify individual life experiences (Dannefer, 2003; O'Rand 1996). In this light, disadvantages in early life will continue growing and lead to increasing divergence in later adolescent internalizing and externalizing behaviors.

Primary caregivers. The primary caregivers in this study include biological mothers and fathers, other female caregivers such as stepmothers, aunts, and grandmothers, and other male caregivers such as stepfathers, uncles, and grandfathers.

Significance of Study

This study contributes to the existing literature on adolescent internalizing and externalizing behaviors in several ways. First, it adds to the literature on CAD and health disparities by testing CAD in an adolescent population that has been rarely examined. Second, it adds to the literature identifying mechanisms linking structural poverty and adolescent internalizing and externalizing behaviors by examining the effects of intergenerational transmission of subjective appraisals of social support in a longitudinal frame. Third, this study proposes that subjective appraisals of social support mediate the linkage between community adversities and adolescent internalizing and externalizing behaviors, and the mediating effects may vary at early, middle, and late adolescence. If the proposed relationships hold, this study will provide prevention programs with evidence to modify and reshape subjective appraisals of social support among both primary caregivers and adolescents at appropriate timing across adolescence, which in turn may improve adolescent internalizing and externalizing behaviors. Fourth, this study tests moderating effects of community level variables on the association between subjective appraisals of social support and internalizing and externalizing behaviors. The findings will provide evidence for the formation of public policies and programs to alleviate structural disadvantages of communities.

In the following sections, I review literature about neighborhood effects on adolescent internalizing and externalizing behaviors, and discuss methods used in this study.

Family Life Course Perspective

Structural Locations
Concentrated Poverty
- Female-headed families
- Male unemployment
- Public assistance receiving

Ethnic Heterogeneity
- The percentage of nonwhite in each community cluster

Residence mobility
- Residence length

Human agency
- Subjective appraisals of social support

Intergenerational transmission and continuity
- The relationship between appraisals of adolescents and their primary caregivers

Transitions
- Early, middle, and late adolescence

Outcomes
Health Disparities
- Internalizing behaviors
- Externalizing behaviors

The Cumulative Advantage/Disadvantage Perspective: The cumulative pattern regulating the effects of structural disadvantages on adolescent internalizing and externalizing behaviors

Figure 1. Theoretical model

Chapter 2: Literature Review

The integrative theoretical framework (Figure 1) combining the family life course perspective and the CAD guides the examination of the effects of community disadvantages on adolescent internalizing and externalizing behaviors. This theoretical framework depicts the relationships among community disadvantages, subjective appraisals of social support by adolescents and their primary caregivers, and adolescent internalizing and externalizing behaviors. In this chapter, several topics relevant to the study are reviewed. First, I review the literature about mechanisms connecting community disadvantages and adolescent outcomes. This line of literature has narrowly focused on the destructive impacts of involved mechanisms and ignores the aspect of resilience. I then discuss the protective effects of subjective appraisals by adolescents and their primary caregivers, which is contrary to the destructive perspective in previous literature. Finally, I discuss the dissipation effects of community disadvantages and gender effects. Based on the literature review, I describe the hypothesized model (Figure 2) for this study.

The Effects of Community Structural Adversities

Community Structural Adversities and Adolescent General Developmental Outcomes

A large body of empirical studies have explored mechanisms linking community level variables and a variety of individual developmental outcomes such as educational outcomes (Leventhal & Brooks-Gunn, 2004), sexual behaviors (Baumer & South, 2001), problem behaviors (Hoffmann, 2002; Kowaleski-Jones, 2000), and depressive symptoms (Wickrama & Bryant, 2003). The findings of these empirical studies have generally supported that neighborhood disadvantages undermine individual development. Yet aspects of neighborhood environments vary in their impacts on different domains of individual developmental outcomes.

Concentrated poverty is one of the dimensions of community structural adversities researchers have commonly examined. Using data from the *National Survey of Children*, Baumer and South (2001) explored the association between socioeconomic disadvantages and sexual activities of adolescents and young adults. The findings suggested that more disadvantaged socioeconomic status was associated with an increase of frequency of engaging in sexual intercourse, the number of sexual partners, and the likelihood of engaging in unprotected sexual intercourse among adolescents and young adults. The neighborhood environment also influences the educational outcomes of poor children and adolescents. In order to explore whether moving from high- to low-poverty neighborhoods would impact the educational outcomes of poor children and adolescents, the U.S. Department of Housing and Urban Development (HUD) sponsored a national housing program entitled *Moving to Opportunity for Fair Housing Demonstration* (MTO). HUD randomly assigned poor families applying to the program to neighborhoods with different levels of poverty. The random assignment aimed to detect the neighborhood effects more precisely by controlling for selection bias and teasing apart family and neighborhood effects. Using the data from MTO, Leventhal and Brooks-Gunn (2004) focused on 583 school-aged children and analyzed the baseline data and follow-up evaluation. The results highlighted that the housing program alleviated gender differentials. Usually, girls have higher achievement scores than boys. Moving from high- to low-poverty neighborhoods increased the achievement scores from 6 to 33 points among boys aged 11 to 18 years old, narrowing the score gap between boys and girls.

Additionally, a few studies examined the neighborhood effects on adolescent deviant behaviors. The majority of the findings generally indicated that disadvantaged neighborhoods have negative effects on deviant behaviors; however, some findings are inconsistent. With data

drawn from the 1990 United States Census, the National Longitudinal Survey of Youth, and

1979 Merged Mother–Child files, Kowaleski-Jones (2000) examined the impact of community

risk factors such as poor employment opportunities, female-headed households, and residential

turnover on risk-taking attitudes and adolescent problem behaviors. The researcher found that a

higher proportion of female-headed families and unemployed individuals were associated with

adolescent aggressive behaviors. In contrast, residential stability and school quality played a

protective role in adolescent aggressive behaviors. More residentially stable neighborhoods and

higher school quality were associated with fewer adolescent problem behaviors. Similarly,

Hoffmann (2002) used data from the National Educational Longitudinal Study (NELS) to

examine adolescent drug use with a sample of children in 10th and 12th grades. Hoffmann found

that male unemployment and the poverty level impacted adolescent drug use in different ways.

The risks of using drugs were more likely to increase in neighborhoods with higher rates of male

unemployment. However, poverty was negatively associated with the rates of drug use after

controlling for male unemployment, which is inconsistent with previous studies suggesting that

poverty increases the likelihood of adolescent drug use (Hoffmann, 2002). These inconsistent

findings suggest that further investigation is needed to advance knowledge of the mechanisms

linking different aspects of community disadvantages and adolescent developmental outcomes.

The Mechanism Connecting Community Structural Adversities and Adolescent

Internalizing and Externalizing Behaviors

Among different aspects of developmental outcomes, research has specifically

suggested that the exposure to poverty increases the risk for internalizing and externalizing

symptoms among adolescents (Frojd, Marttunen, Pelkonen, von der Pahlen, & Kaltiala-Heino,

2006; Ross et al., 2000). Past studies showed that poverty may impact adolescent internalizing

and externalizing behaviors through both direct and indirect paths. Direct exposure to daily stressors relating to living in a structurally disadvantaged community may leave adolescents with feelings of frustration and distress (Ross et al., 2000; Wickrama & Bryant, 2003). Poor neighborhoods are likely to be associated with high levels of community disorders such as drug use and crime. Individuals living in such community environments are at higher risk of experiencing fears, depression, and anxieties compared with those living in more advantaged communities (Ross et al., 2000). The notion of direct paths emphasizes the social influence of community adversities, which implies that individuals growing up in disadvantaged neighborhoods are destined to have negative developmental outcomes. This notion ignores the fact that individuals exposed to the same risk factors do not share the same experiences. It is possible that individuals from disadvantaged neighborhoods become resilient and prosper in their development depending on resources derived from their social relationships and personal characteristics (Thoits, 2006).

Studies on indirect paths linking neighborhood environments and adolescent internalizing and externalizing behaviors have considered the ecological contexts and related mechanisms surrounding adolescent development. Family and peer relations are two major domains involved in these studies (Barrera et al., 2002; Hoffmann, 2002; Roosa et al., 2005; Ross, Mirowsky, & Goldsteen, 1990; Wickrama & Bryant, 2003). As the primary socialization context for children, parents play an important role in child outcomes. Adverse community contexts may disrupt positive parent-adolescent interactions (Wickrama & Bryant, 2003). Additionally, people who perceive their communities as disadvantaged are less willing to establish relationships with each other, which can lead to a breakdown of social networks (Kowaleski-Jones, 2000). The breakdown of social networks in communities may *spill over* into

interactions within families (Wickrama & Bryant, 2003). For example, compared with parents in more advantaged communities, parents in disadvantaged communities may adopt ineffective parenting practices (Simons et al., 1996) that negatively influence internalizing and externalizing symptoms. Conger and his colleagues (1994) examined the impact of economic hardships on internalizing and externalizing behaviors among adolescents from rural areas with three waves of data. The sample included 378 families with two parents and one child in seventh grade. Conger et al. used the concept of coercive family processes from Patterson (1982), and found that coercive family processes mediated the association between economic hardships and adolescent internalizing and externalizing behaviors. The concept of coercive family processes suggests that in a family of high stress, family members tend to be hostile toward each other and meanwhile reinforce these negative behaviors in order to control the behaviors of others. Similarly, Barrera et al. (2002) explored the paths linking economic hardships to internalizing and externalizing behaviors of 300 adolescents aged 11 to 15 years old. The researchers found that parenting depression and parenting support mediated the linkage between economic hardships and adolescent internalizing and externalizing behaviors. That is, economic hardships were linked to parenting depressive symptoms, which was negatively associated with supportive parenting behaviors.

Along with parenting practices and parent-child relationships, association with deviant peers has been examined as another important mechanism linking community environments and adolescent externalizing behaviors. Interviewing 189 primary caregivers and their children from fourth to sixth grade in a metropolitan area, Roosa et al. (2005) tested a stress process model and found that affiliation with deviant peers was one of the mechanisms mediating the linkage between neighborhood criminal events and poor neighborhood quality, and children's

externalizing behaviors. Similarly, Simons et al. (1996) studied 207 single-parent families in rural communities and examined the mediating effects of peers. The findings highlighted gender differences by showing that community disadvantages directly impacted psychological distress of boys and indirectly led to conduct problems among boys through their association with deviant peers. However, the same effects did not apply to girls. Compared with boys, single-parent households influenced girls' conduct problems directly. Single-parent status also increased the chance that girls were involved with deviant peers, which in turn increased their conduct problems.

In summary, past studies examining direct and indirect paths connecting community disadvantages and internalizing and externalizing behaviors have focused on the destructive side of involved mechanisms. These studies examined parenting processes and peer association as risk factors and ignored the aspect of resilience. Studies solely focusing on the destructive side may pathologize individuals living in disadvantaged neighborhoods. Indeed, protective factors such as interpersonal ties with families and friends, social support, and individual personal characteristics may buffer the negative effects of community adversities and redirect individual developmental trajectories (Crosnoe & Elder, 2004; Donnellan et al., 2009; Hatch, 2005). Studies integrating the perspectives of protective factors and resilience are needed to give a more comprehensive understanding when examining effects of community structural adversities on adolescent internalizing and externalizing behaviors.

The CAD and Adolescent Outcomes

The life course cumulative advantage/disadvantage (CAD) perspective has been widely used in the examination of health disparities (Luo and Waite, 2005; O'Rand & Hamil-Luker, 2005; Walesman et al., 2009; Willson et al., 2007). With data from 1998 Health and Retirement

Study (HRS), a longitudinal survey of older Americans, Luo and Waite (2005) examined the relationship between childhood socioeconomic status (SES) and physical, mental, and cognitive well-being in later life with 19,949 respondents aged 50 or over. The research found that those with lower socioeconomic status in childhood had worse health outcomes in later life. With the same data set, O'Rand and Hamil-Luker (2005) examined how early disadvantages such as childhood illness, financial status, parents 'education and occupation accumulated through the life course to shape trajectories of the risk for heart attack. The finding indicted that early disadvantages were associated with the increasing risk for heart attack in later life. However, the majority of studies for health disparities based on the CAD have focused on adults, and very few studies have used this framework to examine adolescent outcomes (Meich & Shanahan, 2000; Walesman et al., 2009; Wheaton & Clarke, 2003; Wickrama et al., 2009). Based on the CAD, Wickrama and his colleagues (2009) examined how family SES in early life influenced the trajectories of depressive symptoms from early adolescence to early adulthood with data from the National Longitudinal Study of Adolescent Health. The researchers found that early disadvantages in family SES predicted the inequalities of depressive symptoms in early adolescence, and this effect diminished during middle adolescence, and reemerged during emerging adulthood. This research provides evidence that psychological well-being across adolescence is not an ageless phenomenon. More research usisng the CAD is needed to detect variations of adolescent outcomes and related mechanisms (Wickrama et al., 2009).

Protective Factors and Adolescent Internalizing and Externalizing Behaviors

The Protective Effects of Subjective Appraisals of Social Support

Past studies investigating the mechanisms linking community structural adversities and adolescent well-being have highlighted the effects of families, schools, and peers (Barrera et al.,

2002; Baumer & South, 2001; Hoffmann, 2002; Kowaleski-Jones, 2000; Leventhal & Brooks-Gunn, 2004; Simons et al., 1996; Xue, Leventhal, Brooks-Gunn, & Earls, 2005; Wickrama & Bryant, 2003). For example, Baumer and South (2001) examined the mediating effects of peer behaviors, school attachment, and parental supervision connecting community disadvantages and youth sexual activity. Kowaleski-Jones (2000) highlighted the protective effects of high-quality schools on adolescent aggressive behaviors. Although these studies uncover the important mechanisms involved in the effects of neighborhood contexts on adolescent outcomes, they emphasize the external contexts of children and adolescents' development. Few studies have examined the effects of individual internal processes.

Bandura (1989) stated, "Any account of the determinants of human action therefore must include self-generated influences as a contributing factor" (p.1175). Consistent with Bandura (1989), Elder (1994) emphasizes the importance of human agency in deciding developmental outcomes, and proposes human beings actively participate in the process to construct their life course by planning and making choices. In this light, adolescents play an active role in determining the effects of community environments on their developmental outcomes. This sheds light on why although living in the same community environments, individuals may vary in their adaptations to community adversities and in turn display wide variations in their development outcomes. For instance, when facing life adversities such as economic hardships, individual characteristics can facilitate resilience (Donnellan et al., 2009). Luthar, Cicchetti, and Becker (2000) defined resilience as "a dynamic process encompassing positive adaptation within the context of significant adversity" (p.543). Individual characteristics are associated with the variability in people's adaption to stressful situations and their well-being. Masten suggested psychological characteristics such as ''cognitive and self-regulation

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skills, positive views of self, and motivation to be effective in the environment" (2001, p.234) can buffer the negative effects of stressful life events. As a result, those with more positive psychological qualities are more likely to be resilient and may have better adjustment outcomes. Thus, in this study, I examine the protective effects of subjective appraisals of social support on adolescent internalizing and externalizing behaviors.

The concept of subjective appraisals of social support is drawn from Vaux's (1988) framework of social support. Vaux, Riedel, and Stewart (1987) indicated that social support is a *metaconstruct* comprised of support network resources, supportive behaviors, and subjective appraisals of support. Among these constructs, subjective appraisals of support are particularly critical to psychological well-being (Vaux et al., 1986). Barrera (1981) also emphasized that individuals' subjective appraisals of social support are more important to their well-being compared with the quantity of supporters and supportive behaviors. In other words, individuals may experience social support in different ways, and their perceptions on how they are supported impact their health.

Another way to categorize social support is to distinguish between received social support and perceived social support (Haber, Cohen, Lucas, & Baltes, 2007). Received social support and perceived social support are two separate constructs. Perceived social support is an equivalent concept to subjective appraisals of social support. Received social support is concerned with specific supportive behaviors, while perceived social support is concerned with how people perceive and evaluate the social support they receive (Sarason, Sarason, & Pierce, 1990). Received social support influences well-being through the effects of perceived social support (Haber et al., 2007). Consistent with this view, Lakey, et al. (2002) found that the association between received and perceived social support was low, which further supports the

argument that they are two separate constructs. When examining the effects of social support on individual well-being, it is therefore important to differentiate between received social support and perceived social support.

Social support can be derived from relationships with families and friends. In the literature of adolescent development outcomes, peer association has been commonly examined as a factor contributing to problem behaviors (Kowaleski-Jones, 2000; Roosa et al., 2005; Simons et al., 1996). How adolescents appraise their relationship with peers and how the appraisals influence their developmental outcomes has been rarely discussed. In this study, I examined the effects of adolescents' subjective appraisals on their peers.

The Protective Effects of Families: Intergenerational Transmission and Transition

Previous studies examining the effects of community structural adversities approach family process from a risk perspective (Barrera et al., 2002; Wickrama & Bryant, 2003). However, a number of studies have identified positive parent-child relationships as one of the important protective mechanisms of adolescent well-being (Armistead et al., 2002; Brody et al., 2003; Jones, Forehand, Brody, & Armistead, 2002). As families comprise immediate environments for the development of children, family processes may be important mediating mechanisms linking community structural adversities and adolescent well-being. Families can therefore promote adolescent development by providing resources and buffering negative effects of life stressful events (Elder, 1998).

Studies highlighting the protective effects of family processes have suggested that warm and supportive parenting alleviates internalizing and externalizing behaviors of adolescents. Armistead et al. (2002) studied the effects of parenting on adolescents who resided in urban areas (high violence-related risks) and rural areas (low violence-related risks). The researchers found

that warm and supportive parenting was associated with fewer internalizing and externalizing behaviors in both areas.

Although parental support plays a primary role in adolescent outcomes, it is not clear how subjective appraisals of social support by parents influence that of their adolescents. Within the domain of family socialization, a great degree of congruence exits between the attitudes, opinions, and worldviews of parents and their children as a result of intergenerational transmission (Acock & Bengtson, 1980; Bucx et al., 2010; Vollebergh, et al., 2001). In a study examining the association among parental self-efficacy, children' self-efficacy, and academic achievement with a sample made up of mothers and adolescents residing in inner-city Philadelphia, Ardelt and Eccles (2001) found that parental efficacy was a strong predictor of their children's self-efficacy and academic outcomes in more disadvantaged families. This association pattern of self-efficacy among parents and adolescents provides evidence for intergenerational transmission of attitudes and opinions. Bucx and colleagues (2010) studied the intergenerational congruence of partnership attitudes with 2,041 dyads of parents and young adults and found direct intergenerational transmission of partnership attitudes from parents to children. Thus, in this study, I predict that primary caregivers may transmit their appraisals of social support to their adolescents. In other words, adolescents and their parents may be congruent in appraisals of social support. In this way, parents' appraisals of social support may transmit to their adolescents, and in turn influence adolescent well-being.

Intergenerational transmission of attitudes and worldviews occurs in a context of life course transitions. Transitions over the life course may change intergenerational relationships and lead to variations in the effects of intergenerational transmission (Bucx et al., 2010; Vollebergh, et al., 2001). In a study looking at intergenerational transmission of cultural

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orientation in adolescence and young adulthood, Vollebergh and colleagues (2001) found that parents' influence on their children's cultural orientation declined over time. The researchers explained that the more egalitarian parent-child relationships as adolescents get older may lead to a diminishing influence. This study provides evidence of how the developmental phases can influence intergenerational transmission.

Adolescence is a period associated with the development of cognitive, emotional, and attitudinal autonomy (Noom, Dekovi´c, & Meeus, 2001; Steinberg & Silverberg, 1986; Zimmer-Gembeck & Collins, 2003). While some researchers have argued that with the development of autonomy, adolescents become more rebellious and detached from their parents, other researchers argue that adolescents achieve autonomy while maintaining a close relationship with their parents (Yu, 2011). As relevant knowledge on the effects of autonomy and close bonding with parents is not determined, the intergenerational influence of parents on their adolescent may vary during the course of adolescence depending on the interaction between autonomy seeking and close bonding with parents. Thus, I predict parents' subjective appraisals of social support on their adolescents may vary across adolescence.

In summary, subjective appraisals of social support by adolescents and their primary caregivers may mediate the effects of community disadvantages on internalizing and externalizing behaviors. The hypothesized model (Figure 2) depicts the mediating influence of subjective appraisals of social support on the association between community disadvantages and internalizing and externalizing behaviors.

The Contextual Dissipation Effect of Community Disadvantages

The protective effects of subjective appraisals of social support and families on internalizing and externalizing behaviors may vary from neighborhood to neighborhood. While

proximal resources such as individual and familial factors impact adolescent outcomes, contextual environments may influence this process. Wickrama and Bryant (2003) used contextual dissipation to describe this influence. Contextual dissipation suggests that contextual disadvantages may attenuate the protective effects of proximal social or familial resources on adolescent development. Wickrama and Bryant (2003) examined the dissipating effects of neighborhood circumstances on adolescent depressive symptoms with data from the National Longitudinal Study of Adolescent Health. The findings indicated that though parental acceptance had positive effects on adolescent depressive symptoms, the effects weakened in highly disadvantaged neighborhoods.

Another similar and relevant concept is contextual amplification (Ge, Gene, Conger, Simons, & Murry, 2002). Contextual amplification describes how negative influences of individual and familial factors can be amplified in disadvantaged contexts. Ge et al. (2002) examined the influence of neighborhood circumstances on the association between pubertal transitions and behavior problems among a group of African Americans aged 10 to 12 years old. The researchers found that early-maturing children living in more disadvantaged neighborhoods were more likely to be affiliated with deviant peers than their counterparts in less disadvantaged neighborhoods, which contributed to behavior problems.

Applied to the present study, disadvantaged neighborhoods may diminish the protective effects of subjective appraisals of support on adolescent internalizing and externalizing behaviors. In other words, neighborhood circumstances may moderate the association between subjective appraisals of social support and internalizing and externalizing behaviors. The hypothesized model (figure 2) depicts the moderating influence.

The Effect of Gender

The process of community structural adversities impact on adolescent outcomes may differ by gender. Research on gender differences in adolescent internalizing and externalizing behaviors between boys and girls, however, yields inconsistent findings. Some research has suggested that female adolescents are at higher risk for internalizing symptoms compared with male adolescents (Botticello, 2009; Crawford, Cohen, Midlarsky, & Brook, 2001). This gender difference is attributed to different gender socialization for girls and boys. Boys are socialized to be independent, while girls are expected to value social relationships and care for others (Rosenfield, Vertefuille, & McAlpine, 2000). As a result, girls tend to be more aware of the distress experienced by families and friends in disadvantaged communities (Botticello, 2009; Crawford et al., 2001). Additionally, compared with males, female adolescents are more likely to be involved in stressful events of families and friends (Hammack, Robinson, Crawford, & Li, 2004). This puts female adolescents at a higher risk for developing internalizing symptoms.

Inconsistently, other studies found that economic disadvantages such as low socioeconomic status impacted depression and conduct problems of boys more strongly than girls (McLeod & Owens, 2004). Researchers argued this could be due to girls being more defined by family resources, and more influenced by stress in the domain of families, thus, economic disadvantages at the community level have greater impacts on boys (Botticello, 2009; Hammack et al., 2004). Researchers also argued that male and female adolescents differ in their perceptions of social support. Compared with male adolescents, female adolescents value mutual support and have a more positive perception of social support (Colarossi & Eccles, 2003). Additionally, females are more sensitive to the social support they receive (Avison & McAlpine, 1992; Botticello, 2009). As social support buffers the negative influence of adverse

environments, female adolescents may be better at coping with life stressful events. Furthermore, in a review of adolescent internalizing and externalizing behaviors, Negriff and Susman (2011) indicated that neighborhood disadvantages were associated with internalizing and externalizing behaviors of both males and females through harsh parenting and association with deviant peers, with no significant gender difference noted.

It is possible that adversities at macro (community) and micro (family and individual) levels have different impacts on male and female adolescents. Meanwhile, how males and females utilize their coping resources intensifies this difference. Studies differentiating effects at macro and micro levels and related coping processes are needed to advance the knowledge of gender differences in these circumstances. In addition to inconsistent findings of gender differences, very few studies have been located that examine if disparities of internalizing and externalizing behaviors are accumulated and reproduced in the same pattern among boys and girls. Thus, in this study, I examine how the association between community structural adversities and adolescent internalizing and externalizing behaviors, and related family and individual processes vary by gender over time.

Based on the hypothesized model (Figure 2), I examined the following research questions and hypotheses.

Research Questions and Hypotheses

General research question

What are the mechanisms connecting community structural adversities, such as concentrated poverty (male unemployment, the percentage of female-headed families and families receiving public assistance, and the percentage of families with low income), residential length, ethnic heterogeneity, subjective appraisals of social support by adolescents and their primary

caregivers, and adolescent internalizing and externalizing behaviors across early, middle, and late adolescence?

Research question 1: How does the growth rate of internalizing and externalizing behaviors during adolescence change over time?

Hypothesis 1.1: The internalizing behaviors will increase during early through middle adolescence and stabilize during late adolescence.

Hypothesis 1.2: The externalizing behaviors will increase during early through middle adolescence and decline during late adolescence.

Research question 2: How do community structural adversities affect the developmental trajectories of internalizing and externalizing behaviors of adolescents?

Hypothesis 2.1: Community level predictors will have an impact on the initial level of adolescent internalizing and externalizing behaviors. Adolescents living in more disadvantaged communities will have a higher initial level of internalizing and externalizing behaviors compared with those from more advantaged community environments.

Hypothesis 2.2: Adolescents living in more disadvantaged communities will have a steeper increase in internalizing and externalizing behaviors compared with those with more advantaged community environments.

Research question 3: What are the mediating effects of subjective appraisals of social support by both primary caregivers and adolescents?

Hypothesis 3: Community structural adversities will influence internalizing and externalizing behaviors through the effects of subjective appraisals of social support by adolescents and primary caregivers.

Research question 4: What are the moderating effects of community structural adversities?

Hypothesis 4: Community structural adversities will moderate the linkage between subjective appraisals of social support by adolescents and internalizing and externalizing behaviors. That is, the protective effect of subjective appraisals of social support by adolescents will become weaker in neighborhoods with a higher percentage of receiving public assistance, female-headed households, male unemployment, higher ethnic heterogeneity, and lower residential stability.

Research question 5: How do the trajectories of internalizing and externalizing behaviors differ in boys and girls?

Hypothesis 5: There are no directional hypotheses for gender differences in the effects of community level predictors, appraisals of social support by caregivers and adolescents on internalizing and externalizing behaviors.
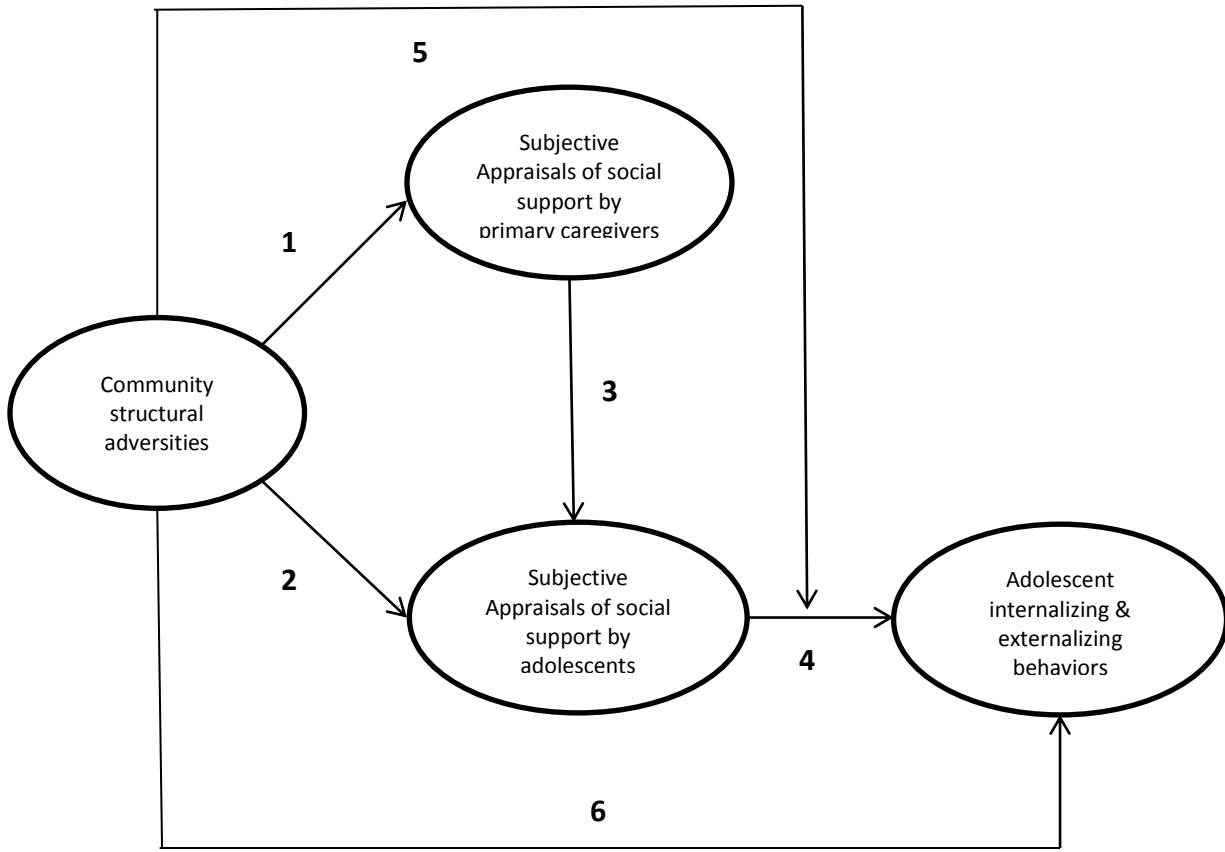
Figure 2. Hypothesized model

Chapter 3: Methods

Research Design

This study used data from the Project on Human Development in Chicago

Neighborhoods (PHDCN) Longitudinal Cohort Study. PHDCN aims to examine the effects of

neighborhood contexts on individual's social and psychological development from birth to

young adulthood in urban neighborhoods (Earls & Buka, 1997). I chose PHDCN for several

reasons. First, one of the goals of the present study is to examine the effects of community

structural adversities such as concentrated poverty, ethnic heterogeneity and residential mobility

on adolescent internalizing and externalizing behaviors. The city of Chicago is characterized by

inner-city poverty and extensive diversity in social class, race, and ethnicity (Sampson, 2001;

Wilson, 1991). These characteristics make Chicago a good place to examine the effects of

community structural adversities. Sampson (2001) noted that PHDCN is "explicitly designed to

examine neighborhood mechanisms in structural context" (p.18). Second, the present study aims

to examine the combining effects of macro (communities) and micro level (families and

individuals) mechanisms on adolescent internalizing and externalizing behaviors. Multilevel

analyses are the appropriate approach to accomplish this goal. The design of PHDCN reflects the

multilevel structure of data. At the initial stage, PHDCN identified and sampled neighborhoods.

The PHDCN combined 847 population census tracts in the city of Chicago to form *343*

"ecologically meaningful" (Sampson, Raudenbush, & Earls, 1997, p.919) *neighborhood clusters*

(NCs) that reflect the homogeneity on a series of key census indicators including socioeconomic

status, ethnicity, house density, and family structure (Sampson et al., 1997). The neighborhoods

were cross-classified by levels of socioeconomic status and levels of ethnic/racial mix, which

yielded 21 strata, and the 343 NCs fell into these 21 strata. In the following stage, the PHDCN sampled approximately 50 individuals from each neighborhood.

Additionally, the design of PHDCN involves multiple age cohorts. Researchers sampled participants of different age groups at a single time point and followed them for several years. This design is referred as an accelerated longitudinal design (Miyazaki & Raudenbush, 2000; Raudenbush & Chan, 1992). Researchers recommend the accelerated longitudinal design in response to the practical and inferential problems associated with the single cohort design. With the single cohort design, researchers have to spend longer time to collect data. Moreover, the accumulation of attrition during the process of data collection over several waves undermines the inferential validity (Miyazaki & Raudenbush, 2000; Raudenbush & Chan, 1992). As part of the PHDCN, the longitudinal cohort studies drew 80 NCs out of 343 NCs and followed 6,000 randomly selected individuals from seven age cohorts (birth, 3, 6, 9, 12, 15, and 18 years) and their primary caregivers over eight years. These are the ages that participants joined the study. Data were collected at three time periods (1994-1997, 1997-2000, and 2000-2002) through in-home interview. With data drawn from PHDCN, I adopt a longitudinal design to examine the trajectories of adolescent internalizing and externalizing behaviors. Among these seven cohorts, I included adolescents and their primary caregivers from the 6-, 9-, 12-, and 15-year-old cohorts given these cohorts provide data on internalizing and externalizing behaviors, which are the outcome variables for my study. I refer to them as cohort 6, 9, 12, and 15 hereafter. Not all cohorts have data from three waves. Table 1 demonstrates the waves and ages of participants at each wave. The data from subjects of cohort 6 were collected at Wave 3 (W3); data of cohort 9 were collected at Wave 2 (W2) and 3; data of cohort 12 were collected at three waves; and data

of cohort 15 were collected at Wave1 (W1) and 2. I will combine the analysis for cohort 6, 9,

12, and 15 to approximate a longer developmental period from age 10 to 17.

Table 1

Cohorts and Waves Included in This Study

Cohorts	Wave of Data (Mean Ages/Range)		
Cohort 6			W3 (10/9-13)
Cohort 9		W2 (11/9-13)	W3 (13)
Cohort 12	W1 (12/10-13)	W2 (14/12-17)	W3 (16/15-18)
Cohort 15	W1 (15/13-16)	W2 (17/15-19)	

Participants

The PHDCN longitudinal studies drew a stratified probability sample of 80 NCs from

the 343 NCs. Approximately 50 people in each NC were interviewed. Table 2 shows the basic

demographic information of adolescents and their primary caregivers from each cohort. The

demographic information for adolescents includes age, gender, and ethnicities. The demographic

information for caregivers includes age, education levels, marital status, and relationships to

adolescents.

Measures

Community structural adversities. Community structural adversities were measured

at W1 only. Community structural adversities include three components: *concentrated poverty*,

ethnic heterogeneity, and *residential stability* (Sampson et al, 1997). Individual level data were

aggregated to generate measures to assess concentrated poverty, immigrant concentration, and

residential stability of each neighborhood cluster. Table 3 provides the descriptive statistics for

the study variables. The skewness values of all variables are between -2 and 2, indicating that none of the variables violate the assumption of normality.

Concentrated poverty was assessed by using three time-invariant variables at W1, namely, the percentage of families receiving public assistance, female-headed households, and male unemployment. Female-headed households (1=female-headed; 0=non female-headed) and male unemployment (1=male-unemployed; 0=non male unemployed) were computed based on primary caregivers' gender (1=male; 2=female), employment status (1=currently employed; 2=unemployed less than 5 years; 3=unemployed more than 5 years), and their partner's employment status (1=currently employed; 2=unemployed less than 5 years, or 3, unemployed more than 5 years). The value of female-headed households and male unemployment were treated as missing if any of the three items had missing values. *Ethnic heterogeneity* was assessed by the percentage of non-White primary caregivers at W1 (Ennet, Flewelling, Lindrooth, & Norton, 1997). The number of years that first primary caregivers live at the same address at W1 was used to assess *residential stability*.

Subjective appraisals of social support. Subjective appraisals of social support were time-varying variables measured at W1 and W3. The measure of subjective appraisals of social support was adapted from Turner, Frankel, and Levin's (1983) Provision of Social Relations (PSR) Scale. The PSR was based on Weiss' s (1974) five dimensions of the provisions of social relations that include attachment, social integration, reassurance of worth, reliable alliance, and guidance. These five dimensions evaluate individuals' appraisals of their social relations.

Table 2

Demographic Information of Adolescents and Their Primary Caregivers from Each Cohort at

Wave 1

	Cohort 6 (N=979)	Cohort 9 (N=828)	Cohort 12(N=821)	Cohort 15(N=696)
	M(*SD*)	M(*SD*)	M(*SD*)	M(*SD*)
Children				
Age	6.16 (.33)	9.16(.33)	12.15(.32)	15.16 (.32)
Gender				
Male	48.9%	52.7%	49.3%	48.9%
Female	51.1 %	47.3%	50.7%	51.1%
Ethnicities				
Hispanic	48.3%	47.6%	44.9%	44.7%
Asian	1.5%	1.3%	1.6%	0.6%
Pacific Island	0.4%	0.2%	0.1%	0.3%
Black	33.2%	34.2%	37%	36.4%
White	14.5%	14.0%	13.6%	15.1%
Native American	0.6%	1.3%	0.9%	1.3%
Other groups	1.2%	1.2%	1.3%	1.6%
Primary caregivers				
Age	33.55 (7.57).	35.98 (7.16)	39.31 (7.76)	41.68 (7.56)
Education Level				
Less than high school	19.7%	20.2%	22.7%	23.7%
Some high school	23.5%	20.4%	22.2%	19.4%
Finish high school	11.0%	13.4%	12.7%	11.8%
some more than high school	35.8%	33.8%	30.9%	30.0%
Bachelor's degree or more	8.1%	8.6%	8.4%	10.2%
Marital Status				
Married	54.4%	58.6%	55.1%	51.6%
Single	30.7%	28.7%	33.4%	33.9%
Has a partner	14.4%	11.5%	10.4%	13.1%
Relationship to children				
Biological mothers	86.3%	84.7%	79.8%	82.0%
Biological fathers	6.5%	7.6%	10.2%	8.9%
Other female caregivers	6.5%	6.2%	8.6%	6.9%
Other male caregivers	0.5%	0.4%	0.6%	0.9%

Additionally, the scales distinguish two sources of the social support by including items

of family support and friend support. In this study, subjective appraisals of social support were

assessed by 13 indicators. The scale included items such as, "I share the same approach to life

that many of friends do," and "I know my family will always stand by me." Each indicator was

measured by a 3-point Likert-type scale ranging from 1 (Not true) to 3 (Very true). This scale

had an internal consistency ranging from .75 to .77 across the four cohorts for caregivers, and ranging from .71 to .77 for adolescents. A mean score of these 13 indicators was created to represent subjective appraisals of social support for both primary caregivers and children, where higher scores represent more positive appraisals. Items from this scale are presented in Appendix A.

Internalizing behaviors and externalizing behaviors. Internalizing and externalizing behaviors were time-varying variables measured at W1, W2, and W3. Internalizing and externalizing behaviors were assessed with Achenbach's (1991) Youth Self-Report, which was developed to evaluate the emotional and behavioral problems of adolescents. The scale included 112 items that were categorized into nine syndrome subscales, Withdrawn, Somatic Complaints, Anxious/Depressed, Social problems, Thought problems, Attention problems, Delinquent behaviors, Aggressive behaviors, and Self-destructive/Identity problems. The internalizing behaviors were assessed by combining three subscales, Withdrawn, Somatic Complaints, and Anxious/ Depressed scales. Cronbach's alpha for the internalizing scale in this study ranged from .87 to .88 across the four cohorts. A composite score was used for analysis where higher scores mean more internalizing symptoms. The externalizing behaviors were assessed by Delinquent and Aggressive subscales. Cronbach's alpha for the externalizing scale in this study ranged from .80 to .88 across the four cohorts. A composite score was used for analysis with higher scores representing more externalizing symptoms (Zimmerman & Pogarsky, 2011). These measures have been commonly used in research regarding emotional and conduct problems and show good reliability and validity (Roosa et al., 2005; Zimmerman & Pogarsky, 2011).

Covariates. Individual ages at W1 were included as a covariate. As individuals from each cohort were at different ages when the data were collected, adding age as a covariate

revealed the age effect on internalizing and externalizing behaviors. Additionally, as poor families tend to gather in poor communities, adverse family socioeconomic status may confound the effects of community structural adversities (Duncan, Connell, & Klebanov, 1997). Thus family socioeconomic status such as family income at W1 was added as a time-invariant covariate in order to tease apart the effects of community structural adversities and family-based disadvantages (Baumer & South, 2001).

Data Analyses

Descriptive analyses were conducted with SPSS (18.0) on all variables to check the normality and missing data. No variables violated the normality assumption as the skewness values were between -2 to 2. Table 4 presents the correlations among all the study variables. The growth curve models were estimated in Mplus 6.12. Missing data were handled using maximum likelihood estimations (Acock, 2005; Enders, 2001). Specifically, a two-level growth curve model was fit using all available data from the four cohorts. The first level includes two components: (a) a growth model assessing the trajectories of internalizing and externalizing behaviors across three waves; (b) a path model assessing pathways connecting community level predictors, subjective appraisals of social support by both adolescents and their caregivers, and internalizing and externalizing behaviors. In the second level, I examined the effects of community level predictors.

Table 3

Descriptive Statistics of Study Variables

Variable	*M*	*SD*	Range	Skewness
Individual level variables				
Internalizing behaviors W1	12.96	8.48	.00-53.00	.87
Internalizing behaviors W2	11.57	8.11	.00-55.00	1.07
Internalizing behaviors W3	11.48	8.10	.00-54.00	1.03
Externalizing behaviors W1	12.28	8.35	.00-44.00	.82
Externalizing behaviors W2	8.35	5.46	.00-31.00	.79
Externalizing behaviors W3	7.73	5.30	.00-31.00	.99
Subjective appraisals of social support by adolescents W1	2.61	.29	1.00-3.00	-.95
Subjective appraisals of social support by adolescents W3	2.65	.30	1.25-3.00	-.91
Subjective appraisals of social support by caregivers W1	2.63	.31	1.23-3.00	-.99
Subjective appraisals of social support by caregivers W3	2.65	.32	1.30-3.00	-1.01
Community level variables				
% Female-headed household W1	.19	.09	.00-.50	.77
% Male Unemployment W1	.41	.18	.00-.85	.39
% Public assistance W1	.32	.18	.00-.85	.36
% Non-White W1	.84	.24	.00-1.00	-1.82
Length of residence (years) W1	6.02	2.24	1.69-12.48	1.06
Covariate				
Family income W1	4.00	1.90	1.00-7.00	.11

Table 4

Correlations among Study Variables

Study variables	1	2	3	4	5	6	7	8
Individual level variables								
1. Internalizing behaviors W1	-							
2. Internalizing behaviors W2	.50**	-						
3. Internalizing behaviors W3	.30**	.48**	-					
4. Externalizing behaviors w1	.59**	.30**	.25**	-				
5. Externalizing behaviors w2	.32**	.52**	.29**	.54**	-			
6. Externalizing behaviors w3	.23**	.29**	.53**	.44**	.54**	-		
7. Subjective appraisals of social support by adolescents W1	-.24**	-.11**	-.08*	-.23**	-.10**	-.04	-	
8. Subjective appraisals of social support by adolescents W3	-.21**	-.22**	-.23**	-.14**	-.17**	-.19**	.24**	-
9. Subjective appraisals of social support by caregivers W1	-.04	-.06*	-.11**	-.07**	-.07**	-.11**	.06**	.13**
10. Subjective appraisals of social support by caregivers W3	-.03	-.08*	-.07**	.03	-.06*	-.08**	.04	.13**
Community level variables								
11. % public assistance	.05	.03	.08**	.04	.05*	.08**	-.07**	-.14**
12. % Female-headed household	-.02	.02	.02	.00	.06*	.07**	-.003	-.04
13. % Male Unemployment	.02	.05*	.05*	.03	.09*	.11**	-.04	-.09**
14. % Non-White	.04	.08**	.07**	.02	.04	.08**	-.08**	-.16**
15. Length of residence (years)	-.01	-.09**	-.02	.04	-.01	.04	-.03	-.01
Covariate								
16. Family income	-.07**	-.08**	-.06**	-.03	-.04	-.03	.12**	.18**

Study variables	9	10	11	12	13	14	15	16
9. Subjective appraisals of social support by caregiver W1	-							
10. Subjective appraisals of social support by caregivers W3	.43**	-						
Community level variables								
11. % public assistance	-.06**	-.12**	-					
12. 16.% Female-headed household	-.01	-.05*	.39**	-				
13. % Male Unemployment	-.00	-.07**	.60**	.74**	-			
14. % Non-White	-.11**	-.16**	.57**	.26**	.41**	-		
15. Length of residence (years)	.10**	.12**	.12**	.16**	.26**	-.04*	-	
Covariate								
16. Family income	.17**	.21**	-.38**	-.11**	-.20**	-.33**	.09**	-

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

Based on Hu and Bentler's (1999) recommendations, model fit was evaluated with multiple indices including root mean square error of approximation (RMSEA) with the cutoff value of .05, standardized root mean square residual (SRMR) with the cutoff value of .08, comparative fit index (CFI) with cutoff value of .95, and the Tucker-lewis index (TLI) with cutoff value of .95. In the following sections, I described the steps to test each hypothesis.

Growth Curve Models for Internalizing and Externalizing Behaviors

Hypothesis 1.1: The internalizing behaviors will increase during early through middle adolescence and stabilize during late adolescence.

Hypothesis 1.2: The externalizing behaviors will increase during early through middle adolescence and decline during late adolescence.

Growth curve models were fit to examine the trajectories of adolescent internalizing and externalizing behaviors of boys and girls respectively. This process reveals intra-individual and inter-individual change of internalizing and externalizing behaviors. The intra-individual change demonstrates the direction and magnitude of the change across waves within each adolescent. The inter-individual change reveals how trajectories of internalizing and externalizing behaviors vary across all adolescents. Age and family socioeconomic status were added as covariates.

The Cumulative Effect of Community Level Predictors

Hypothesis 2.1: Community level predictors will have an impact on the initial level of adolescent internalizing and externalizing behaviors. Adolescents living in more disadvantaged communities will have a higher initial level of internalizing and externalizing behaviors compared with those from more advantaged community environments.

Hypothesis 2.2: Adolescents living in more disadvantaged communities will have a steeper increase in internalizing and externalizing behaviors compared with those with more advantaged community environments.

Unconditional models were fit to estimate the average internalizing and externalizing behaviors. No predictors at any level were included. Next, multilevel models were fit to examine how community disadvantages influence the internalizing and externalizing behaviors of adolescents. Models for girls and boys were fit separately. In the multilevel model, community structural adversities were community level data, which were represented by indicators such as the percentage of receiving public assistance, female-headed families, male unemployment, the percentage of non-White primary caregivers, and average years that primary caregivers living at the same address.

Mediating Effects of Subjective Appraisals of Social Support

Hypothesis 3: Community structural adversities will influence internalizing and externalizing behaviors through the effects of subjective appraisals of social support by adolescents and primary caregivers.

The test of medicating effects of appraisals of social support by adolescents included three steps. The models were examined for girls and boys respectively. First, the effects of community level predictors on subjective appraisals of social support by adolescents were examined (path 2 in Figure 2). Second, the effects of subjective appraisals of social support by adolescents on their internalizing and externalizing behaviors (path 4) were examined. Third, the effects of community predictors on adolescent internalizing and externalizing behaviors were examined (path 6).

The mediating effects of appraisals of social support by caregivers were examined in two steps. First, the effects of community level predictors on appraisals of social support by caregivers were examined (path 1). Second, the effects of caregivers' appraisals of social support on their adolescent appraisals were examined (path3).

Moderating Effects of Community Predictors

Hypothesis 4: Community structural adversities will moderate the linkage between subjective appraisals of social support by adolescents and internalizing and externalizing behaviors. That is, the protective effect of subjective appraisals of social support by adolescents will become weaker in neighborhoods with a higher percentage of receiving public assistance, female-headed households, male unemployment, higher ethnic heterogeneity, and lower residential stability.

The cross-level moderating effects of community level predictors were examined. First, the random slopes were created to represent the relationship between subjective appraisals of adolescents and internalizing and externalizing behaviors. Then the effects of community level variables on the random slopes were examined.

Hypothesis 5: There are no directional hypotheses for gender differences in the effects of community level predictors, appraisals of social support by caregivers and adolescents on internalizing and externalizing behaviors.

All the above associations were estimated for boys and girls separately.

5

Subjective
Appraisals of social
support by
primary caregivers

1

Community
structural
adversities

3

2

Subjective
Appraisals of social
support by
adolescents

4

Adolescent
internalizing &
externalizing
behaviors

6
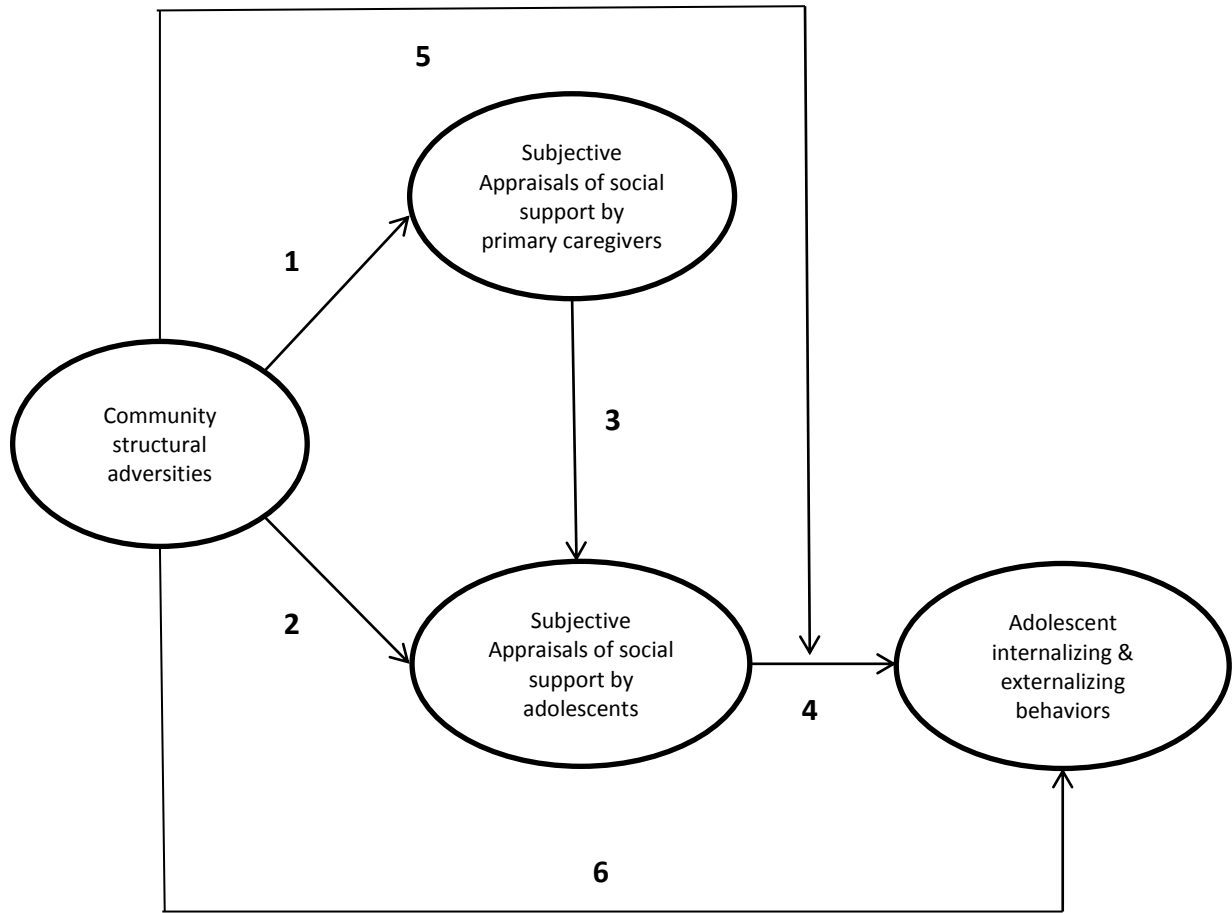
Figure 2. Hypothesized model

Chapter 4: Results

Results of the growth curve models for internalizing and externalizing behaviors,
mediating effects of subjective appraisals of social support, and moderating effects of community
level predictors corresponding to each hypothesis are presented here. All the analyses were
conducted with Mplus 6.12. The Mplus syntaxes can be found in Appendix B.

Growth Curve Models for Internalizing and Externalizing Behaviors

**Hypothesis 1.1: The internalizing behaviors will increase during early through
middle adolescence and stabilize during late adolescence.**

Table 5 shows the results of growth models of internalizing and externalizing behaviors
of both girls and boys. The growth curve model for internalizing behaviors had a good fit with X^2
$(2) = 6.88$, p<.05, RMSEA = .04, CFI =0.99, and TLI=0.97. The variance of both intercept and
slope of internalizing behaviors for girls were significant, indicating that individual girls varied
in their initial level and rate of change for internalizing behaviors. The internalizing behaviors
declined over time for girls (slope = -.87). Similarly, the variance of both intercept and slope of
internalizing behaviors for boys were significant, indicating that individual boys varied in their
initial level and rate of change for internalizing behaviors. Boys' internalizing behaviors declined
over time (slope = -.80).

Next, time invariant covariates, i.e., age and family income, were added to the model.
Figure 3 and 4 show model results. The model fit well with X^2 $(6) = 2.70$, p>.05, RMSEA = .00,
CFI =1.00, and TLI =1.02. Age was a significant predictor for the initial values of internalizing
behaviors among both boys and girls. Younger boys had a higher initial level of internalizing
behaviors ($b = -.29$, $p <.001$), whereas older girls had a higher initial level of internalizing
behaviors ($b = .29$, $p <.001$). Age continued to be a significant predictor for the rate of change of

internalizing behaviors among girls but not among boys. Internalizing behaviors declined at a

faster rate as girls grew older ($b = -.34$, $p < .001$).

Table 5.

Results of Growth Curve Models for Internalizing and Externalizing Behaviors

	Boys			Girls		
	Mean	Variance	b	Mean	Variance	b
Baseline growth model						
Internalizing behaviors						
Intercept	11.73***	34.30***		14.24***	54.86***	
Slope	-.80***	9.04**		-.87***	12.38**	
Externalizing behaviors						
Intercept	10.96***	63.12***		11.76***	73.46***	
Slope	-2.65***	37.79***		-3.48***	38.90***	
Model including age and family income as covariates						
Internalizing behaviors						
Intercept						
Age			-.29***			.29***
Family income			-.15**			-.09*
Slope						
Age			-.03			-.34***
Family income			.14*			.02
Externalizing behaviors						
Intercept						
Age			.40***			.61***
Family income			-.06			-.02
Slope						
Age			-.32***			-.60***
Family income			.03			-.01

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

Figure 3. Results of growth curve models for boys' internalizing behaviors

Note. INT1, INT2, INT3 represent internalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.
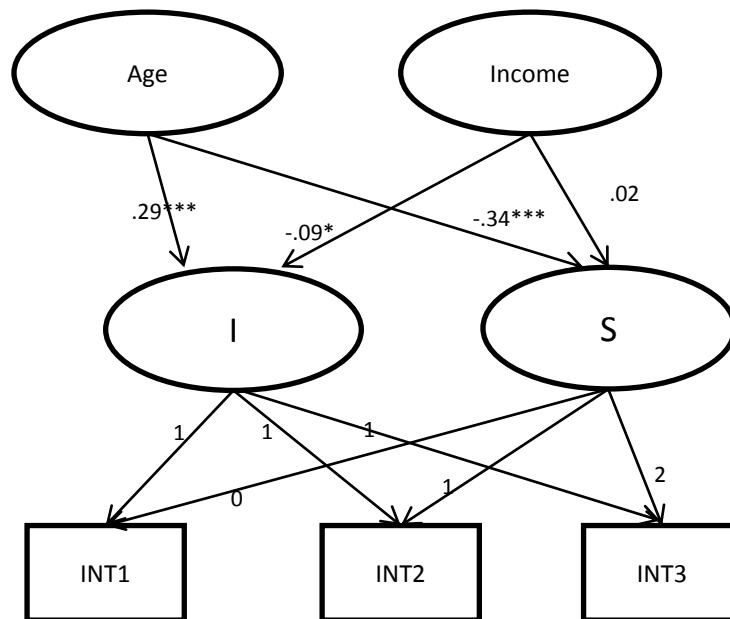
Figure 4. Results of growth curve models for girls' internalizing behaviors

Note. INT1, INT2, INT3 represent internalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.

Figure 5. Results of growth curve models for boys' externalizing behaviors

Note. EXT1, EXT2, EXT3 represent externalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.
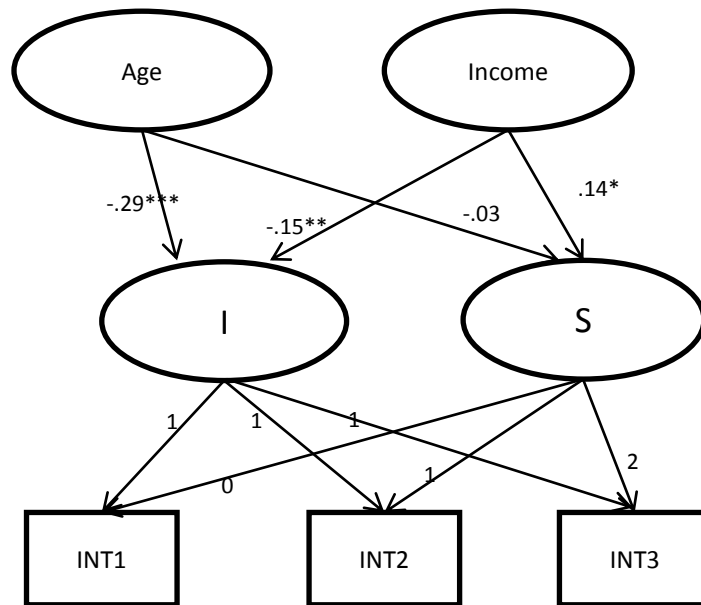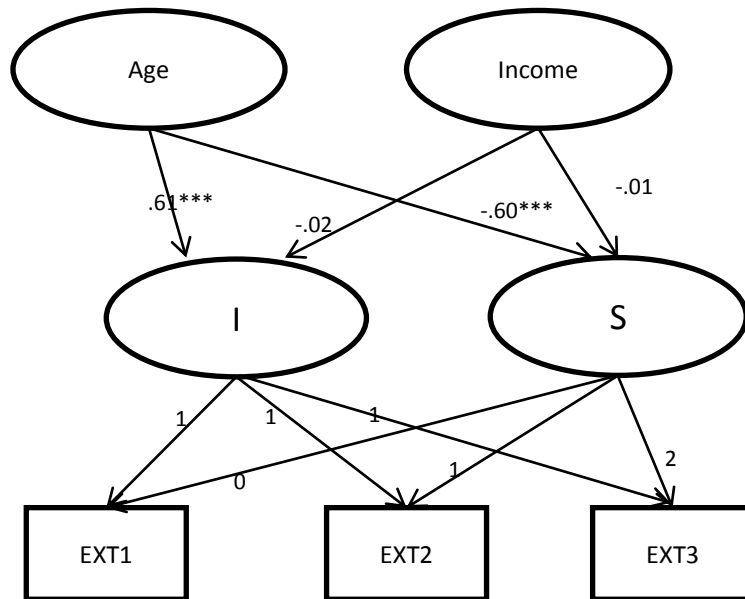

Figure 6. Results of growth curve models for girls' externalizing behaviors

Note. EXT1, EXT2, EXT3 represent externalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.
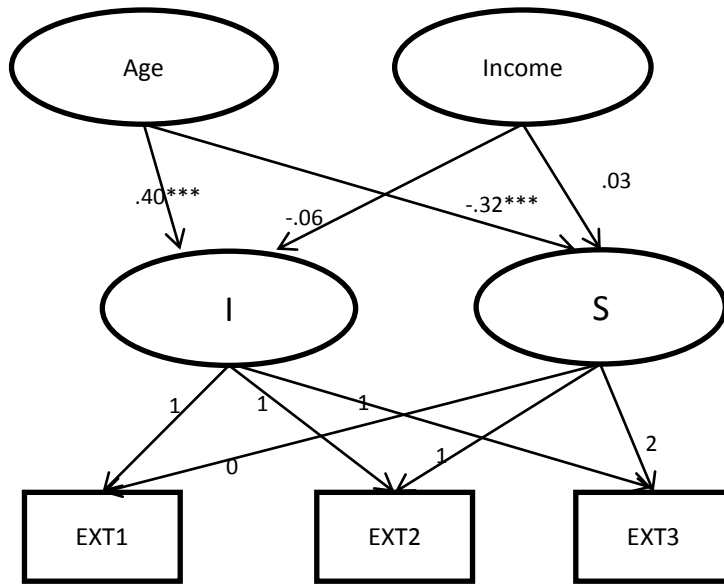
Family income was added as a controlling variable to tease apart the effects of community-based and family-based disadvantages. Family income appeared to be a significant predictor for the initial level of internalizing behaviors of both boys ($b = -.15$, $p <.001$) and girls ($b = -.09$, $p <.05$). Generally, individuals with higher family income had less internalizing behaviors. The effects of family income on internalizing behaviors increased over time among boys ($b = .14$, $p <.05$) but not girls.

In summary, the findings partially supported the hypothesis. Unexpectedly, internalizing behaviors declined rather than stabilized over time. For girls, internalizing behaviors were more pronounced in older girls at the initial level and declined at a faster rate as girls grew older. This pattern was not found among boys. Internalizing behaviors of boys were more pronounced in younger ones at the initial level and were relatively stable as boys grew older.

Hypothesis 1.2: The externalizing behaviors will increase during early through middle adolescence and decline during late adolescence.

The growth curve model for externalizing behaviors had a good fit with X^2 (3) = 7.99, p <.05, RMSEA = .03, CFI = 0.99, and TLI = 0.99. The result showed the variance of both intercept and slope of internalizing behaviors among girls and boys were significant, indicating that individuals varied in their starting level and rate of change of internalizing behaviors. Externalizing behaviors declined over time for both girls (slope = -3.48) and boys (slope = -2.65).

Next, the time invariant covariates, i.e., age and family income were added to the model. Figure 5 and 6 show the model results. The model had a good fit with X^2 (7) = 35.30, p =.05, RMSEA = .05, CFI = 0.97, and TLI = 0.92. Age predicted the initial level of externalizing behaviors among both boys and girls. Both boys ($b =.40$, $p <.001$) and girls ($b = .61$, $p <.001$) of

older age showed more externalizing behaviors at the initial level. Age continued to be a significant predictor for the rate of change of externalizing behaviors among both boys and girls. This indicated that the externalizing behaviors declined at a faster rate when boys ($b = $ -.32, p <.001) and girls ($b = $ -.60, p <.001) grew older. Family income did not influence either the initial levels or the rate of change of externalizing behaviors. The findings generally supported the hypothesis. Externalizing behaviors declined over time for both boys and girls.

The Cumulative Effects of Community Level Predictors

Hypothesis 2.1: Community level predictors will have an impact on the initial level of adolescent internalizing and externalizing behaviors. Adolescents living in more disadvantaged communities will have a higher initial level of internalizing and externalizing behaviors compared with those from more advantaged community environments.

Hypothesis 2.2: Adolescents living in more disadvantaged communities will have a steeper increase in internalizing and externalizing behaviors compared with those with more advantaged community environments.

Table 6 presents the results of cumulative effects of community level predictors. A two-level model examining the direct effects of community level variables showed that out of the five community level predictors, only ethnic heterogeneity was a significant predictor of the intercept of internalizing behaviors among girls, whereas none of the predictors significantly predicted the slope of internalizing behaviors for girls (Figure 8). This finding indicated that girls residing in neighborhoods with a higher percentage of non-White had a higher initial level of internalizing behaviors ($b =$.46, p <.05). None of the community predictors significantly predicted either the intercept or the slope of externalizing behaviors among girls (Figure 10). While for boys, none of

the community predictors had significant effects on either the intercept or the slope of both

internalizing (Figure 7) and externalizing behaviors (Figure 9).

Table 6.

Results of Cumulative Effects of Community Predictors

	Internalizing		Externalizing	
	Boys	Girls	Boys	Girls
Intercept				
Receiving public assistance	.44	.25	.20	.63
Female-headed households	.09	-.35	.39	-.40
Male unemployment	-.02	.14	.26	.72
Ethnic heterogeneity	.31	.46*	.29	.40
Residence length	.12	-.84	.19	.37
Slope				
Receiving public assistance	.08	.24	.13	.68
Female-headed households	.05	.72	.20	.67
Male unemployment	.27	.50	.38	.79
Ethnic heterogeneity	.27	-.02	.05	.58
Residence length	-.15	.41	-.33	-.20

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

In summary, the findings only partially supported the hypotheses. The initial level of

internalizing and externalizing behaviors was not higher among adolescents residing in more

disadvantaged neighborhoods except for the effects of ethnic heterogeneity on girls' initial level

of internalizing behaviors, nor did the internalizing and externalizing behaviors increase at an

accelerated rate among adolescents residing in more disadvantaged neighborhoods.

Figure 7. Results of cumulative effects of community predictors on boys' internalizing behaviors

Note. INT1, INT2, INT3 represent internalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.
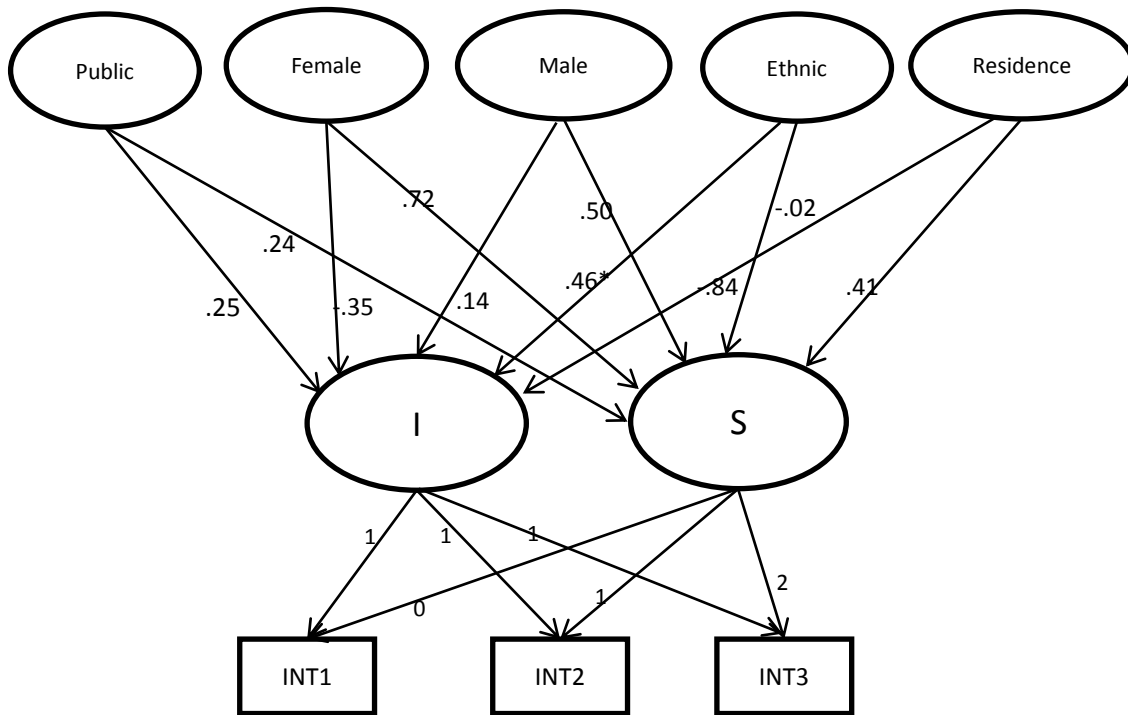
Figure 8. Results of Cumulative Effects of Community Predictors on girls' internalizing behaviors

Note. INT1, INT2, INT3 represent internalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.
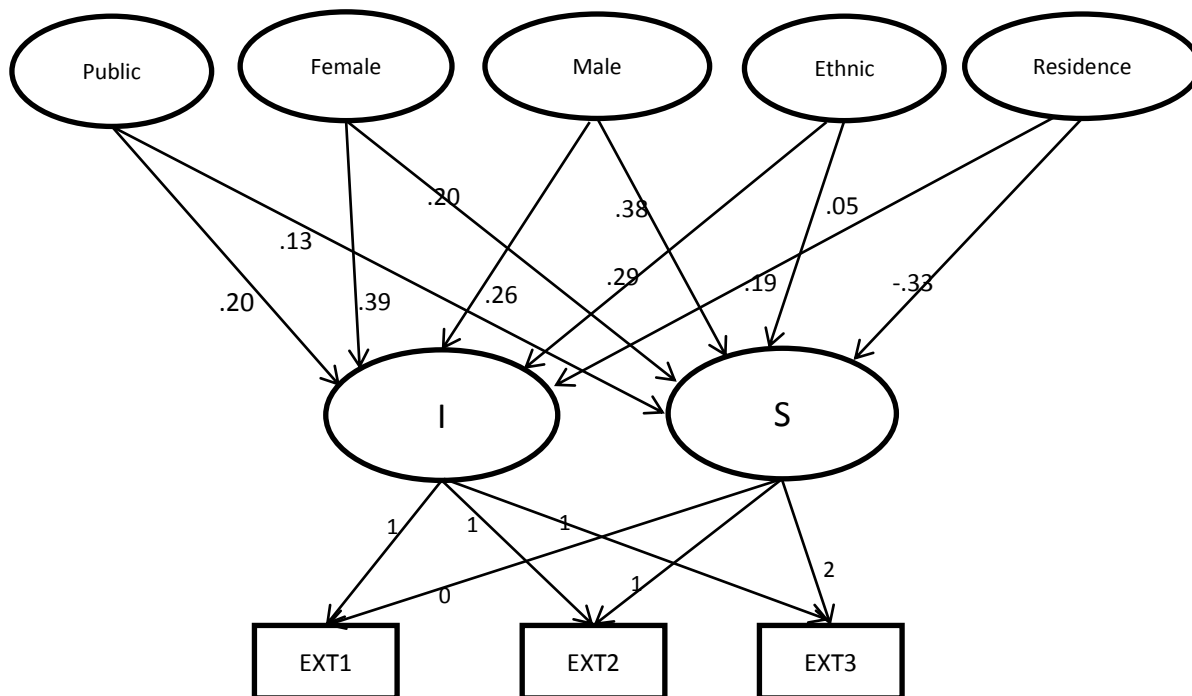
Figure 9. Results of cumulative effects of community predictors on boys' externalizing behaviors

Note. EXT1, EXT2, EXT3 represent externalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.
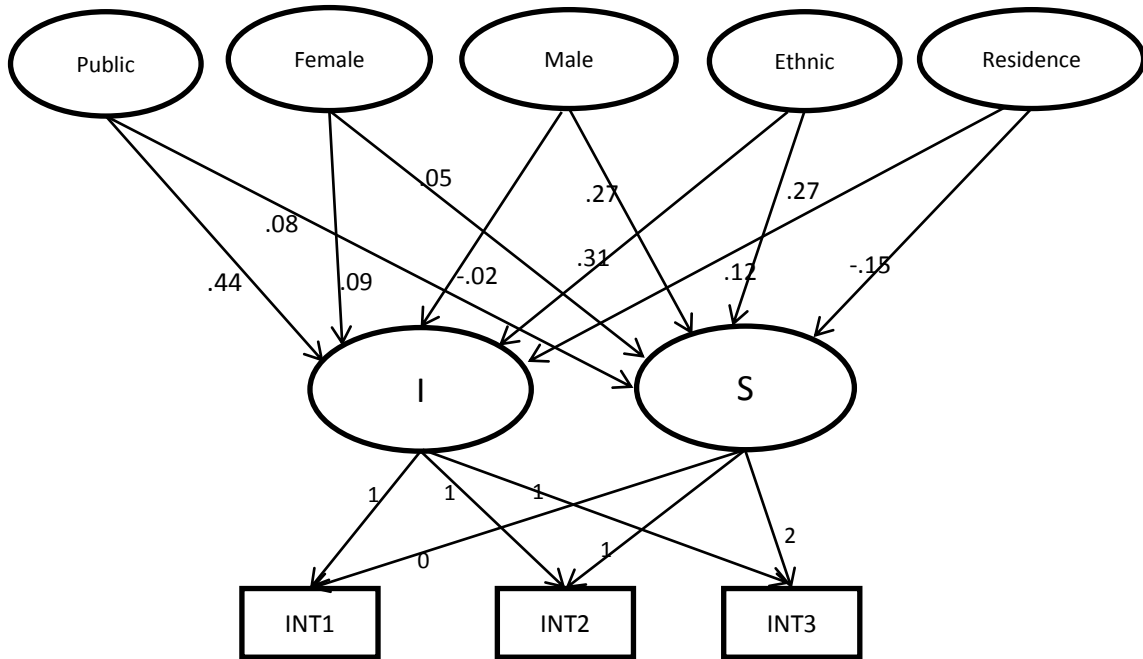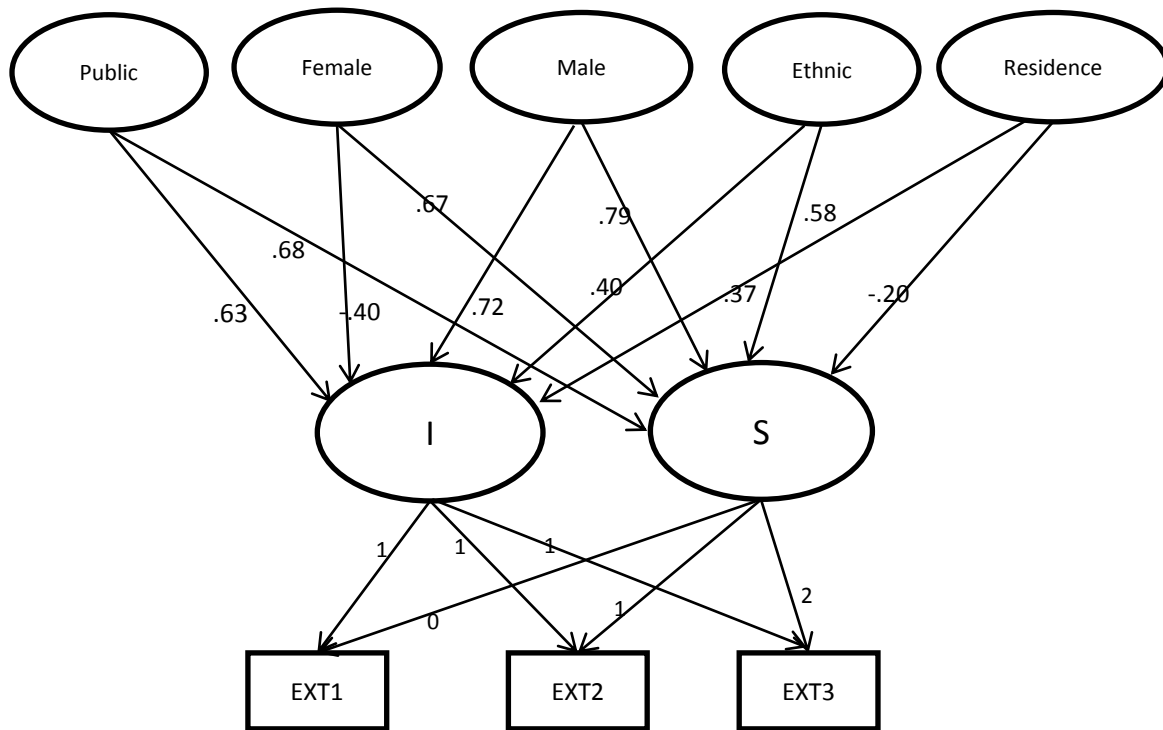
Figure 10. Results of Cumulative Effects of Community Predictors on girls' externalizing behaviors

Note. EXT1, EXT2, EXT3 represent externalizing behaviors at Wave 1, 2, and 3 respectively. I represents intercept and S represents slope.

Mediating Effects of Subjective Appraisals of Social Support

Hypothesis 3: Community structural adversities will influence internalizing and externalizing behaviors through the effects of subjective appraisals of social support by adolescents and primary caregivers.

The mediating effects of appraisals of social support by adolescents were examined through testing the effects of community level predictors on adolescent appraisals, the effects of appraisals on internalizing and externalizing behaviors, and the direct effects of community level predictors on internalizing and externalizing behaviors. Figure 11 and 12 respectively shows the mediating effects of subjective appraisals of social support by adolescents and caregivers on boys' and girls' internalizing and externalizing behaviors.

The effects of community level predictors on appraisals of social support by adolescents. Table 7 shows the results. Among boys, receiving public assistance ($b = -.91$, $p < .001$), male unemployment ($b = -.72$, $p < 0.01$), and ethnic heterogeneity (b= -0.95, p<.001) were significant predictors of appraisals of social support at W3 but not W1. These results suggested that boys in neighborhoods with a higher percentage of receiving public assistance, male unemployment, and non-White population had a lower score on appraisals of social support. The percentage of female-headed households and residence length did not have significant effects on appraisals of social support.

The effects of community level variables were similar among girls. Receiving public assistance significantly predicted appraisals at W1 ($b = -.73$, $p < .05$) and W3 (b= -.78, $p < 0.001$). Ethnic heterogeneity was a significant predictor of appraisals at W1 ($b = -.89$, p <.001) and W3 ($b = -.93$, $p < .001$). Unemployment also significantly predicted appraisals at W3 ($b = -.49$, $p < .05$) but not W1. These results suggested that girls in neighborhoods with a higher percentage

of receiving public assistance, male unemployment, and non-White population appraised their social support to be lower.

Table 7.

The Effects of Community Predictors on Subjective Appraisals of Social Support by Adolescents

	Boys		Girls	
	Appraisals at T1	Appraisals at T3	Appraisals at T1	Appraisals at T3
Receiving public assistance	-.42	-.91***	-.73*	-.78***
Female-headed households	-.13	-.40	.02	-.22
Male unemployment	-.21	-.72**	-.54	-.49*
Ethnic heterogeneity	-.44	-.95***	-.89***	-.93***
Residence length	-.36	-.20	.07	-.02

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

The effects of appraisals of social support by adolescents on internalizing and externalizing behaviors. Table 8 shows results. Appraisals of boys significantly predicted internalizing behaviors at W1 ($b = -.15$, $p < .001$) and W3 ($b = -.13$, $p < .001$), and the externalizing behaviors at W1 ($b = -.18$, $p < .001$) and W3 ($b = -.11$, $p < .001$) as well. The similar significant effects were found among girls. The appraisals also significantly predicted internalizing behaviors at W1 ($b = -.28$, $p < .001$) and W3 ($b = -.16$, $p < .001$), and externalizing behaviors at W1 ($b = -.21$, $p < .001$) and W3 ($b = -.12$, $p < .001$) as well.

Table 8.

The Effects of Subjective Appraisals of Social Support by Adolescents on Internalizing and Externalizing Behaviors

	Boys		Girls	
	Internalizing T1	Internalizing T3	Internalizing T1	Internalizing at T3
Appraisals T1	-.15***	-	-.28***	
Appraisals T3	-	-.13***		-.16***
	Externalizing T1	Externalizing T3	Externalizing T1	Externalizing T3
Appraisals T1	-.18***	-	-.21***	-
Appraisals T3	-	-.11***	-	-.12***

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

The direct effects of community level predictors on internalizing and externalizing

behaviors. The direct effects were already examined in hypothesis 2. Except for ethnic

heterogeneity that significantly predicted the initial level of internalizing behaviors among girls,

community level variables were not important predictors for the intercept and slope of

internalizing and externalizing behaviors for boys and girls.

In summary, as hypothesized, the findings indicated that subjective appraisals of social

support by adolescents mediated the effects of community level predictors on internalizing and

externalizing behaviors. That is, community level predictors did not have significant direct

effects on internalizing and externalizing behaviors. However, community level predictors such

as receiving public assistance, male unemployment, and ethnic heterogeneity showed indirect

effects on internalizing and externalizing behaviors through the effects of appraisals of social

support by adolescents.

Baron and Kenny (1986) suggested for a mediational pathway to hold, an independent

variable needs to be related to a dependent variable. However, more recent research suggests that

a mediation pathway holds as long as an independent variable is related to an intervening

variable, and the intervening variable in turn is related to a dependent variable. In other words,

an independent variable can have indirect effects on a dependent variable even though they are

not related to each other directly (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

This study found that adolescents residing in communities with a higher rate of receiving public

assistance, male unemployment, and non-White population had lower appraisals of social

support. Lower appraisals were in turn related to increased internalizing and externalizing

behaviors. Thus, according to MacKinnon et al. (2002), appraisals of social support by

adolescents mediated the effects of community level predictors on internalizing and externalizing behaviors.

The indirect effects of appraisals by primary caregivers were examined by testing the effects of community level predictors on appraisals of social support by caregivers and the relationship between appraisals by caregivers and adolescents.

The effects of community level predictors on appraisals of social support by caregivers. Table 9 shows the results. For the primary caregivers of boys, community level receipt of public assistance was a significant predictor of appraisals at W1 ($b = -.32$, $p < 0.05$) and W3 ($b = -.62$, $p < .001$). Community ethnic heterogeneity also had significant effects on appraisals at W1 ($b = -.66$, $p < .001$) and W3 ($b = -.75$, $p < .001$), the same as the effects of residence length on appraisals at W1 ($b = .66$, $p < .001$) and W3 ($b = 0.48$, $p < .05$). These results suggest that primary caregivers residing in neighborhoods with a higher percentage of people/population receiving public assistance and non-white population, and those who lived in the same neighborhood for a shorter time had a lower score on appraisals. The percentage of female-headed households and male unemployment did not exert significant effects on appraisals by caregivers.

Table 9.

The Effects of Community Predictors on Subjective Appraisals of Social Support by Primary Caregivers

	Caregivers(boys)		Caregivers(Girls)	
	Appraisals at T1	Appraisals at T3	Appraisals at T1	Appraisals at T3
Receiving public assistance	-0.32*	-.62***	-.54**	-.39*
Female-headed households	0.02	-.23	-.11	-.22
Male unemployment	0.01	-.34	.11	-.22
Ethnic heterogeneity	-.66***	-.75***	-.77***	-.70***
Residence length	.66***	.48**	.39	.64***

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

Similarly, for the primary caregivers of girls, receiving public assistance was a significant predictor of appraisals of social support at W1 ($b = -.54$, $p <0.05$) and W3 ($b = -.39$, $p <.05$). Ethnic heterogeneity significantly predicted appraisals at W1 ($b = -.77$, $p < .001$) and W3 ($b = -0.70$, $p <.001$). Residence length also had a significant effect on appraisals at T3 ($b = .64$, $p <.001$). The percentage of female-headed households and male unemployment did not exert significant effects on appraisals by caregivers.

The effects of caregivers' appraisals of social support on adolescents' appraisals of social support. Foy boys, appraisals by caregiver at W1 and W3 significantly predicted appraisals of boys at W3 ($b = .10$, $p <.05$; $b= .07$, $p<.05$) respectively. For girls, subjective appraisals of primary caregivers at W1 significantly predicted the subjective appraisals of girls at W3 ($b= .09$, $p=.05$).

In summary, caregivers appraised their social support to be lower in neighborhoods with a higher percentage of receiving public assistance and non-white population, and living in the same neighborhood for a shorter time. Moreover, caregivers' appraisals of social support positively influenced adolescent appraisals of social support, where the higher caregivers' appraisals were related to the higher adolescent appraisals. Thus, as hypothesized, the effects of community predictors exerted indirect effects on adolescent internalizing and externalizing behaviors through the effects of appraisals by caregivers.
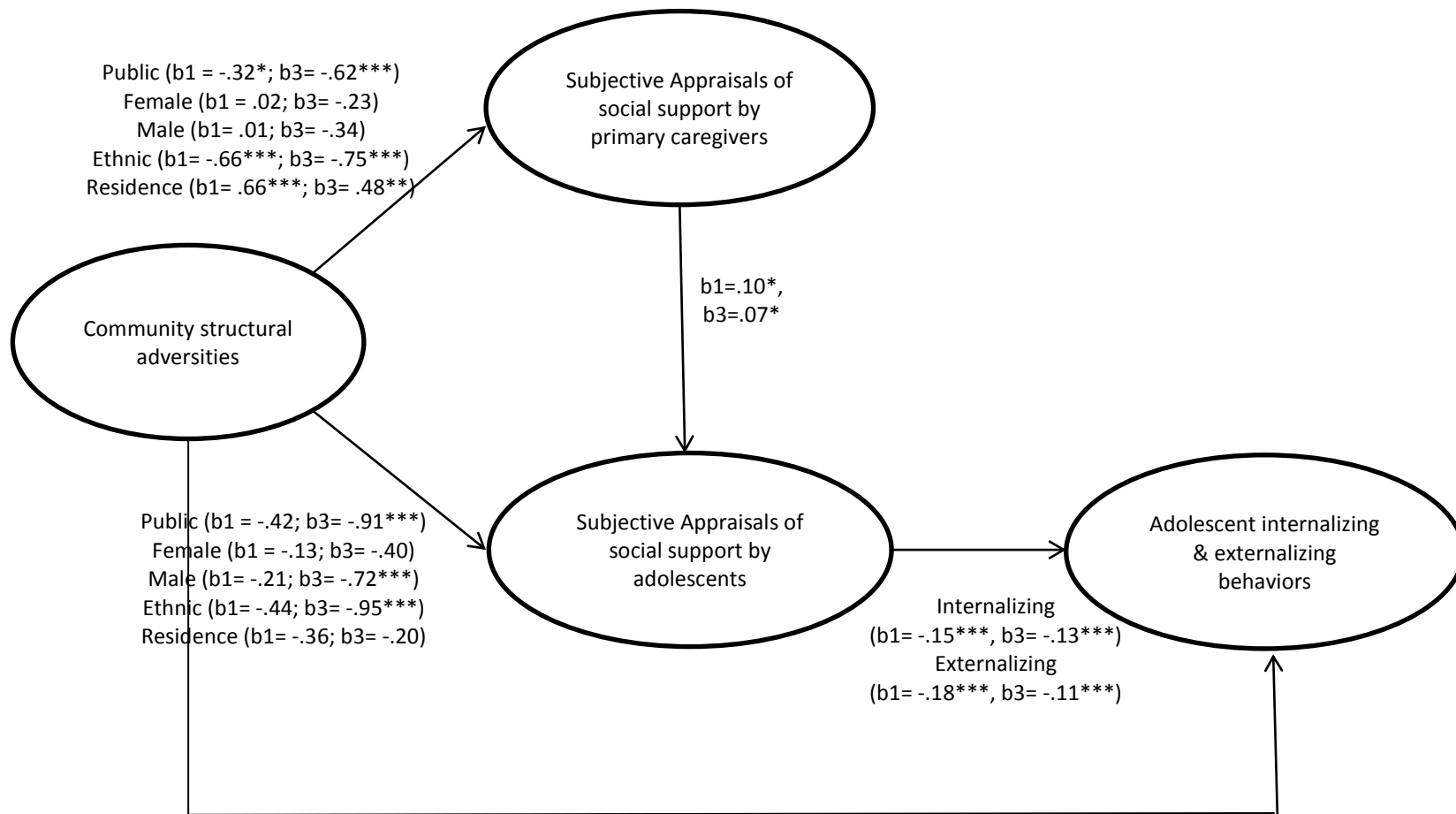
Figure 11. Mediating effects of appraisals of social support on boys' internalizing and externalizing behaviors

Note. b1 and b3 represent regression coefficients at Wave 1 and Wave 3 respectively.
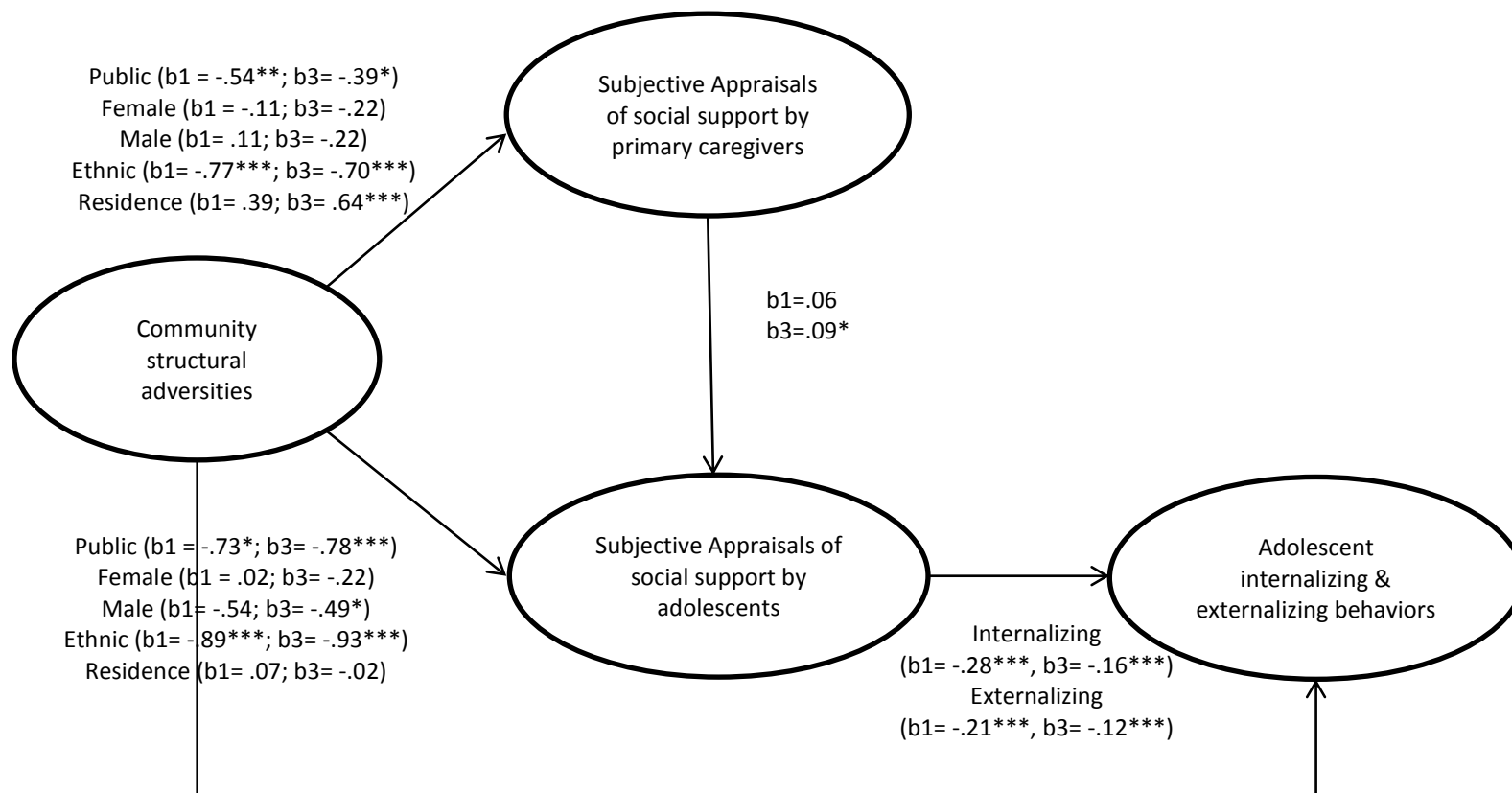
Figure 12. Mediating effects of appraisals of social support on girls' internalizing and externalizing behaviors

Note. b1 and b3 represent regression coefficients at Wave 1 and Wave 3 respectively.

Moderating Effects of Community Predictors

Hypothesis 4: Community structural adversities will moderate the linkage between subjective appraisals of social support by adolescents and internalizing and externalizing behaviors. That is, the protective effect of subjective appraisals of social support by adolescents will become weaker in neighborhoods with a higher percentage of receiving public assistance, female-headed households, male unemployment, higher ethnic heterogeneity, and lower residential stability.

Table 10 shows the results. Receiving public assistance moderated the linkage connecting appraisals by adolescents and their internalizing behaviors. The cross-level interaction between appraisals with receiving public assistance significantly predicted internalizing behaviors at W3 for both boys ($b = 5.45$, $p < .05$), indicating that the protective effect of appraisals on internalizing behaviors of boys was weaker in more disadvantaged neighborhoods that had a relatively higher percentage of receiving public assistance. Figure 13 shows the moderating effects of community predictors on boys' internalizing behaviors.

Ethnic heterogeneity also moderated the linkage connecting appraisals and internalizing behaviors of girls at W3 ($b = 8.10$, $p < .001$). The protective effect of appraisals on internalizing behaviors of girls was weaker in neighborhoods with a relatively higher percentage of non-White. None of the community predictors moderated the linkage between appraisals and girls' externalizing behaviors. Figure 14 shows the moderating effects of community predictors on girls' internalizing behaviors.

In summary, the findings partially supported the hypothesis. Different community level predictors varied in their moderating effects. As expected, in more disadvantaged neighborhoods

that had a relatively higher percentage of receiving public assistance and non-White population, the protective effects of appraisals on internalizing behaviors became weaker. That is, the protective effects of appraisals on internalizing behaviors were dissipated in more disadvantaged communities. However, community predictors did not show moderating effects on externalizing behaviors of either boys or girls. Figure 15 and 16 shows the moderating effects of community predictors on boys' and girls' externalizing behaviors.

Table 10.

Moderating Effects of Community Level Predictors on Internalizing and Externalizing Behaviors

	Internalizing		Externalizing	
	Boys	Girls	Boys	Girls
Main effects				
Appraisals T1	-2.09	-9.33***	-2.89	-5.75***
Appraisals T3	4.58*	4.91*	-1.29	-.61
Receiving public assistance on intercept	2.30	-.74	1.83	1.96
Receiving public assistance on slope	-.09	.98	-.85	.30
Interaction effects				
Receiving public assistance × appraisals T1	3.38	-2.60	2.11	2.44
Receiving public assistance × appraisals T3	5.45*	8.00	7.35	3.34
Main effects				
Appraisals T1	-2.13	-9.27***	-3.02	-5.70*
Appraisals T3	4.64*	4.88*	-1.17	-.67
Female-headed households on intercept	3.44	-4.95	8.77	-2.38
Female-headed households on slope	-1.01	6.30	-.80	2.48
Interaction effects				
Female-headed households × appraisals T1	5.28	7.22	5.68	13.31
Female-headed households × appraisals T3	-1.40	2.13	-21.98	2.13
Main effects				
Appraisals T1	-2.20	-9.39***	-3.07	-5.74**
Appraisals T3	4.68*	4.96*	-1.11	-.68
Male unemployment on intercept	.05	-.23	4.20	1.33
Male unemployment on slope	1.68	3.45	1.68	2.09
Interaction effects				
Male unemployment × appraisals T1	3.06	1.86	3.42	6.42
Male unemployment × appraisals T3	3.10	3.90	-11.30	7.90
Main effects				
Appraisals T1	-1.99	-9.29***	-2.81	-5.72*
Appraisals T3	4.61*	4.71*	-1.37	-.63
Ethnic heterogeneity on intercept	1.93	1.51	2.37	.62
Ethnic heterogeneity on slope	-.05	-0.64	-.95	.03
Interaction effects				
Ethnic heterogeneity × appraisals T1	2.19	-2.56	.40	.62
Ethnic heterogeneity × appraisals T3	1.10	8.10***	4.96	7.67
Main effects				
Appraisals T1	-2.19	-9.29***	-2.71	-5.79*
Appraisals T3	4.70*	5.05*	-1.24	-.71
Residence length on intercept	-.05	-.23	.22	.02
Residence length on slope	-.05	.07	-.14	.02
Interaction effects				
Residence length × appraisals T1	-.03	.15	.41	.47
Residence length × appraisals T3	.18	.42	-.18	.52

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

Figure 13. Moderating effects of community predictors on boys' internalizing behaviors

Note. b1 and b3 represent regression coefficients at Wave 1 and Wave 3 respectively. bI represents the regression coefficient for the intercept of internalizing behaviors. bS represents the regression coefficient for the slope of internalizing behaviors.
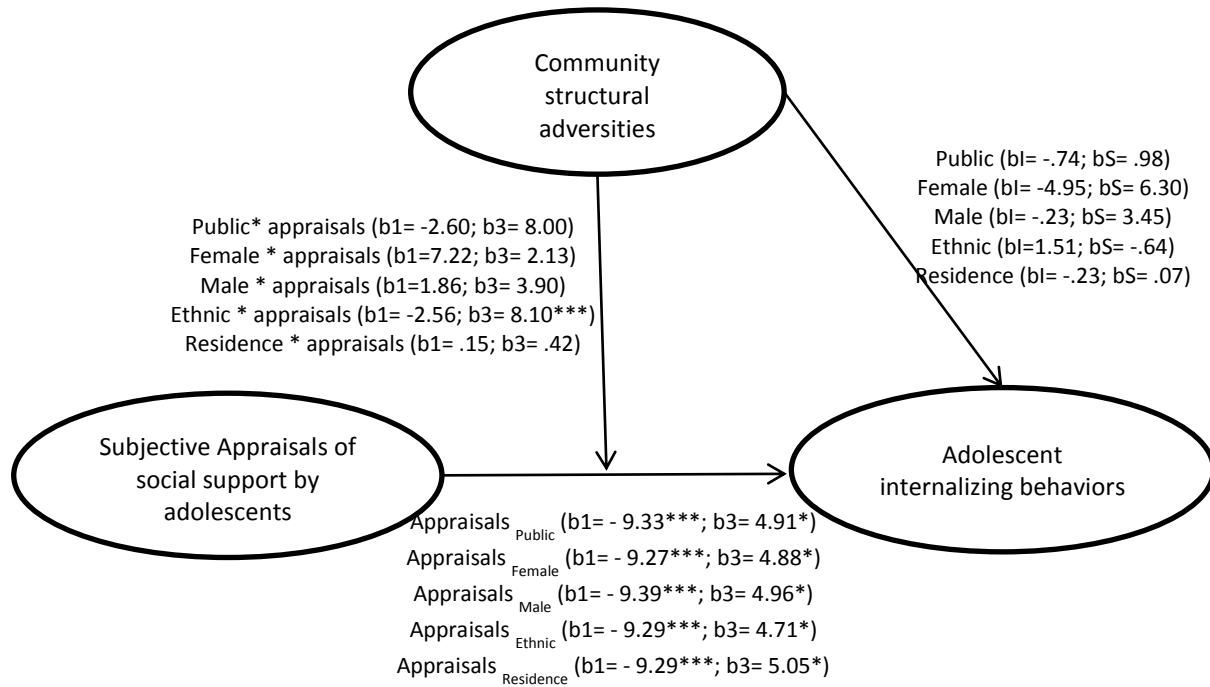
Figure 14. Moderating effects of community predictors on girls' internalizing behaviors

Note. b1 and b3 represent regression coefficients at Wave 1 and Wave 3 respectively. bI represents the regression coefficient for the intercept of internalizing behaviors. bS represents the regression coefficient for the slope of internalizing behaviors.
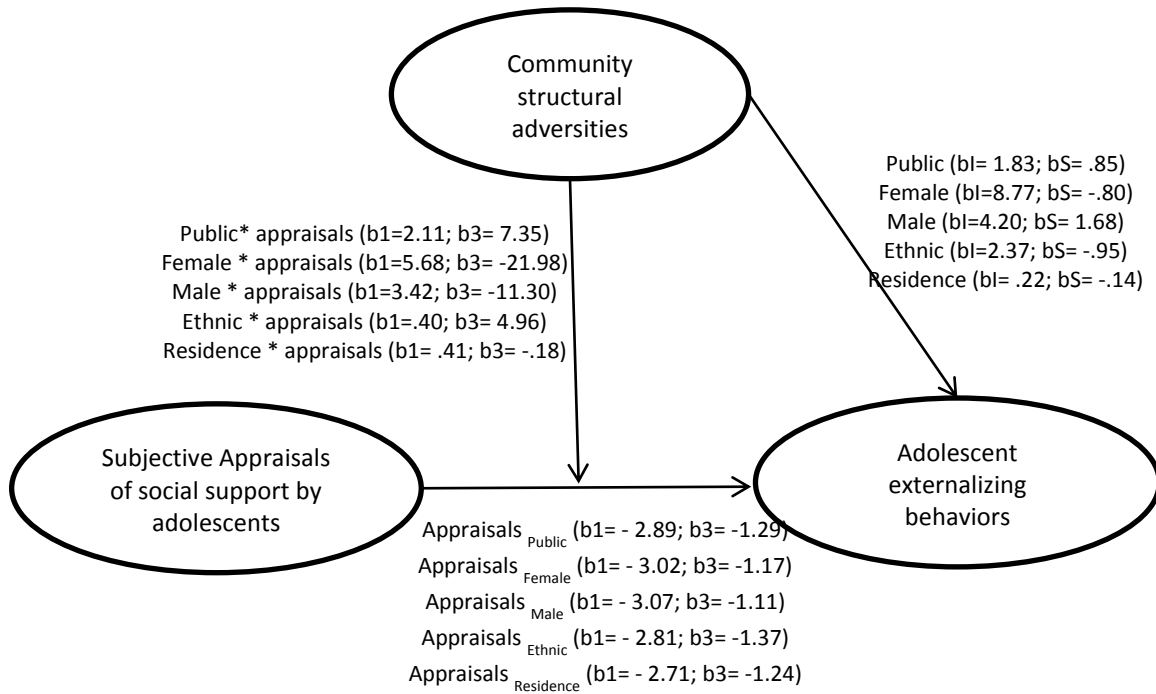
Figure 15. Moderating effects of community predictors on boys' externalizing behaviors

Note. b1 and b3 represent regression coefficients at Wave 1 and Wave 3 respectively. bI represents the regression coefficient for the intercept of externalizing behaviors. bS represents the regression coefficient for the slope of externalizing behaviors.
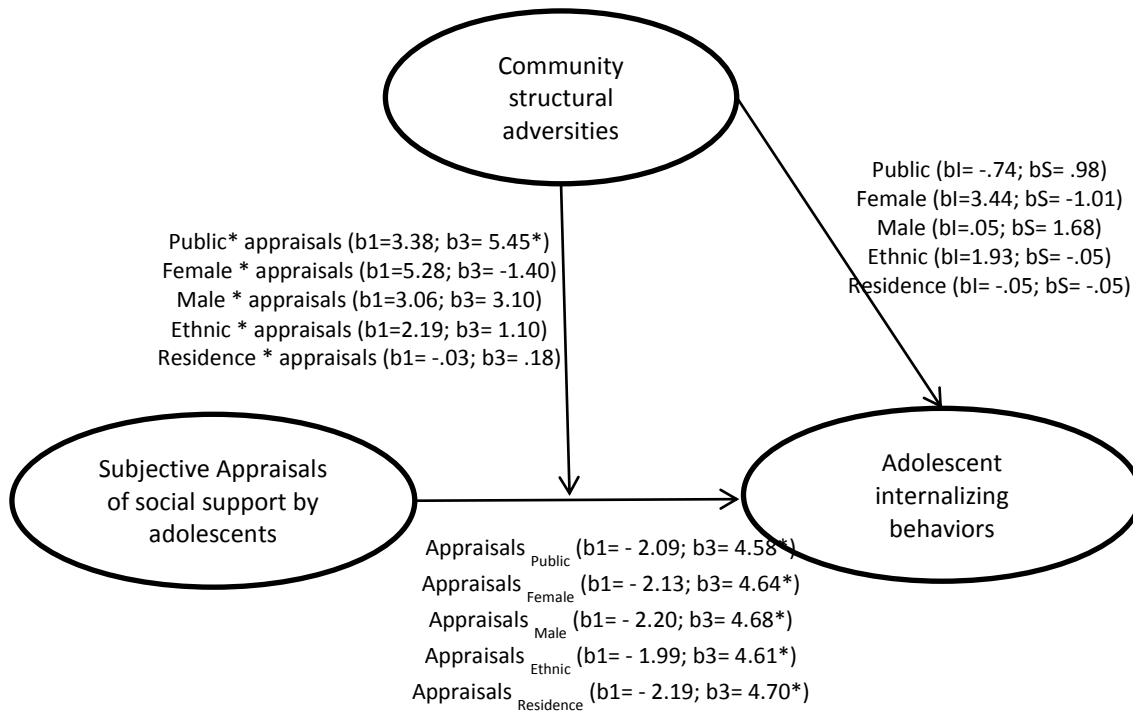
71
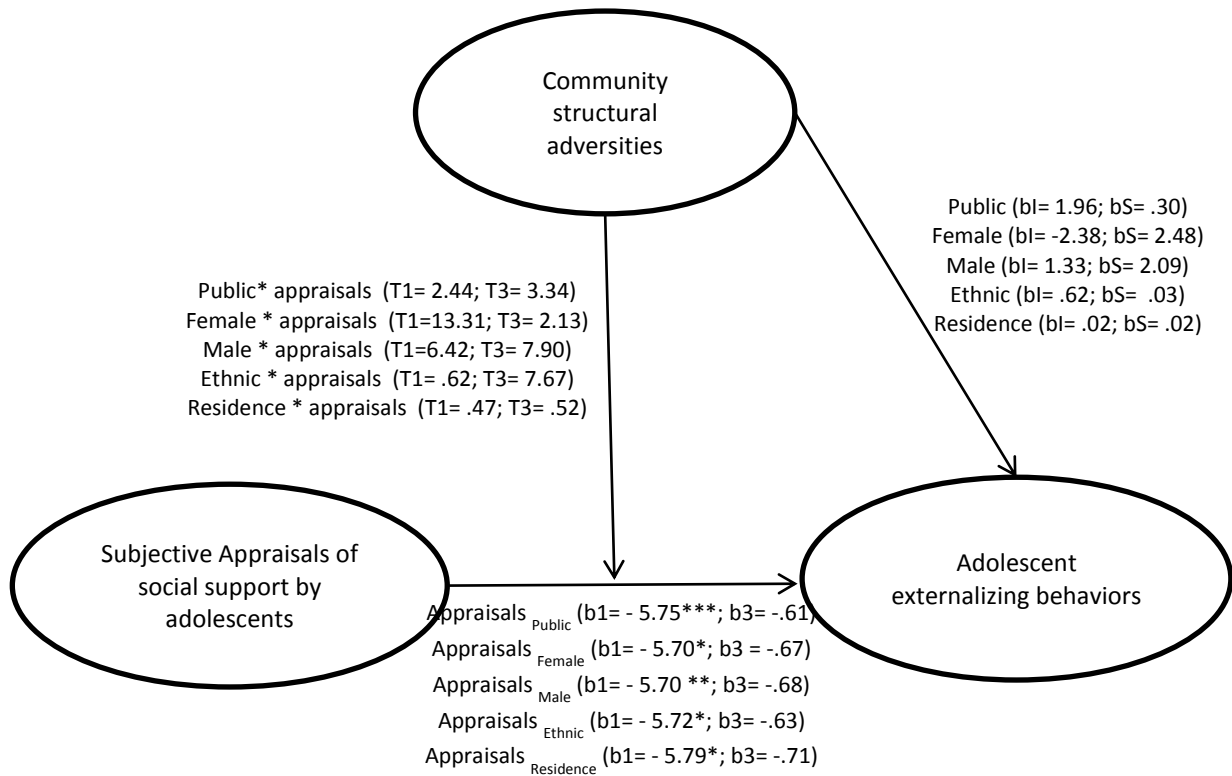
Figure 16. Moderating effects of community predictors on girls' externalizing behaviors

Note. b1 and b3 represent regression coefficients at Wave 1 and Wave 3 respectively. bI represents the regression coefficient for the intercept of externalizing behaviors. bS represents the regression coefficient for the slope of externalizing behaviors.

Chapter 5 Discussion

The emergence and variation of internalizing and externalizing behaviors among adolescents are regulated by the interaction of developmental, contextual, and social processes. Drawing on family life course theory and the cumulative advantage /disadvantage (CAD) perspective, I investigated the effects of community structural adversities, such as concentrated poverty, ethnic heterogeneity, and residential stability, on the trajectories of adolescent internalizing and externalizing behaviors and involved family and individual mechanisms. I examined the mediating effects of subjective appraisals of social support and the moderating effects of community level predictors. The results partially supported the research hypotheses. Subjective appraisals of social support were found to mediate the effects of community predictors on internalizing and externalizing behaviors. Moreover, the findings showed that community predictors moderated the protective effects of subjective appraisals of social support on internalizing and externalizing behaviors. However, variations existed in the effects of different community level predictors. Receiving public assistance and ethnic heterogeneity consistently showed significant effects, whereas the effects of other community level predictors were equivocal. The following sections include the discussion of findings, limitations, implications for the formulation of public policies and programs, and directions for future research.

Growth Curve Models for Internalizing and Externalizing Behaviors

The first research question was concerned with the trajectories of internalizing and externalizing behaviors. In this study, internalizing and externalizing behaviors of both boys and girls declined over time and did not show variations across early, middle, and late adolescence as suggested by previous literature, such as increasing during the early and middle adolescence and

stabilizing or declining in the late stage (Overbeek et al., 2001). This lack of variations may reflect complications involved in distinguishing adolescent developmental phases. Adolescence is defined as a period between puberty and transition into adulthood (Feixa, 2011; Furstenberg, 2000). Modern psychology greatly focuses on the examination of the period from 12-18 years old. Yet adolescence is a biologically, socially, and culturally marked life period (Feixa, 2011; Furstenberg, 2000), which can cover a wider span of years. For example, entering into full employment or getting married are traditional markers of the transition into adulthood (Furstenberg, 2000). My sample is comprised of young people from disadvantaged communities. According to Furstenberg (2010), young people from disadvantaged communities have limited chance to secure a well-paid job and find a partner with solid earnings. As a result, the transition to adulthood may be delayed and the span of adolescence may be extended. Thus, as economic and social conditions shift, adolescence can start from 12 and extend to 22-25 and even into later years (Feixa, 2011). My sample only includes individuals aged from 10-17, which may be a relatively short period that does not necessarily encompass the variations of internalizing and externalizing behaviors across adolescence.

The results also suggested that younger boys and older girls showed more internalizing behaviors at the initial level. This finding was consistent with previous literature stating that gender difference exists in the trajectory of internalizing behaviors depending on age. During early adolescence, boys are more susceptible to internalizing symptoms (Cohen et al., 1993). In contrast, girls are more likely to develop internalizing symptoms during middle adolescence as they experience developmental stressors such as menarche and transition to middle school (Cohen et al., 1993; Crawford et al., 2001). Family life course theory also sheds light on this finding. Transitions are associated with the change of roles and mark the beginning of new

trajectories. Menarche introduces the dramatic pubertal transition of girls. This transition is associated with the high level of stress and may increase girls' vulnerability to emotional distress (Ge, Conger, & Elder, 2001).

As for externalizing behaviors, the results showed that both girls and boys at an older age showed more externalizing behaviors at the initial level. The bonding relationship with parents and autonomy seeking across adolescence may provide insights to this finding. For example, adolescents tend to have more independent opinions and start to detach from parents when they endeavor to be autonomous (Bucx et al., 2010; Yu, 2011). These autonomy seeking efforts may weaken the supervision and control from parents, and meanwhile increase opportunities to affiliate with delinquent peers, which put adolescents at a higher risk of externalizing behaviors.

The Cumulative Effect of Community Level Predictors

The second research question was whether community level predictors, such as receiving public assistance, female-headed households, male unemployment, ethnic heterogeneity, and residential stability influenced the trajectories of internalizing and externalizing behaviors in an accumulative pattern. The findings showed that girls in neighborhoods with a higher percentage of non -White population had higher levels of internalizing behaviors at the initial point. This finding provided some evidence to support the notion that structural locations play a role in determining variations of individual development (Dannefer, 2003; O'Rand, 1996; Willson et al., 2007). This study showed that structural factors such as ethnic configuration influence the initial level of internalizing behaviors. However, findings did not support the theoretical argument of the CAD that community disadvantages may influence the internalizing and externalizing behaviors in a cumulative pattern over time, given

none of the community predictors showed significant effects on the rate of change of either internalizing or externalizing behaviors. There could be several explanations for this finding. First, the lack of continuous increment in internalizing and externalizing behaviors may reflect the fact that although these behaviors are influenced by social structural positions, they are regulated by biological and psychological processes. As a result, the increase of these behaviors is not infinite over time for those who reside in more disadvantaged communities, given these behaviors are unique phenomena associated with adolescence that are inclined to stabilize and decline over time. Another explanation could be that neighborhood conditions are a more distal influential factor compared with the more proximal environments such as family environments. The effects of community predictors on internalizing and externalizing behaviors may therefore not be manifested as direct, but rather manifested through the effects of family and individual mechanisms. This possibility received affirmation in the examination of the mediating effects of subjective appraisals of social support by adolescents and their primary caregivers discussed in the following sections.

Mediating Effects of Subjective Appraisals of Social Support

The third research question was whether community level predictors influenced internalizing and externalizing behaviors indirectly through subjective appraisal of social support by adolescents and caregivers. This influence was explored through examining the effects of community predictors on appraisal of social support by adolescents and caregivers, the effects of adolescent appraisals on internalizing and externalizing behaviors, the effects of caregivers' appraisals on adolescent appraisals, and the direct effects of community predictors on appraisals of social support by adolescents.

The effects of community predictors on appraisal of social support by adolescents and

caregivers. Consistent with the hypothesis, community predictors such as receiving public assistance, male unemployment, and ethnic heterogeneity had significant effects on appraisals for boys at Wave 3 (W3), yet for girls at Wave 1 (W1) and W3. That is, adolescents residing in communities with a higher percentage of receiving public assistance, male unemployment, and the non-White population had a lower score on their appraisals of social support. As for caregivers, the percentage of receiving public assistance and the non-White population showed similar effects on caregivers' appraisals of social support. However, the effects of male unemployment were not manifested among caregivers. Additionally, residence length had effects on the appraisals of social support by caregivers but not adolescents. Generally, these findings are in accordance with prior studies indicating community disadvantages disrupt social networks in a community where people rely on acquiring social support to cope with their stressful life events (Kowaleski-Jones, 2000; Wickrama & Bryant, 2003). As a result, people may have relatively negative appraisals of social support in disadvantaged communities.

Further, the negative effects of community predictors on adolescent appraisals of social support increased from W1 to W3, which lends somewhat support to the theoretical notion of the CAD. The effects of community predictors on appraisal were more manifested at W3 than W1 for girls, while for boys, the effects were manifested at W3 but not W1. Results showed that adolescents' appraisals of social support showed a trend to deteriorate over time. In other words, the negative effects of community-predictors on appraisals of social support showed a trend to magnify over time. However, as the data of adolescent appraisals of social support were only available at W1 and W3 rather than all three waves, the declining trend of appraisals of social support is only tentative and cannot be assumed.

The effects of caregivers' appraisals of social support on adolescent appraisals of

social support. As hypothesized, the finding showed the congruence of appraisals between caregivers and adolescents. This lends support to theoretical arguments of the family life course theory by showing intergenerational transmission of appraisals from caregivers to their adolescent changes. Further, the findings showed that for both girls and boys, the effects of caregivers' appraisals of social support on adolescent appraisals at W1 were more manifested compared to W3. In other words, the extent of congruence of appraisals of social support by adolescents and caregivers decreased from W1 to W3. This may indicate that transitions happen during the life course of adolescence, which is reflected by the variation in boning relationships between parents and children. The transition creates new socialization contexts for intergenerational transmission, and as a result, leads to variations in the extent of congruence of appraisals of social support by adolescents and caregivers. Specifically, primary socialization mainly happens during childhood and adolescence. Attitudes and worldviews of caregivers in the early years are more influential as the bonding relationships between caregiver and children are closer when the children are younger. Along with autonomy seeking at an older age, adolescents may have more independent opinions (Bucx et al., 2010). Moreover, despite the trend to decrease over time, the effects of caregivers' appraisals of social support on their adolescent appraisals continued. This finding lends support to the family life course theory by showing the continuity and stability of intergenerational transmission (Bengtson & Allen, 1993).

The effects of adolescent appraisals on internalizing and externalizing behaviors. Appraisals of social support showed significant effects on internalizing and externalizing behaviors of both boys and girls. This is consistent with previous literature stating that appraisals of social support are critical to one's psychological well-being (Scholte, van Lieshout, & van Aken, 2001; Vaux et al., 1986). Adolescents who appraise the support from their parents and

peers as low are at higher risk of low psychological well-being and high levels of behavior

problems (Scholte et al., 2001).

Variability in the effects of community predictors. Another important finding

highlighted is the variability in the effects of community predictors on appraisals of social

support by adolescents and caregivers. As hypothesized, receiving public assistance and ethnic

heterogeneity consistently showed negative effects on appraisals of social support by adolescents

and caregivers, whereas the effects of female-headed households, male unemployment, and

residence length showed variability. Variations in the intersection of these predictors and family

and individual factors may shed light on the findings. First, although living in neighborhoods

with a high percentage of female-headed households has been examined as one of the critical

factors associated with negative child outcomes in prior studies (Kowaleski-Jones, 2000;

Sampson et al., 1997), this study did not find the significant effects of the percentage of female-

headed households on appraisals of social support by either adolescents or caregivers. How the

intersection of family structure and race influences resources that female-headed households are

able to access may explain this unexpected finding. The sample of this study is mainly comprised

of Blacks and Hispanics. Given that both Black and Hispanic families generally receive social

support from the extended family and kin networks (Brown, 2008; Haxton & Harknett, 2009),

female-headed households may get social support from their wide social network to take care of

the younger generation. For example, in Black families, grandmothers and uncles serve as

important sources of social support for single-mother households (Richardson, 2009). Family

members outside of primary caregivers get involved in supervising the behaviors of adolescents

and foster positive adolescent development. As a result, the percentage of female-headed

households may not show negative effects of appraisals of social support. This finding lends

support to the argument that growing up in a single-parent family household may not be the cause of poor child well-being (Brown, 2010). Therefore, research concluding that decreasing the proportion of female-headed households and promoting marriage will contribute to child outcomes may be arbitrary. Another explanation could be the percentage of female-headed families was computed differently from previous research, which leads to the discrepancy of findings. The computation of the percentage of female-headed households in this study was based on the employment status of caregivers and their partners. As data on employment status were missing for a great number of households, the computation result may deviate from the real percentage of female-headed households in these communities. Second, previous studies indicate that fewer problem behaviors of adolescents have been found in more residentially stable communities (Kowaleski-Jones, 2000). This study did not find the effects of residential stability on appraisals of social supports by adolescents, nor in turn their internalizing and externalizing behaviors. However, this study did find that residential stability had a positive effect on caregivers' appraisals of social support, where the more stable the residency, the higher the caregivers' appraisals of social support. Given the intergenerational congruence of appraisals of social support between caregivers and adolescents, residential stability may have indirect effects on adolescent internalizing and externalizing behaviors. Third, male unemployment showed effects on adolescent but not caregivers' appraisals of social support. The finding of the effects of male unemployment on adolescent appraisals of social support are in agreement with theoretical arguments and prior studies that indicate male unemployment, as one of the indicators of concentrated poverty, can hinder the formation of social networks in a community and undermine a community's ability to exert control on its residents' behaviors (Hoffmann, 2002; Wickrama & Bryant, 2003; Wilson, 1996). People residing in a community characterized by the

breakdown of social networks are likely to have negative appraisals of social support. Moreover, at the family level, male caregivers such as fathers who are under economic stress are vulnerable to depression, which can jeopardize their relationships with children. Depressed fathers may adopt hostile parenting or show less involvement with children (Anderson, Kohler, & Letiecq, 2005). This can lead to low appraisals of social support by adolescents since primary caregivers such as parents are one of the major resources to provide social support. However, male unemployment did not show similar effects on caregivers' appraisals of social support. This lack of effects could be due to caregivers' different reactions to unemployment in contrast with adolescents. Caregivers who are unemployed or have an unemployed partner are likely to experience psychological distress as they experience financial difficulties and the feelings of hopelessness and powerlessness (Anderson et al., 2005; Goosby, 2007). In this sense, caregivers' immediate response to unemployment is more likely to appear as depressed feelings rather than low appraisals of social support.

In summary, the above findings support the hypothesis that subjective appraisals of social support by adolescents and caregivers mediated the effects of community predictors on internalizing and externalizing behaviors. That is, community predictors did not exert a direct influence, but rather an indirect influence on internalizing and externalizing behaviors through the effects of subjective appraisals of social support by adolescents and caregivers. In accordance with the theoretical argument of human agency (Bandura, 1989; Elder 1994) that human beings actively participate in the process of constructing their life course by planning and making choices, the appraisals and perceptions of adolescents play a critical role in determining the effects of community level predictors on their internalizing and externalizing behaviors.

Moderating Effects of Community Predictors

The fourth research question examined whether community level predictors moderated the linkage connecting subjective appraisals of social support and internalizing and externalizing behaviors. The findings suggest an alternative pathway, that community contexts exerted influence on adolescent outcomes by indicating that receiving public assistance moderated the effect of adolescent appraisals of social support on internalizing behaviors of boys. Moreover, ethnic heterogeneity moderated the effect of adolescent appraisals of social support on internalizing behaviors of girls. That is, the protective effects of appraisals of social support on internalizing behaviors became weaker in more disadvantaged communities with a higher percentage of residents receiving public assistance and the non-White population. This finding is consistent with previous literature that indicates the protective effects of family factors will be strengthened in less disadvantaged communities (Roche et al., 2007; Wickrama & Bryant, 2003).

The moderating effects of receiving public assistance on the linkage between appraisals of social support and internalizing behaviors were pronounced among boys only. This finding is consistent with literature indicating that economic disadvantages impact depression and conduct problems of boys more strongly than girls (McLeod & Owens, 2004; Simons et al., 1996). Compared with girls who are more defined by family resources (Botticello, 2009), boys are more likely to be influenced by broader contexts beyond families and thus more sensitive to community economic disadvantages. The community disadvantages may harm boys' perceived opportunities of occupational choices and social mobility (Simons et al., 1996).This may put boys at a higher risk of psychological distress.

The moderating effects of ethnic heterogeneity on the linkage between appraisals of social support and internalizing behaviors were manifested among girls but not boys. Parents'

gender socialization efforts in disadvantaged communities may shed light on this finding. For example, poor families from different ethnic and cultural backgrounds are likely to gather in economically disadvantaged neighborhoods (Duncan et al, 1997; Wickrama & Bryant, 2003). In disadvantaged communities, parents tend to enhance their supervision over girls in order to protect them from negative influences of the neighborhood (Leventhal & Brooks-Gunn, 2005; Zimmerman & Messner, 2010). On one hand, girls benefit from the protection derived from the heightened supervision and close bonding with their parents, but on the other hand, girls' relationship with their caregivers are more susceptible to the influence of neighborhood conditions (Leventhal & Brooks-Gunn, 2005). When neighborhood disadvantages increase and become more disruptive to parent-daughter interactions, girls will be at a higher risk of internalizing behaviors (Leventhal & Brooks-Gunn, 2005; Zimmerman & Messner, 2010). Additionally, in communities with diverse ethnic groups, communications among residents and the formulation of social networks may be hindered as residents vary in their languages, cultural practices, and religions (Wickrama & Bryant, 2003). Mothers who are not able to acquire social support from their communities may tend to rely on their daughters for social support, which puts pressure on girls (Leventhal & Brooks-Gunn, 2005). Moreover, in families distressed by community disadvantages, parents tend to burden girls with family responsibilities (Zimmerman & Messner, 2010). Overall, community disadvantages exert influence on family processes, which put girls at a higher risk of internalizing behaviors.

None of the community level predictors moderated the linkage between appraisals of social support and adolescent externalizing behaviors. This lack of effects may reflect that mechanisms involved in the development of externalizing behaviors are different from the mechanisms for internalizing behaviors. Informal social control is one of the key factors to

inhibit adolescent problem behaviors in a community (Baumer, 2001; Kowaleski-Jones, 2000; Sampson et al., 1997). The social control perspective emphasizes that adolescent attachment to conventional institutions such as school and residents' capacity and willingness to intervene in problem behaviors for the common good of communities inhibit adolescent deviant behaviors in a neighborhood (Baumer, 2001; Kowaleski-Jones, 2000; Sampson et al., 1997). Although researchers argue that social controls are more likely to be weakened in disadvantaged neighborhoods (Baumer, 2001; Kowaleski-Jones, 2000; Sampson et al., 1997), community disadvantages assessed by the five indicators in this study do not equate to diminishing social control necessarily. This may explain the finding that none of the community level predictors moderated the linkage between appraisals of social support and adolescent externalizing behaviors.

Limitations

This study is limited in several ways. First, like any other longitudinal design, the data set used for this study involves the issue of attrition. Participants from different cohorts drop out of studies across the different waves. It is unknown if there is a difference between individuals who remain in the study versus those who chose to drop out, which may introduce the issue of selection bias (Kazdin, 2003). The loss of participants may affect the validity of the findings. Second, this study did not follow the same adolescents from ages 10 to 17, but rather used adolescents from cohort 6, 9, 12, and 15 to approximate a developmental period from age 10 to 17. It is not known if cohort differences exist among individuals from different cohorts. The cohort effects may confound the age effects, which may compromise the conclusion about the trajectories of internalizing and externalizing behaviors across age 10 to 17. Third, community level predictors were created by aggregating individual level data. The aggregating values based

on individual level data may deviate from the real community level data. Fourth, the dataset

used in this study is designed to examine the effects of community structural adversities such as

concentrated poverty, ethnic heterogeneity, and residential mobility on adolescent development.

As a result, the data set used a homogeneous sample that is mainly composed of disadvantaged

groups such as low-income and minority urban residents. A more heterogeneous sample that

includes both more disadvantaged and advantaged groups is needed to better understand the

variability in the effects of community level variables.

Implications for Future Research

Further research is needed to explore how the intersection of family structure and race

influences the effects of community structure disadvantages on adolescent development. Prior

studies examined the proportion of female-headed households in a community as risk factors for

child development (Kowaleski-Jones, 2000; Sampson et al., 1997). This study revealed that

being raised in the community with a relatively high percentage of female-headed households

was not necessarily related to negative child outcomes as prior studies proposed. The

configuration of ethnic groups of the sample may shed light on this finding. The sample of this

study is mainly comprised of Hispanics and Blacks. As families of these two ethnic groups are

generally able to gain support and resources from their extended families and kin networks

(Allen et al., 2011; Haxton & Harknett, 2009), single-parent families may be as resourceful as

non- single-parent families in their capacity to rear children. Thus this study did not find negative

effects of female-headed households. It is unknown if this result can be generalized to other

ethnic groups. The comparison of different ethnic groups was not conducted in this study

because of the small proportion of White families and families of other ethnic origins. Future

studies should sample a relatively even proportion of families from different ethnic origins and

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compare how the effect of being raised in female-headed households differs across different ethnic groups.

This study only examined a relatively short period of adolescence from 10 to 17 years of age, which may not be able to capture the variation in the trajectories of internalizing and externalizing behaviors or the effects of appraisals of social support across adolescence, given research suggesting that adolescence can start at 12 and extend to 22-25 and even into later years (Feixa, 2011). Future studies examining a longer period are needed to reveal the variability of neighborhood effects, involved family and individual processes, and individual developmental outcomes on adolescents.

Finally, future studies examining the effects of community disadvantages need to reconsider how to measure structural disadvantages. Research has widely used concentrated poverty, a measure combining a series of indicators such as receiving public assistance, female-headed families, and unemployment, to assess structural economical disadvantages (Sampson et al., 1997; Wickrama & Bryant, 2003; Xue et al., 2005). The findings of this study suggest that using a composite score to assess community disadvantages may overshadow the variability in the effects of different community indicators, which may in turn provide inaccurate evidence and mislead the formulation of government policies and programs. For example, this study found that the percentage of female-headed households, which was examined as one of the critical contributing factors of negative child outcomes in previous studies and used as evidence for programs promoting marriage, did not show effects on internalizing and externalizing behaviors. Therefore, the effects of indicators tapping different dimensions of community disadvantages should be examined separately in future studies.

Implications for Programs and Policies

The findings of the effects of community level predictors and involved family and individual mechanisms on adolescent internalizing and externalizing behaviors provide evidence for the formulation of government programs and policies. First, the detection of mediating effects of appraisals of social support by adolescents and caregivers provides evidence in support of prevention and intervention programs and the timing for these programs as well. As appraisals of social support by both adolescents and caregivers buffer the negative effects of community disadvantages, family level intervention programs can be developed to reshape appraisals of social support by both adolescents and caregivers to improve adolescent internalizing and externalizing symptoms. Moreover, the findings showed the effects of caregivers' appraisals of social support on their adolescents' appraisals were more manifested at early age periods. This reflects that attitudes and worldviews of caregivers in early years are more influential. Thus intervention to reshape appraisals of social support in early years of adolescence is critical. Second, the findings uncovered that subjective appraisals of social support at both family and individual levels were an important mechanism through which community effects were translated into individual well-being. Thus, programs and policies at the government level helping promote positive appraisals may influence the trajectories of adolescent outcomes. For example, government can provide funds to support parenting education and training in communities that help both caregivers and their children to develop positive appraisals toward their environment.

Conclusion

Previous literature examining neighborhood effects on individual development draws heavily on the perspective of social disorganization that focuses on the destructive effects of

community disadvantages, whereas protective mechanisms at the family and individual levels have not been well addressed (Hoffmann, 2002; Roche et al., 2007; Wickrama & Bryant, 2003). Community disadvantages do not equate to family disadvantages or poor individual development. How community disadvantages influence family processes and in turn are translated into individual outcomes need to be examined. In this light, this study adds to the literature by taking a strengths perspective to examine the mediating effects of family and individual level factors and the moderating effects of community level disadvantages on adolescent internalizing and externalizing behaviors. This study contributes to the existing literature in several ways. First, it adds to the literature by revealing variability in the effects of different community level predictors. Previous literature examining effects of community disadvantages combines different community level indictors into one variable. A combined score assumes that all community level predictors have equal effects on family dynamics and individual outcomes. However, this study reveals that variations in the intersection of different community level predictors and family and individual level factors may exert different influences on adolescent internalizing and externalizing behaviors. For example, the percentage of female-headed households did not show effects on adolescent internalizing and externalizing behaviors as receiving public assistance. This finding highlights the importance of considering the intersection of community, family, and individual factors when examining neighborhood effects on individual development. Second, this study adds to the literature by taking a strengths perspective to uncover the protective effects of family and individual level factors, i.e., appraisals of social supports by adolescents and their primary caregivers. Third, this study provides evidence for the formulation of government policies and programs. The findings suggest that intervention efforts at both family and community levels are needed to improve adolescent

outcomes. Moreover, the findings highlight that the timing of intervention programs is critical. Given the family is a more influential context to children at their younger age, intervention programs at an early age are important.

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Appendices

Appendix A: Scale of Subjective Appraisals of Social Support

1. When I am with my friends I feel completely be able to relax myself and be myself.

2. I share the same approach to life that many of my friends do.

3. People who know me trust me and respect me.

4. No matter what happens, I know that my family will always be there for me should I need them.

5. When I want to go out to do things, I know that many of my friends would enjoy (like) doing these things with me.

6. I have at least one fiend that I could tell anything to.

7. My family lets me know they think I'm a worthwhile (valuable) person.

8. I feel very close to some of my friends.

9. People in my family have confidence in me.

10. People in my family help me find solutions to my problems.

11. People who know me think I am good at what I do.

12. My friends would take the time to talk about my problems, should I ever want to.

13. I how my family will always stand by me.

Appendix B: Mplus Syntax for Growth Curve Models

```
TITLE: A linear growth model of internalizing behaviors
DATA: FILE IS 0321Diss_Ind_Com.dat;
VARIABLE: NAMES ARE ID INT1-INT3 EXT1-EXT3 AGE1-AGE3
PSS1 PSP1 PSS3 PSP3 PUB FE MALE ETH RES FINCOME EDU NC GEN;
USEVARIABLES ARE INT1 INT2 INT3 AGE1 FINCOME GEN;
MISSING = ALL(-999999);
GROUPING IS GEN (0=female 1=male);
MODEL:
I S | INT1@0 INT2@1 INT3@2;
I S ON AGE1;
I S ON FINCOME;
PLOT:
TYPE IS PLOT3;
SERIES IS INT1 INT2 INT3(*);
OUTPUT: SAMPSTAT STANDARDIZED TECH4 MODINDICES(3.84);


TITLE: A linear growth model of externalizing behaviors
DATA: FILE IS 0321Diss_Ind_Com.dat;
VARIABLE: NAMES ARE ID INT1-INT3 EXT1-EXT3 AGE1-AGE3
PSS1 PSP1 PSS3 PSP3 PUB FE MALE ETH RES FINCOME EDU NC GEN;
USEVARIABLES ARE EXT1-EXT3 AGE1 FINCOME GEN;
MISSING = ALL(-999999);
GROUPING IS GEN (0=female 1=male);
MODEL:
I S | EXT1@0 EXT2@1 EXT3*2;
I S ON AGE1;
I S ON FINCOME;
EXT1@0;
PLOT:
TYPE IS PLOT3;
SERIES IS EXT1 EXT2 EXT3(*);
OUTPUT: SAMPSTAT STANDARDIZED TECH4 MODINDICES(3.84);
```

Appendix C: Mplus Syntax for Two-Level Models

```
TITLE: 2-Level model for internalizing behaviors
DATA: FILE IS Ind_com_male.dat;
VARIABLE: NAMES ARE ID INT1-INT3 EXT1-EXT3 AGE1-AGE3
PSS1 PSP1 PSS3 PSP3 PUB FE MALE ETH RES FINCOME EDU NC GEN;
USEVARIABLES ARE INT1-INT3 AGE1 RES FINCOME NC;
MISSING = ALL(-999999);
WITHIN = AGE1 FINCOME;
BETWEEN = RES;
CLUSTER = NC;
MISSING = ALL(-999999);
ANALYSIS: TYPE = TWOLEVEL;
MODEL:
%WITHIN%
iw sw | INT1@0 INT2@1 INT3@2;
iw sw on AGE1;
iw sw on FINCOME;
INT1-INT3(1);
%BETWEEN%
ib sb | INT1@0 INT2@1 INT3@2;
INT1-INT3@0;
ib sb on RES;
PLOT:
TYPE IS PLOT3;
SERIES IS INT1 INT2 INT3(*);
OUTPUT: SAMPSTAT STANDARDIZED TECH4 MODINDICES(3.84);
```

NOTE: community-level predictors on the "BETWEEN" level are entered one at a time. The models are fit for girls and boys respectively. The models are fit for internalizing and externalizing behaviors respectively.

Appendix D: Mplus Syntax for Mediation Models

```
TITLE: 2 LEVEL MODEL effects of community predictors on appraisals of
social support
DATA: FILE IS ind_com_male.dat;
VARIABLE: NAMES ARE ID INT1-INT3 EXT1-EXT3 AGE1-AGE3
PSS1 PSP1 PSS3 PSP3 PUB FE MALE ETH RES FINCOME EDU NC GEN;
USEVARIABLES ARE PSS1 PSP1 PSS3 PSP3 ETH NC;
BETWEEN = ETH;
CLUSTER = NC;
MISSING = ALL(-999999);
ANALYSIS: TYPE = TWOLEVEL;
MODEL:
%WITHIN%
PSS1 ON PSP1;
PSS3 ON PSP1;
PSS3 ON PSP3;
PSS3 WITH PSS1;
PSP1 WITH PSP3;
%BETWEEN%
PSS1 PSS3 PSP1 PSP3 ON ETH;
PLOT:
OUTPUT: SAMPSTAT STANDARDIZED TECH4 MODINDICES(3.84);
```

NOTE: community-level predictors on the "BETWEEN" level are entered one at a time. The models are fit for girls and boys respectively.

```
TITLE: 1 LEVEL MODEL effects of appraisals of social support on
internalizing behaviors
DATA: FILE IS 0321Diss_Ind_Com.dat;
VARIABLE: NAMES ARE ID INT1-INT3 EXT1-EXT3 AGE1-AGE3
PSS1 PSP1 PSS3 PSP3 PUB FE MALE ETH RES FINCOME EDU NC GEN;
USEVARIABLES ARE INT1-INT3 AGE1 PSS1 PSP1 PSS3 PSP3 FINCOME GEN;
MISSING = ALL(-999999);
GROUPING IS GEN (0=female 1=male);
MODEL:
I S | INT1@0 INT2@1 INT3@2;
I S ON AGE1;
I S ON FINCOME;
INT1 ON PSS1;
INT3 ON PSS3;
PSS1 ON PSP1;
PSS3 ON PSP1;
PSS3 ON PSP3;
PLOT:
TYPE IS PLOT3;
SERIES IS INT1 INT2 INT3(*);
OUTPUT: SAMPSTAT STANDARDIZED TECH4 MODINDICES(3.84);
```

NOTE: The models are fit for internalizing and externalizing behaviors respectively.

Appendix E: Mplus Syntax for Moderation Models

```
TITLE: 2 LEVEL MODERATION
DATA: FILE IS Ind_com_male.dat;
VARIABLE: NAMES ARE ID INT1-INT3 EXT1-EXT3 AGE1-AGE3
PSS1 PSP1 PSS3 PSP3 PUB FE MALE ETH RES FINCOME EDU NC GEN;
USEVARIABLES ARE INT1-INT3 AGE1 PSS1 PSS3 ETH FINCOME NC;
BETWEEN = ETH;
WITHIN = AGE1 PSS1 PSS3 FINCOME;
CLUSTER = NC;
CENTERING = GRANDMEAN (INT1-INT3 AGE1 PSS1 PSS3 ETH FINCOME);
MISSING = ALL(-999999);
ANALYSIS: TYPE = TWOLEVEL RANDOM;
MODEL:
%WITHIN%
iw sw | INT1@0 INT2@1 INT3@2;
iw sw ON AGE1;
iw sw ON FINCOME;
INT1 ON PSS1;
INT3 ON PSS3;
INT1-INT3 (1);
s1 | sw ON PSS1;
s2 | sw ON PSS3;
%BETWEEN%
ib sb | INT1@0 INT2@1 INT3@2;
ib sb on ETH;
INT1-INT3@0;
s1 s2 ON ETH;
OUTPUT: SAMPSTAT STANDARDIZED TECH4 MODINDICES(ALL);
```

NOTE: community-level predictors on the "BETWEEN" level are entered one at a time. The models are fit for girls and boys respectively. The models are fit for internalizing and externalizing behaviors respectively.

Appendix F: IRB Approval Letters

VirginiaTech

MEMORANDUM

DATE: October 19, 2010

TO: Peggy S. Meszaros, Jing Zhang, Tina Savla, Yasuo Miyazaki

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires June 13, 2011)

PROTOCOL TITLE: The Cumulative Advantage/Disadvantage and Adolescent Developmental Outcomes: Community and Family Processes as Protective Factors

IRB NUMBER: 10-835

Effective October 18, 2010, the Virginia Tech IRB Administrator, Carmen T. Green, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at http://www.irb.vt.edu/pages/responsibilities.htm (please review before the commencement of your research).

PROTOCOL INFORMATION:
Approved as: **Expedited, under 45 CFR 46.110 category(ies) 5**
Protocol Approval Date: **10/18/2010**
Protocol Expiration Date: **10/17/2011**
Continuing Review Due Date*: **10/3/2011**
*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:
Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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Date*	OSP Number	Sponsor	Grant Comparison Conducted?

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

cc: File

Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24060
540/231-4606 Fax 540/231-0959
e-mail irb@vt.edu
Website: www.irb.vt.edu

MEMORANDUM

DATE: September 23, 2011

TO: Peggy S. Meszaros, Jing Zhang, Tina Savla, Yasuo Miyazaki

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: The Cumulative Advantage/Disadvantage and Adolescent Developmental Outcomes: Community and Family Processes as Protective Factors

IRB NUMBER: 10-835

Effective October 18, 2011, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the continuation request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at http://www.irb.vt.edu/pages/responsibilities.htm (please review before the commencement of your research).

PROTOCOL INFORMATION:
Approved as: **Expedited, under 45 CFR 46.110 category(ies) 5**
Protocol Approval Date: **10/18/2011** (protocol's initial approval date: **10/18/2010**)
Protocol Expiration Date: **10/17/2012**
Continuing Review Due Date*: **10/3/2012**
*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:
Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

cc: File