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ABSTRACT

Title ofDocument: PREDICTORS AND OUTCOMES OF ADOLESCENT SELF-EFFICACY BELIEFS: AN ANALYSIS OF INDIVIDUAL, PEER, FAMILY, AND NEIGHBORHOOD LEVEL VARIABLES

Metin Özdemir, Ph.D., 2009

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Adolescence is a period when young individuals face many challenging tasks. These include becoming resilient in the face of adversities, establishing and maintaining healthy relationships, achieving in school, and preparing for adult life. Self-efficacy beliefs are important to youth's success in accomplishing these tasks. Specifically, consistent with the premises of Bandura's Self-Efficacy Theory, ample evidence suggests that self-efficacy beliefs are highly critical in task selection, persistence, and successful completion. Nevertheless, few studies to date have examined the predictors of self-efficacy beliefs, or the role of efficacy beliefs in mediating the relationship between contextual factors and positive developmental outcomes.

Three interrelated studies were conducted to examine 1) the structure of a multidimensional self-efficacy measure (Study I), 2) the individual, family, peer, and neighborhood predictors of adolescents' domain specific self-efficacy beliefs (Study II), and 3) the mediating role of domain specific self-efficacy beliefs in predicting

adolescents' developmental outcomes (Study III). All three studies relied on a secondary analysis of the Project in Human Development in Chicago Neighborhoods (PHDCN) data set. Specifically, surveys of youth aged 10-19, and systematic social observations conducted to measure neighborhood physical and social disorganization were examined.

The findings of Study I (N = 1,487) provided evidence for the multidimensional structure of the self-efficacy measure, consistent with the original premises of Self-Efficacy Theory. The findings of Study II (N = 1,015) suggested that family environment and peer relations are the most consistent predictors of adolescents' domain-specific self-efficacy beliefs, while individual characteristics and neighborhood context exerted influence on specific domains only. The pattern of different predictors being linked to different self-efficacy domains underscores the importance of the multidimensional structure of self-efficacy beliefs, and the complexity of relationships between sources of influence, across levels and domains of self-efficacy beliefs. The findings of Study III provided evidence for the mediating role of domain specific self-efficacy beliefs. Overall, the findings underscore the importance of examining predictors and outcomes of self-efficacy beliefs in multiple domains using a multidimensional measure of efficacy beliefs.

# PREDICTORS AND OUTCOMES OF ADOLESCENT SELF-EFFICACY BELIEFS: AN ANALYSIS OF INDIVIDUAL, PEER, FAMILY, AND NEIGHBORHOOD LEVEL VARIABLES.

By

Metin Özdemir

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# Dedication

To those who believe in that children and youth can thrive in the face of adversities; to those who fight against the system that creates and maintains obstacles to young people's development; and to those who work hard and give their thought, time and energy for the betterment of human life.

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It takes a village to raise a child. There are a countless number of people in my village, whose support and encouragement made completion of this project and my doctoral studies possible. It was that support, in the face of adversities and challenges, which established my sense of efficacy, and fueled my ambition to learn, grow, and thrive from the very beginning of my life.

I am grateful to my parents who have allowed me to explore my world as I want; to my first grade teacher, my father, who taught me the joy of learning; to my family, relatives, neighbors, and childhood friends, who always found my childhood inventions exciting, which encouraged me to work hard and even harder, and led me to dream myself as a scientist.

My transition to middle school was accompanied by the transition to city life, which was extraordinarily difficult for a child who was born and raised in a small village. Since then, every new school I attended represented a major transition in my living environment. Every time I went through such a transition, I learned new skills and became more aware of my strengths and weaknesses. Learning how to handle challenges and manage stress and ambiguity would not have been possible without those who provided me with challenges and those who never hesitated to provide their precious support. Now, I am ready for another transition, a new environment, a completely new culture and language. This journey to date has made me the person who I am now, much different than that child who was shy, reserved and vulnerable.

During this journey, the people who thrived in the face of difficulties and challenges, and those who sympathized and supported the people in their surroundings

have always inspired me. During my doctoral training, I had more of these people in my environment than anytime I had in my life. My mentor, Ken Maton and his lab has always been my major source of support and inspiration. I am and will be always grateful to know him.

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# Chapter 1

## Introduction

Adolescence, conceptualized as a period of preparation for adult life, has long been of interest to psychologists and other social scientists. There have been varied philosophical, sociological, and anthropological studies on the characteristics of the adolescence period. Nevertheless, it was not until recent decades that a consistent advancement of knowledge in this field has been observed, particularly in psychology. Although psychology announced its interest in this period during the beginning of the last century (Hall, 1904), the literature has significantly grown within the last two decades following the introduction of ecological perspectives, methodological improvements, and changing funding priorities (Steinberg & Morris, 2001).

Lerner (1987; 1995) describes adolescence as a period of "continual change and transition between individuals and their contexts." In a broader definition, adolescence was defined as "the period within the lifespan when most of a person's biological, cognitive, psychological, and social characteristics are changing from what is considered childlike to what is considered adult-like" (Lerner & Galambos, 1998). This period of adjustments and transformations in the self, in the family, and in the peer group presents a dramatic challenge for most adolescents. However, contrary to the general conception of adolescence, many adolescents go through normative developmental experiences and grow up as healthy youth (Lerner, Peterson, & Brooks-Gunn, 1991; Motemayor, Adams, & Gullotta, 1990; Petersen, 1988).

Research on adolescents has examined multiple patterns of relationships between adolescent behaviors and their correlates. Most of the studies on this population have

conceptualized this age as a period of difficulties, and focused on problem behaviors – trying to understand the "non-normative" instead of examining healthy developmental pathways (Steinberg & Morris, 2001). Despite this one-sided focus, the literature on non-normative development has provided a wealth of information about development during adolescence. Hence, Steinberg and Morris (2001) argued that the study of problem behaviors enhanced our understanding of healthy development while warning researchers about the danger of over generalizations based on the study of atypical behavior. They emphasized the reality that (1) not all problem behaviors indicate troublesome behavioral patterns, and in fact may represent naïve experimentation; (2) problems may originate from early experiences, rather than having started during adolescence; and (3) some problems may be transitory in nature and may be resolved in adulthood.

*Relationship between adolescent experiences and later well-being*

Although Steinberg and Morris (2001) explicitly argued that not all problems during adolescence persist in the long run, this argument does not imply that some experiences during the adolescence period are not transferred to later life. In fact, there is evidence indicating continuity between youth and adult behaviors and well-being. For example, studies on health outcomes, risk taking behaviors, smoking and alcohol or drug use, career aspirations, attainment of life goals, and social relations for youth and adults provided evidence that most of the related behavioral patterns and life styles associated with these outcomes are established during adolescence (see Bandura, 2006a; Lerner & Galambos, 1998; Steinberg & Morris, 2001 for reviews). Relatedly, a recent study (Wiesner & Windle, 2006)reported persistent trajectories of young adult substance use and depression thatfirst emerged during adolescence.

Besides patterns of problem behaviors and life-styles, empirical evidence suggests that conceptions of self, including self-esteem, self-concept and self-efficacy are established during adolescence (although they may fluctuate throughout life). Both meta-analysis (Trzesniewski, Donnellan, & Robins, 2003) and longitudinal studies (Kelkikangas-Jarvinen, 1990) provide evidence that self-esteem and self-concept become stable during adolescence and persist across young adulthood and adulthood. Because self-efficacy is more influential on behavioral and performance outcomes than other self constructs, its outcomes may have stronger long term effects on individuals' lives(Bandura, 1997). Hence, Bandura(1986; 1989b) emphasized that self-efficacy is related to academic performance and career choice, both of which have critical implications for individuals' later socioeconomic well-being and social status. Because self-efficacy and other related competence judgments are critical self evaluations which influence motivation, goal setting, and persistence, they may play major roles in determining the type of young adults adolescents will grow up to be.

*Self-efficacy of adolescents as predictors of multiple behavioral domains*

Adolescents' conceptualizations of their self, appreciation of their skills, and competencies have significant impacts on their well-being and behavioral engagements. For instance, high self-esteem and positive self-concept are consistently related to positive psychological well-being and fewer problems during childhood and adolescence(Kelkikangas-Jarvinen, 1990; Pajares & Miller, 1994). These variables also predict behavioral outcomes such as interpersonal relations, and involvement in meaningful activities and groups.

On the other hand, Bandura(1986) suggested that global measures of self such as self-esteem and self-concept can not accurately predict behavioral and psychological outcomes in specific situations. For example, global self-concept reflects a composite of judgments on different domains such as physical appearance, social skills, and academic skills. An individual may have positive feelings about his/her social skills and physical appearance, but may not feel academically competent. Therefore, a global measure of self-concept would be less successful in predicting outcomes related to all these areas. In contrast, domain specific measures of competencies in each area would result in more accurate predictions. Hence, self-efficacy theory posits that the best predictors of behavior in specific situations are individuals' self-perceptions regarding those situations (Bandura, 1989b).

Self-efficacy is defined as "people's judgments of their capabilities to organize and execute courses of action required to obtain a designated type of performance" (Bandura, 1986 p. 39). The original theoretical assumption of self-efficacy as an underlying mechanism of behavioral change, maintenance, and generalization has been supported by various studies. This research has provided evidence that self-efficacy significantly predicts outcomes such as academic achievement, social skills, smoking cessation, athletic performance, career choices, assertiveness, coping with fear, recovery from heart attack, and sales performance (Bandura, 1986).

Self-efficacy is not only directly related to performance outcomes, but also indirectly influences outcomes through its effects on mediation of the process. Self-efficacy has been construed as a key factor promoting sense of agency – the sense that individuals have the potential to influence their own lives (Bandura, 1997, 2001), and can

achieve outcomes that they desire in various domains. It has been hypothesized that self-efficacy influences choice of activities, effort, and persistence in many behavioral domains. Hence, Bandura(1997) stated that individuals with higher self-efficacy would participate more readily, work harder, persist longer, and achieve at higher levels.

Adolescence brings about many new challenges for youth (Bandura, 1997; Graber, Brooks-Gunn, & Petersen, 1996). According to social-cognitive theory, children who enter adolescence with a robust sense of efficacy for coping with its unique stressors and interpersonal demands are less likely to be vulnerable to stress and dysfunction. Youngsters who have a high sense of personal efficacy in key life domains such as academic performance and social interactions are more likely to face challenges in a persevering and relatively anxiety-free manner (Bandura, 1997). Thus, high self-efficacy may be a key factor in adolescents' resilience and successful coping with emergent difficulties. Hence, Bandura(1986; 1997)consistently argued that accurate appraisal of self-efficacy is a critical component of successful functioning and adjustment. Moreover, he contended that slightly high judgments could positively influence task persistence and achievement in the domain of focus, although he also warned about the possible negative implications of overestimation of competence such as risky behavioral engagements and failure due to inadequate skill level for task completion. Overestimation of self-efficacy may also negatively affect the psychological well-being of adolescents upon failure when high achievement is expected (Schunk & Pajares, 2004).

Adolescents' adjustment and well-being are influenced by multiple factors. Theoretical advances in the ecological, contextual, and biological perspectives, and newly introduced methodological and statistical techniques have challenged unilateral

and unidimensional approaches to human behavior and development. Developmental context or the ecology of human behavior comprises multiple, multi-layered levels of organization such as biological, psychological, social-interpersonal, cultural, and historical (Lerner & Galambos, 1998). Therefore, no single variable can be responsible for the developmental outcomes of adolescents, and self-efficacy has to be considered as an influential, but a single cognitive/psychological variable that influences behavior, and at the same time, is being influenced by the multiple dimensions of developmental ecology.

Self-efficacy has been studied in many areas such as academic achievement, social-interpersonal relations, health behaviors, career choice, job performance, and parenting (Bandura, 1997). The association between self-efficacy and academic achievement is an often studied topic. Although adolescents' academic achievement is influenced by multiple factors, there is evidence indicating that students' personal beliefs about their academic capabilities may override the importance of some other variables (Schunk & Pajares, 2004). For example, Collins(1982)found that self-efficacy determined academic achievement above and beyond ability and skills. Students with high ability and low self-efficacy underachieved compared to students with low ability but high self-efficacy. Another finding was that the latter group showed more persistence when they had difficulty in solving a problem. Thus, Collins argued that students with high skills but low self-efficacy may perform worse than those with low skills but high self-efficacy. This suggests the importance of self-efficacy beliefs in succeeding at tasks that require persistence and long term commitment. Importantly, most of adolescents'

lay developmental tasks, such as completion of education, building a social network, career choice, and interpersonal relationships require such persistence and commitment.

Although self-efficacy is not the only factor influencing behaviors and outcomes, it appears to have critical importance. Reviews and meta-analyses have confirmed the importance of self-efficacy for academic performance. In their meta-analysis, Multon and colleagues (1986) reported that self-efficacy accounted for about 14% of the variance in academic performance. However, the level of magnitude was related to the specificity of the self-efficacy measure. Studies using task specific self-efficacy measures reported higher effect sizes. For example, Stajkovic and Luthans(1998) reported an average weighted correlation of $r = .38$ between occupational self-efficacy and work-related performance, which accounted for a 28% gain in task performance.

Besides academic performance, self-efficacy also predicts adolescents' social behaviors and psychological well-being. For example, a study on Italian adolescents (Cappara, Barbarelli, Pastorelli, & Cervone, 2003) reported that self-regulation self-efficacy predicted peer preference, academic achievement, and externalization problems among high school students. Another significant finding of this study was that self-efficacy beliefs predicted psychosocial outcomes such as peer preference, internalization, and externalization even after controlling the effects of global personality traits.

Although many studies on the outcomes and correlates of self-efficacy are available in the literature, there are fewer studies examining the sources of self-efficacy. Moreover, researchers have been more interested in studying the outcomes of efficacy appraisals in different contexts and age groups than the predictors.

Bandura's(1997) social-cognitive theory of self-efficacy postulates four sources of self-efficacy belief. These are 1) mastery experiences, 2) vicarious experiences, 3) verbal persuasion, and 4) physiological indexes. These sources are reviewed in the later sections in detail. Extant literature provides evidence about the impact of these sources on the self-efficacy beliefs of individuals (Bandura, 1977a, 1986, 1997; Schunk & Meece, 2006).

*Lack of studies on neighborhood-level contextual factors*

Self-efficacy theory includes a focus on the sources of self-efficacy, all of which are cognitive appraisals of the stimuli and situation. Due to the strong influence of Self-Efficacy Theory as a part of the larger social-cognitive theory of Bandura, most psychological studies acknowledge these cognitive appraisals as the only sources of individuals' efficacy judgments. Thus, the premises of the Self-Efficacy Theory have resulted in programs, especially in schools, which focus on altering the self-efficacy of students through verbal persuasion, extensive use of positive feedback and avoidance of negative feedback, and providing mastery opportunities thorough increasing engagement of students in various activities. Moreover, some studies focus on correlates of self-efficacy such as peer influence (Schunk & Hanson, 1985) and family dynamics (McFarlane, Belissimo, & Norman, 1995; Trusty, 2001) as critical variables affecting the self-efficacy of children and adolescents. In contrast, other disciplines argue that socioeconomic and contextual factors may also influence the self-efficacy appraisals of individuals.

Among the socioeconomic variables studied have been occupational prestige, personal income(Hughes & Demo, 1989), and educational level (Gecas & Seff, 1990).

Studies conclude that all three variables are positively correlated with the self-efficacy of individuals. High socioeconomic status is associated with the availability of resources and opportunities for individuals, which increases their engagement in activities and environments that translate into a high sense of control over their activities and lives (Boerdieu, 1986). On the other hand, low socioeconomic status limits individuals' opportunities to engage in activities in what they are interested and that help them to achieve their goals. Moreover, high SES individuals have the opportunity to interact with other capable and successful individuals, which alters their sense of efficacy thorough role modeling. These pathways of influence are consistent with self-efficacy theory as it emphasizes mastery experiences and vicarious experiences as critical sources of self-efficacy.

Although some studies have shown that individual level socioeconomic status is associated with a sense of efficacy, there is a dearth of studies on the effects of neighborhood and community social and physical characteristics. Apart from individual level income, education, or occupational status, there is reason to argue for the possibility of the effect of social environment on individuals' self-efficacy, independent of their own status. For example, Schunk and Pajares(2004) argued that peer culture in a school environment may hinder the positive influence of high self-efficacy on academic achievement when students do not want to appear intelligent. Moreover, the social environment of students, including peer group, value of achievement, family income, and parental expectations have critical impact on achievement motivation and actual performance (Steinberg, 1998). Contrary to individual level cognitive appraisals, these

factors are critical to examine as potential correlates of self-efficacy with important implications for the design of programs and social policies.

Boardman and Jason (2000) studied neighborhood level SES, controlling for the effects of individual level indices of socioeconomic status such as personal income, assets, education, and employment. Neighborhood level SES variables were percent population below poverty level in the neighborhood, unemployment rate, and percent population on public assistance. Unemployment rate and public assistance rates were significant predictors of global self-efficacy above and beyond the effects of individual level SES variables. These findings signify the role of neighborhood level variables on the self-efficacy of individuals.

Although there is evidence suggesting a neighborhood influence on self-efficacy, many questions remained unanswered, and existing studies have a series of limitations. First of all, the only study (Boardman & Robert, 2000) to date directly investigating neighborhood level variables controlling for individual level variables used a global measure of self-efficacy. This measure was an aggregate of four items not originally intended to measure self-efficacy. The inter-item reliability coefficient was very low for these four items ($\alpha = .54$). Moreover, there was no evidence for the construct reliability and validity of this measure. Therefore, the findings can be considered questionable.

Also, none of these studies focused on adolescence. Adolescence is a unique developmental period which differs from both childhood and adulthood (Steinberg & Morris, 2001). Adolescence warrants more scientific attention to better understand the dynamics of development during this period and the successful transition to young adulthood.

*Focus of the current study*

Lerner and Galambos(1998) stated that "50% of the youth in the United States may be at moderate or greater levels of risk for engaging in unhealthy, unproductive, and even life-threatening behaviors (p. 438)." Social scientists should thus pay greater attention to the adolescent population to accumulate information needed for effective program and policy development. Although most adolescents go through normative developmental processes, programs and policies targeting a reduction of risk is highly critical for the well-being of society. Therefore, the dynamics of healthy adolescent development and coping should be examined using comprehensive, multidimensional, and multilevel perspectives.

Regarding adolescent resilience, Fergus and Zimmerman (2005) argued that adolescents may avoid the negative effects of risky behaviors either because of their available assets or available resources. Assets are defined as positive factors that reside within the individual. Competence, coping skills, self-esteem, and self-efficacy are considered important assets of adolescents. On the other hand, resources, external to the individual characteristics of adolescents, are also important factors in dealing with risky situations. Some of the crucial resources are parental support, adult mentoring, and community organizations contributing to adolescents' positive development.

Whereas assets emphasize individual differences and characteristics, the term resources point outs the importance of the ecological context on adolescent development. Due to the dynamic interaction between individual and context, and the continuous interplay between assets and resources (individual and environmental), understanding resiliency and adolescent development requires a dynamic and multilevel analysis of the

process. Such an approach may allow us to target external variables as a focus of intervention efforts (Fergus & Zimmerman, 2005).

Consistent with this discussion, Lerner and Galambos(1998), in their comprehensive review of the factors influencing adolescent developmental processes and outcomes, suggested that three individual level variables, and three contextual variables are highly critical for the development of risk behavior and their prevention. The individual level variables were age, expectations for education and school grades, and behavioral patterns (academic, social, etc); contextual variables were peer influences, parental influences, and neighborhood influences. They argued that a comprehensive understanding of adolescent development could be achieved through focusing on these variables and the interaction between individual and contextual factors. Finally, Steinberg and Morris (2001) encouraged researchers to focus on contextual variables using ecological, multi-systemic, and dynamic approaches in the study of adolescent development.

In the present study, the major aim was to examine the structure, predictors, and consequences of adolescents' self-efficacy. A comprehensive analysis of the contextual, inter-personal, and individual factors that influence domain specific self-efficacy beliefs, and the mediating role of self-efficacy in predicting psychological and behavioral outcomes for adolescentswas conducted. This research includedthree related studies. Specific aims are listed below.

Aim I. A confirmatory factor analysis of a multidimensional self-efficacy measure to test the structure of adolescents' self-efficacy beliefs (Study I).

Aim II. A contextual examination of the predictors of adolescents' self-efficacy beliefs (Study II). Specifically, an examination of the individual, family level, peer, and neighborhood level predictors of adolescents' self-efficacy beliefs was performed.

Aim III. Testing the mediating role of self-efficacy on the association between neighborhood characteristics and adolescent developmental outcomes (Study III).

Figure 1 illustrates the conceptual model and the constructs that were reviewed in the following sections. The box with dashed lines indicates the variables that werereviewed for Study II, the predictors of self-efficacy beliefs at four levels: individual, family, peer, and neighborhood. The box with dotted lines indicates the variables that were reviewed to lay out the theoretical and empirical rationale of Study III, examining the relationship between neighborhood characteristics and adolescent psychological and behavioral problems, and between self-efficacy and adolescent developmental problems.

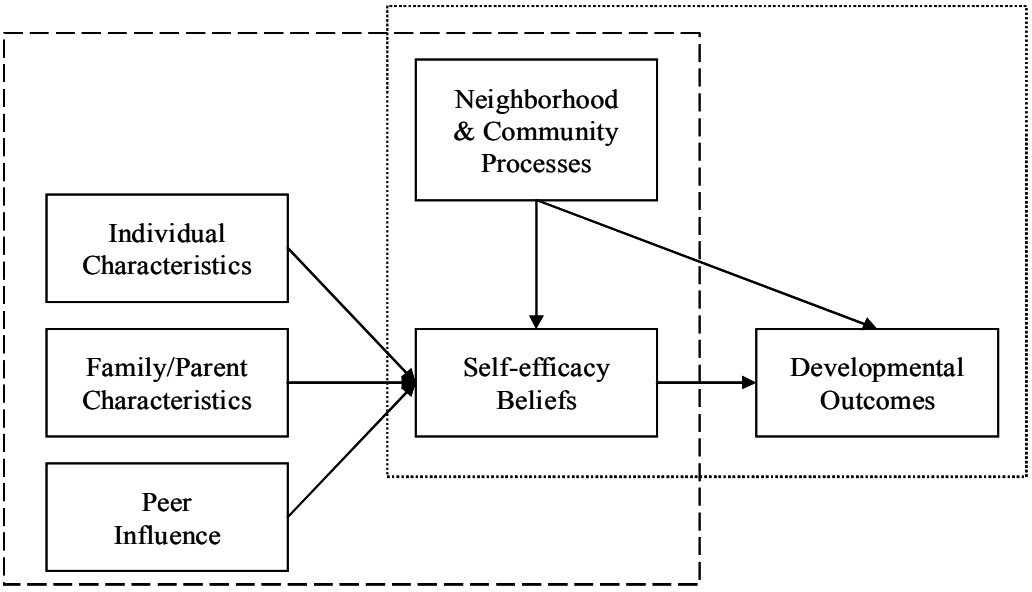


Figure 1: The conceptual model and groups of variables that are included in the review.

# Chapter 2

## Theory of Self-efficacy

Self-efficacy has been studied by both motivational and cognitive theorists. Although there are some conceptual differences, empirical studies do not differentiate between these two approaches in most cases (Gecas, 1989). Some of the motivational approaches conceptualize self-efficacy as a fundamental human need and a primary element of the drive to exert control over the environment (Gecas, 1989; White, 1959). Cognitive approaches, on the other hand, define self-efficacy as an accumulation of cognitive appraisals about control over one's own behavior and environment (Bandura, 1986). Cognitive perspectives were used in this study as they relate self-efficacy to contextual factors as well as individual variables. According to this perspective, self-efficacy theory is an integral part of the larger social-cognitive theory, which posits that individuals' achievement depends on the interaction between personal qualities such as thoughts, beliefs, and behavior, and contextual conditions (Bandura, 1986, 1997). The theory posits that self-efficacy influences people's behavior, and both shapes and is influenced by environmental conditions. This reciprocal relationship between individuals' cognitions, behaviors, personal characteristics, and their environment are the key aspects of the theory. Accordingly, sources of self-efficacy are based on cognitive appraisals of enactive experiences and interaction with the social environment which provides vicarious experiences and persuasive messages related to one's competencies.

Although self-efficacy and confidence (competence beliefs) have been used interchangeably in some contexts, they refer to different constructs (Bandura, 1986; 1997). First of all, confidence is a general term, like self-concept, and fails to specify the

object of the belief. Second, confidence of obtaining a certain result may include failure as well as success (Bandura, 1997). That is, confidence may have a negative meaning. On the other hand, self-efficacy is a positive and agentic self-belief of one's perceived potential to create given levels of accomplishment in diverse contexts. Therefore, self-efficacy beliefs include both judgments of capability and perceived confidence in those judgments.

Self-efficacy has a generative capability which requires the integration of cognitive, social, and behavioral skills to perform courses of action (Bandura, 1986). Perseverant effort is imperative to succeed in a given course of action, because effective completion of a task requires generation and testing of alternative forms of behaviors. Therefore, self-efficacy plays an important role in both generating courses of action and persevering until successful completion of action. Possession of skills is required but not a sufficient element to succeed without the belief that would motivate the initial action. Hence, Collins (1982) demonstrated that students with high self-efficacy performed better, controlling for the effect of skill level. Because of the consequences of self-efficacy beliefs, it has been considered as one of the most critical self constructs to be studied in order to understand, and also influence behavioral outcomes (Bandura, 1986, 1997; Schunk & Pajares, 2004).

*Ecological Approach: Process-Person-Context-Time Model*

To date, a large number of studies have examined different facets of self-efficacy and its predictive power related to certain courses of actions. Nevertheless, there is a dearth of studies examining predictors of domain specific self-efficacies and their predictive utility related to certain behavioral and psychological outcomes in a

developmental ecological model. However, Bronfenbrenner's(1979a) ecological model of human development, specifically person-process-context-time model may enhance our understanding of how self-efficacy is developed and function for people with different characteristics and backgrounds in different contexts.

Bronfenbrenner's ecological model emphasizes the importance of studying human behavior and development as a joint function of personal and environmental characteristics. Biological qualities of the person are shaped in a context where the individual actively interacts with multiple environments and participants in these environments. Social and physical characteristics of these environments either directly affect the development of the person or indirectly do so through their influences on the processes that affect the developmental course. Bronfenbrenner's original proposition makes this phenomenon clear. He posits that

> "Especially in its early phases, and to a great extent throughout the life course, human development takes place through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of time. Such enduring forms of interaction in the immediate environment are referred to as *proximal processes.* Examples of enduring patterns of proximal processes are found in parent-child and child-child activities, group or solitary play, reading, learning new skills, studying, athletic activities, and

performing complex tasks" (p. 620, Proposition I; italic is original; Bronfenbrenner, 1995).

After contemplating the sources of influences on development, he continues with the explanation of the dynamic interaction between these forces.

> "The form, power, content, and direction of the proximal processes effecting development vary systematically as a joint function of the biopsychological characteristics of the developing person; of the environment, both immediate and remotemode, in which the processes are taking place, and the nature of the developmental outcomes under consideration" (p. 621, Proposition II).

According to Bronfenbrenner(1995), one of the unintended consequence of extreme specialization in science is extensive focus on specific variables that provide little explanation of the complex nature of developmental processes, and little search for effects generalizable across contexts. However, the ecological model posits that the dynamics and complex nature of development can be understood through designs utilizing a process-person-context-time (PPCT) model. The virtue of this model is that explicit hypotheses can be produced suggesting direct, indirect, and interactive influences including multiple forces of developmental ecology.

Applying the PPCT model, this study first explored multiple sources of self-efficacy for different groups (gender, age, and ethnicity) in different contexts (peer, family, and neighborhood). Then, the role of self-efficacy as a mediator of the relationships between personal characteristics, family environment, and peer

relations on the developmental outcomes of adolescents was tested (e.g., depression, anxiety, substance use, delinquency). The first goal forms the basis of the Study II, whereas Study III tested the second one.

Below, the literature related to the aims of Study II is reviewed. First, a general overview of Bandura's Self-Efficacy Theory is outlined. This theory has provided a major theoretical background for most psychological studies on self-efficacy, which extensively focuses on the predictive power of self-efficacy. These studies mainly focused on personal characteristics and experiences. In contrast to psychological studies, sociological studies shed light on the contextual predictors of self-efficacy and human competence such as employment, social status, and poverty. To date, there has not been an effort to integrate the psychological and sociological approaches within an ecological framework.

*Sources of Self-efficacy*

Starting from the very first months of life, infants can learn contingencies between their actions and the physical environment (Bandura, 1986; Watson, 1972). According to Bandura (1986), making sounds by moving, hitting, or throwing objects and toys, for example, are some of the early mastery experiences of infants which make them realize that they can have effects on their environment. As children develop, the social environment gains importance, and interactions with others start to influence developmental outcomes. Role models and verbal persuasions emerge as sources of personal efficacy. Overall, Bandura's (1986) self-efficacy theory proposes four sources of self-efficacy appraisals: (1) mastery experiences, (2) vicarious experience, (3) verbal persuasion, and (4) physiological state.

Mastery experiences are the major and the most powerful source of efficacy appraisals (Bandura, 1986, 1997). Individuals' success and failure experiences are the primary information sources for efficacy judgments. For example, achievement successes at school lead to the development of high academic self-efficacy whereas peer rejection may result in low social self-efficacy.

A second important source of self-efficacy beliefs is vicarious experiences. Similar others offer critical information about an individual's own capabilities. For example, an early study revealed that students who observe their peers' failure or success in academic tasks tend to alter their efficacy evaluations if they perceive their peers as being similar to them (Schunk & Hanson, 1985).

The third factor that influences self-efficacy beliefs is verbal persuasion (Bandura, 1997). For example, positive feedback in classroom or family settings increases the self-efficacy of students (Schunk, 1991). Verbal persuasion may have only limited influence in terms of boosting self-efficacy, but especially positive persuasive messages may encourage people to try harder, and persevere to achieve the given task, and subsequently increase the likelihood of achievement which may in turn lead to high self-efficacy through mastery experience.

The last source of efficacy appraisal is physiological reactions. Bandura (1997) argues that people often rely on their physiological reactions to certain situations in judging their competence level. Such judgments may be relevant to tasks that require physical effort. On the other hand, experiences such as increased heart beat during a public speech may also influence individuals' judgments about their efficacy regarding

that task. Likewise, fear-provoking environments may elevate physiological reactions, in turn possibly affecting efficacy beliefs on a related domain.

*Sociological Approaches to Self-Efficacy*

Psychological and sociological approaches to self beliefs often bear more convergent ideas than divergent perspectives, even though each discipline emphasizes different sets of related variables. In general, sociologists are more interested in the degree of influence of status characteristics, social relationships, and structural context on human thoughts, feelings and behavior whereas psychologists are more focused on the mechanisms of influence through which social factors impact individuals (Thoits, 1995). As a result, sociological studies of self-efficacy and related constructs (locus of control, personal control, personal efficacy) have examined the impacts of individual and family income, neighborhood socioeconomic status, and occupational and social status (Boardman & Robert, 2000; Hughes & Demo, 1989; Lewis, Ross, & Mirowsky, 1999) with an attempt to identify the magnitude of relationships between social structural variables and self-beliefs. In contrast, most psychological studies focused on the mechanisms and the specific situations (e.g., academic achievement, peer relations, athletic involvement, response to treatment) in which self-efficacy influences social, emotional, and behavioral outcomes, and the mechanism through which influence occurs (see Bandura, 1997, for an extensive review).

The divergent perspective of sociologists has led to studies looking at the context and distal factors influencing the development of self-efficacy, unlike psychological studies emphasizing individual and more proximal variables such as family environment and specifically focusing on the outcome of self-efficacy. Gecas (1989) summarized the

studies specifically focusing on work and occupation, social status, ethnicity, and culture. The details of this literature were reviewed in a later section.

The association between self-efficacy and social structural variables can be explained through the propositions of Bandura's (1986) self-efficacy theory, particularly mastery experiences as a primary source of self-efficacy. Social class and status have critical implications for the opportunities available to individuals to engage in efficacious behaviors. Evidence provided by studies focusing on different occupational status and education levels implies that occupational prestige and level of education are positively related to self-efficacy (Gecas & Seff, 1990; Lewis et al., 1999). These variables, in the workplace, are associated with the amount of work autonomy, flexibility, and job complexity that an individual has. That is, high status individuals have more opportunities to engage in mastery behaviors that would develop their sense of efficacy compared to those with subordinate job positions.

Besides job position and education, social class is also consistently related to a low level of personal control and sense of efficacy. Sennett and Cobb (1972) argued that low social class is related to a greater sense of inefficacy and absence of control in many spheres of life compared to high social class. Because social class is closely related to poverty level, education level, joblessness, poor work conditions, and uncertain employment status, individuals with low social class have a limited opportunity to securely engage in behaviors in which they would like to engage. In contrast, they constantly have to deal with uncertainty and the insecurity of their life conditions. Feelings of uncertainty and insecurity leads to powerlessness, lack of control, and helplessness (Seligman, 1975).

Sociological studies also revealed that ethnicity and culture are related to self-efficacy and perceived control. For example, Lewis and colleagues (1999) found that Black youth have a lower sense of control than White youth, even after controlling for family income, cognitive skills, and education. There is also evidence suggestingthat this low sense of control is independent of the effect of social class (Gurin, Gurin, & Morrison, 1978). That is, the low control beliefs of Black youth may be a result of experiencing (or perceiving) discrimination which is related to limited power, control, and access to resources in society for discriminated minorities (Gecas, 1989).

Finally, cultural teachings have been suggested as a source of efficacy and control beliefs. Cultures and ideologies that encompass fatalistic beliefs may be associated with lower self-efficacy compared to those that emphasize mastery and self-reliance. For example, Mexican-Americans were found to have lower control beliefs than Whites (Mirowsky & Ross, 1983). The authors argued that Mexican culture emphasizes the importance of external control (across social class), leading to a low sense of control and efficacy.

In summary, psychological and sociological perspectives on the development of self-efficacy complement each other. Social cognitive theory posits that mastery is the most critical source of self-efficacy, with early experiences as well as family environment and school having important influences on self-efficacy development. Moreover, availability of role models in the developmental context and positive feedback may enhance efficacy beliefs. On the other hand, sociological perspectives emphasize the impact of social structures, class, ethnicity, and culture through their influences on the opportunities for efficacious mastery behaviors and the life-views of individuals. An

integrative approach that combines both psychological and sociological perspectives in a single model would contribute to our understanding of the multilevel influences on self-efficacy and the mechanisms of influence. Such an ecological model would provide an integrative framework that helps to examine multiple levels of influences and the interaction between these levels.

*Self-Efficacy and Related Variables*

In the following sections, variables related to the self-efficacy of adolescents in particular were reviewed at different ecological levels. These levels are the individual (age, gender, and ethnicity), family, peer, school, and neighborhood. Although school context is also an important developmental ecology for children and adolescents, this study did not include school context (due to lack of appropriate school variables measuring environmental characteristics of school other than students' self-report in the data set utilized).

The review of the literature attempted to cover both psychological and sociological studies. Due to the few number of studies available in some areas, studies on some other self-constructs (e.g., competence, self-concept, self-efficacy) were included where relevant. Moreover, some of the studies were included in the review if they provided information on the variables of interest although their major focus was not that variable, when there was no directly relevant study available.

*Individual Level Variables*

The ecological model places a special emphasis on the characteristics of the person. Certain characteristics have greater influence on the developmental course than others. In particular, gender, and ethnicity are of special importance as these variables

influence both how a person experiences certain environmental conditions and how they are treated during the course of care-giving and interpersonal relations. For example, gender roles, and types and level of expectations for boys and girls show variations at different ages. In addition, parental behaviors and how parents respond to their child's distress differ for boys and girls. For example, a recent study (Sturge-Apple, Davies, Boker, & Cummings, 2004) reported that interparental discord predicted decreased responsiveness of both parents to the distress of boys, whereas responsiveness to girls' distress increased during marital conflicts. Similarly, interparental discord was positively associated with increased use of parental psychological control for boys, but not for girls.

Regarding ethnicity, ethnic origin is one of the most critical predictors of dominant cultural orientation in the family, which has important influences on the outcomes of proximal processes. For example, parenting behaviors, practices, and parent-child interactions, and use of different discipline techniques are influenced by the cultural orientation of parents (Caughy & Franzini, 2005). Also, outcomes of similar parenting strategies and family environments could differ across ethnic groups. For example, paternal harsh discipline predicted adjustment problems of European Americans, whereas marital problems predicted adjustment problems for Mexican Americans (Parke et al., 2004).

The evidence indicates that age, gender, and ethnicity of children and adolescents are important variables that impact both their developmental course and outcome. Therefore, these three variables were selected to include in the PPCT model as personal characteristics.

*Age and Self-Efficacy*

As Bandura (1986) stated, the sense of agency starts developing through mastery experiences at very early ages. These experiences give individuals a sense of control over their environment. However, cognitive appraisals of capabilities and self-beliefs such as self-concept and self-efficacy develop in parallel with cognitive skills. As children grow up, they develop beliefs about their efficacies in various domains (Pajares, 1996).

In general, age has a negative correlation with performance expectations (Schunk & Meece, 2006). Children usually overestimate what they can do, which is partially attributed to lack of adequate mastery experiences. Similarly, children may overestimate their self-efficacy even if the task is difficult for their developmental level (Pajares, 1996; Schunk, 1995). On the other hand, although it is uncommon, children may also underestimate their skills and feel less efficacious (Schunk&Pajares, 2004).

Regarding adolescence, research shows that changes in competence beliefs occur during this period. Several studies using academic or domain specific measures of competence documented that perception of competence starts declining in Grade 7 (Eccles, Wingfield, & Schiefele, 1998; Fredricks & Eccles, 2002). Of note, Fredricks and Eccles (2002) demonstrated that there was a continuous decline in math and sports competence perceptions from 1$^{st}$ to 12$^{th}$ grade for both boys and girls, although there were some gender differences regarding the level and pattern of decline.

As for self-efficacy, studies indicate mixed results. Some studies reported a decline in self efficacyin various domains, whereas other studies documented an increase in math and language self-efficacy over time (Shell, Colvin, Bruning, 1995; Zimmerman

& Martinez-Pons, 1990). Schunk and Meece (2006) argued that these inconsistencies in self-efficacy levels may arise from differences in measurement specificity. They argued that there may be differences in general versus domain-specific self-efficacies, or between domains of self-efficacies. Regarding the decline in competence, the decreasing level of competence may be caused by the increasing importance of social comparison as children and adolescents grow up. Because competence evaluation reflects beliefs regarding relative standing of the self compared to others (Bong & Skaalvik, 2003), the increasing importance of social comparison may result in a decline in perceived competence level (Schunk&Meece, 2006).

Another issue related to age is calibration. Calibration is defined as the overlap between judgments of self-efficacy and actual performance on the accompanying tasks (Schunk & Pajares, 2004). Different self-efficacy domains, and variations across tasks, may influence calibration. Early studies (Bandura& Adams, 1977; Bandura et al., 1977) reported a high calibrations level, as high as 90% or even higher. On the other hand, educational studies focusing on cognitive skill acquisition and task performances that require cognitive effort have found lower percentages (Schunk, 1995). For example, Schunk (1981) reported percentages ranging from 30-85% overlap between students' self-efficacy judgment and performance on mathematics tests.

Schunk and Pajares (2004) discussed three issues related to low calibration among children and adolescents. First, children may tend to overestimate their skills and have difficulty in understanding the level of skill required to perform a task successfully. Second, sociocultural factors may result in boosted self-efficacy judgments. For example, if the social environment encourages an adolescent constantly to master tasks

and provides positive feedback, then the efficacy of the adolescent may increase unrealistically. Finally, because of the nature of the task (e.g. cognitive versus physical), it may become difficult to judge the skill level that is required to perform that task.

In sum, the level of self-efficacy and the association between self-efficacy and performance on a given task may differ based on developmental level. Of note, a recent cross-cultural study comparing adolescents aged 12 to 16 from four countries (Netherlands, Germany, Switzerland, and Czech Republic) reported consistent findings (Peetsma, Hascher, van der Veen, & Roede, 2005). There was a decline in both academic self-concept and self-efficacy over age. More interestingly, the strength of association between self-efficacy and investment in school tasks and school achievement declines as adolescents grow older. Moreover, social and contextual factors may affect calibration as they may influence the level of efficacy in either direction.

The current study explored the association between age and level of domain specific self-efficacies. Consistent with previous findings, older adolescents are expected to have lower self-efficacy beliefs in the domains of school, future, social and family self-efficacies. In contrast, older adolescents are expected to have higher safety self-efficacy than younger adolescents. Because older adolescents are more likely to spend time outside of their home, they are expected to develop higher safety self-efficacy than younger adolescents.

*Gender and Self-Efficacy*

Various studies have found that boys and men feel more competent than girls and women in math, science, and technology (Meece, 1991; Wingfield, Eccles, & Pintrich, 1996) regardless of their skill and actual performance levels. Regarding self-efficacy in

the school context, girls reported lower self-efficacy than boys although they were able to perform as well as boys (Pajares, 1996a; Pajares & Miller, 1994). Pajares(1996b) also found that gifted girls were negatively biased in the appraisal of their self-efficacy.

The relationship between gender and self-efficacy appraisals is confounded by other factors. For example, when achievement level is controlled, gender differences in self-efficacy may disappear (Pajares, 1996). Moreover, Wingfield and colleagues (1996) argued that boys and girls do not respond to self-efficacy instruments in the same way. In general, boys are more self-regulatory, whereas girls tend to be more modest in their responses. That is, the resulting gender differences may simply be due to different response tendencies of boys and girls.

An interesting finding regarding gender differences is that risk and protective factors related to deviant behaviors among adolescent boys and girls may be different. Crosnoe and colleagues (2002) found that different deviant behaviors were related to different sets of protective and risk factors for boys and girls. Thus, outcomes of self-efficacy in a given outcome domain may be expected to differ for boys and girls.

*Ethnicity and Self-Efficacy*

Developmental studies have provided evidence showing the inadequacies of the "one model fits all" approach as it relates to ethnic and cultural groups (e.g., Garcia-Coll et al., 1996). A recent study (Swenson & Prelow, 2005), for example, on African American and European American teenagers' depressive symptoms investigated whether perceived efficacy mediated the relation of ethnic identity and self-esteem with depression. For African American youth, self-efficacy fully mediated the association between ethnic identity and depressive symptoms, and partially mediated the association

between self-esteem and depressive symptoms. On the other hand, this mediation was not found for European-American students. This finding implies that self-efficacy may have differential outcomes and functions for different ethnic and cultural groups.

A review (Graham, 1994) of the studies on competence beliefs of African-American students indicated that African-American students maintained optimism and positive self-regard despite their social and economic disadvantage. Graham stated that self-beliefs of African-Americans are strong even if they experience achievement failure. Moreover, she argued that the self-beliefs of African-Americans are as strong as and often stronger than their White counterparts. Similar findings have been reported with Hispanic-American samples (Stevenson, Chen, & Utal, 1990). In contrast, although some research implies that minorities may have high competence beliefs, there may be differences in domain specific or task specific efficacy beliefs. Some studies documented that African-American students had lower mathematics self-efficacy than Whites (Pajares& Kranzler, 1995), and Hispanic high school students had lower writing self-efficacy than non-Hispanic White students (Pajares & Johnson, 1996). Other domain specific self-efficacies are yet to be studied.

The association between ethnicity and efficacy beliefs warrants ecological examination. It has been long argued that attributing psychological differences to ethnicity provided only a surface, or easy explanation (Ross, 1919). In fact, most of the differences due to ethnicity may be better explained by differences in socioeconomic status and social class. Social class and socioeconomic status may be related to self-beliefs, particularly self-efficacy, due to differences in the opportunities to engage in meaningful efficacious actions, as a result of the adverse conditions that affect people

from low socioeconomic status and class. That is, the lack of opportunities for mastering skills that lead to high efficacy beliefs may hinder the development of self-efficacy among low social class individuals. Hence, the self-efficacy levels of adolescents may be similar among those living in neighborhoods with similar characteristics and from families with similar SES. Specifically, those living in affluent neighborhoods and from high SES families would have higher self-efficacy levels than those living in adverse neighborhoods, controlling for ethnicity.

On the other hand, self-efficacy and ethnicity may be related above and beyond the impact of social class. Gurin and colleagues (1978) reported that Black men had lower self-efficacy than Whites, even after controlling for the effect of social class. They argued that this low self-efficacy may be due to perceived discrimination that is associated with feelings of powerlessness, inability to control one's life, and deprived access to resources. Although this seems to contradict the finding that socioeconomic status is related to self-efficacy, the nature of the relationship between these variables can best be explored through interactional models.

*Family Characteristics and Self-Efficacy*

The impact of parents and family on child and adolescent development has inspired research by both psychologists and sociologists. In general, psychological studies focus on parenting issues and the relationship between parent and child, whereas sociological perspectives tend to be more concerned about family demographic structure, economic status, and parental education. Both lines of research have provided vast amounts of evidence showing both short term and persistent long term effects of parenting and family dynamics on developmental outcomes such as self-esteem, control

beliefs, efficacy, behavioral conduct, mental health, problem behavior, delinquency, and achievement.

Bandura (1997) argued that the initial sources of self-efficacy are connected to the family environment. Parenting practices and overall family climate help children to effectively interact with their environment, which promotes mastery experiences. Parents stimulating their children's curiosity and exploration allow the children to build up mastery based self-efficacy. This association may also be bidirectional; parents of children displaying curiosity may become more responsive parents.

Several studies reported that supportive parenting practices are positively associated with perceived self-efficacy (Juang & Silbereisen, 1999; Swenson & Prelow, 2005). Also, research on parenting styles revealed that authoritative parenting, which is characterized by high responsiveness to child's needs, warmth, and support, and related to a democratic family environment, is linked to positive developmental outcomes for children and adolescents. One of the positive outcomes is high competence in school and social relations (Steinberg, Mounts, Lamborn, & Dornbusch, 1991). Despite the strong consistent effect of parenting styles, there may be variations due to ethnicity, socioeconomic status, and family structure (Cauce, Hannon, & Sargeant, 1992; Steinberg et al., 1991). For example, it was found that authoritative parenting was positively related to GPA, and self-reliance, and negatively related to psychological distress and delinquency among European Americans, whereas it was not related to self-reliance among African-Americans and Hispanics. This finding implies that particular parenting styles may have different developmental outcomes for different ethnic groups.

The parent's role is not limited to structuring the environment of their children. They may also become role models and provide persuasive messages to their children. Although the process is not clear, there is evidence suggesting that overall self-efficacy can be transferred between generations. A dissertation study (Lin, 2003) using a longitudinal multigenerational study sample reported a significant positive association between parental self-efficacy (measured during adolescence) and adolescents' self-efficacy. Educational attainment of the parents was a significant mediating variable, indicating that accomplishments of adults may serve as role models for younger generations.

Parents may also design a family environment that fosters positive developmental outcomes for their children. Belsky(1984) argued that parenting practices such as providing a warm, responsive, and supportive home environment promotes exploration and curiosity for their children, which in turn enhance their intellectual, social, and emotional development. In line with this argument, a study (Whitbeck et al., 1991) examining the direct and indirect consequences of family economic hardship on adolescent self-esteem, reported that economic hardship has a direct, negative influence on parents' support of and involvement with their children. Although there was also a direct negative effect of economic hardship on self-esteem, an indirect effect through parental support and involvement was stronger than the direct influence (for both males and females).

Another important feature of the family environment for adolescent development is conflict. Adolescents growing up in families where there is much conflict and lack of control over interpersonal processes may not be able to develop social skills and a strong

sense of competence(Dancy & Handal, 1984; Formoso, Gonzales, & Aiken, 2000). How family conflict influence adolescents' self-efficacy is yet to be examined.

In summary, family socioeconomic status and parental supportiveness are related to adolescents' self-efficacies. Specifically, high socioeconomic status and parental supportiveness are expected to positively predict adolescents' self-efficacies. On the other hand, family conflict would negatively predict adolescent self-efficacies. Consistent with the propositions of the PPCT model, moderating effects of gender and ethnicity were explored. Regarding context, family socioeconomic status was expected to be more strongly related to self-efficacies for adolescentboys and White adolescents whereas parental support and conflict would be more important predictors for adolescent girls and ethnic minorities.

*Peer Relations and Self-Efficacy*

Affiliation and relations with peers have critical implications for adolescent development. The impact increases as children grow into adolescence because peers become more influential role models than parents (Steinberg & Morris, 2001). Steinberg and colleagues (1996) concluded that peer influence emerges during childhood and reaches its peak at grades 8-9, and then decreases over time. In general, it becomes very critical around the ages of 12 to 16.

Peer influence has impacts on adolescent development, motivation, and performance, especially in academic settings (Schunk & Pajares, 2002). For example, evidence shows that peer group membership at the beginning of the school year significantly predicted children's motivational engagements across the school year (Kinderman, McCollam, & Gibson, 1996). Children engaging in academically oriented

peer groups showed improvement in their academic motivation whereas children with peers who were less academically oriented were influenced negatively. Likewise, observing peers may have influences on children's and adolescents' perception of themselves. Hence, it was found that observing peers who successfully performed problem solving tasks influenced observers' self-efficacies on that domain more than observing teachers performing the same task (Schunk & Hanson, 1985). On the other hand, students who observed teachers outperformed those who had no role model. Although observing peers did not contribute to skills, improvements in self evaluation may be expected to affect behaviors such as task preference, engagement, and perseverance.

Beyond serving as a role model, peers may also function as a source of support. For example, social support received from peers and peer attachment positively predicted the social self-efficacy of adolescents (McFarlane et al., 1995). Similarly, Cauce(1986) found that peer emotional support was associated with school and peer competence among African American adolescents. The evidence suggests that the nature of the role models provided by peers and the quality of peer relations may both impact adolescents' efficacy beliefs in the academic and social domains. Other domains of self-efficacies warrant more scientific attention.

Self-efficacy is not only influenced by peers, but also serves as a protective factor against peers' negative influence (Cappara, Regalia, & Bandura, 2002). Adolescents with higher self-efficacy beliefs for resisting peer pressure have lower antisocial behaviors according to both cross-sectional (Cappara et al., 1998) and longitudinal studies (Cappara et al., 2003). Similarly, perceived efficacy discouraged delinquency by

promoting prosocial behaviors among adolescents (Bandura, Pastorelli, Barbarelli, & Cappara, 1999). Nevertheless, how peer deviance impacts adolescents' self-efficacy is a research question that needs to be explored.

Overall, evidence suggests that peers impact adolescents' self-evaluations and efficacies, and efficacy beliefs may reduce the negative consequences of peer influences. Specifically, peer support is positively related to adolescents' motivation and self-efficacy. Moreover, self-efficacy serves as a protective factor against negative peer influences such as peer pressure. Nevertheless, existing studies fall short in providing evidence for how domain specific self-efficacies are affected and their role as protective factors against negative impacts of peer influences such as delinquency. The current study further explored the association between peer relations and domain specific self-efficacies. It is expected that strong peer support would be positively related to high self-efficacies. On the other hand, delinquency of peers was expected to negatively influence adolescent self-efficacy beliefs.

*Neighborhood Level Influences on Adolescents' Self-Efficacy*

Although psychological studies of self-efficacy tend not to focus on contextual factors such as social structure, neighborhoods, and communities, the theoretical rationale to examine these contextual factors exists. As discussed earlier, mastery experiences and role models are critical sources of self-efficacy according to Social Cognitive Theory. Both sources are strongly related to characteristics of neighborhoods. Sociological approaches posit that economic and structural adversity in a neighborhood bars people from engaging in types of behaviors they would like to enjoy and which would improve their skills and sense of efficacy. Moreover, such environments provide fewer positive

role models, impeding residents' visions and beliefs in their own capacities. For example, in a neighborhood with a high unemployment rate, members of the community would easily accept beliefs regarding the difficulty of finding job. In turn, this cognitive appraisal would be reflected in their self-efficacy beliefs related to earning, financial independence, financial security, and even making future plans. In the academic domain, Bandura (1986) argued that social constraints and inadequate resources may detrimentally influence academic performance, and in turn students may become uncertain about what they can do. Similarly, experiencing social and economic oppression may lead people to believe that no amount of skill and effort would achieve desired outcomes (Schunk & Pajares, 2002).

Social characteristics of a neighborhood may also be linked to self-efficacy development. It has been shown that the existence of multiple role models helps students build self-efficacy in educational environments (Schunk & Hanson, 1985; Schunk, Hanson, & Cox, 1987). The availability of multiple models increases the likelihood of seeing at least one of the models as similar to oneself, which alters self-efficacy beliefs through vicarious reinforcement. It is expected that the number of negative role models in impoverished neighborhoods exceeds the number of such models in affluent neighborhoods. These negative role models could be delinquents, unemployed residents, people having financial difficulties, victims of different crimes, or school drop outs. These neighbors, based on their experience of negative life events and difficulties, may serve as negative role models. Therefore, adolescents in poor neighborhoods may face a greater risk of developing low efficacy beliefs.

Aggregate income, unemployment rates, or number of social welfare recipients within neighborhoods are often used as measures of neighborhood level socioeconomic status (e.g., Boardman & Jason, 2000). Moreover, other neighborhood disadvantages such as demographic structure and crime rates are highly correlated with neighborhood socioeconomic status. Hence, consistent evidence suggests that neighborhoods may have moderate to large impacts on different facets of adolescent development, including but not limited to delinquency, problem behaviors, well-being, parent-adolescent and adolescent-peer relations, and control beliefs (e.g., Brooks-Gunn et al., 1993; Cook et al., 2002; Elliott et al., 1996).

Although evidence indicating pathways of influence of neighborhoods on adolescent efficacy beliefs exists, there isvery limited research to date focusing directly on an adolescent sample. Research examining the effects of spatial concentration of poverty has implications for adolescents' self-efficacy beliefs. For example, studies of youth and adults indicate significant associations between the spatial concentration of poverty and both the political efficacy of the residents (Cohen & Dowson, 1993) and perceived collective self-efficacy (Sampson, Raudenbush, & Earls, 1997). However, these studies did not test the differential effects of individual level and neighborhood levels socioeconomic status on outcomes.

A comprehensive examination of the interplay between individual level and neighborhood level SES requires measuring SES at each level, independent of the other, and testing the effects of each other controlling for the other. Boardman and Jason (2000) studied neighborhood level SES, controlling for the effects of individual level indices of socioeconomic status such as personal income, assets, education, and

employment. Neighborhood level SES variables included in the analyses were percent of the population below poverty level in the neighborhood, unemployment rate, and percent population on public assistance. Unemployment and public assistance rates were significant (inverse) predictors of global self-efficacy, above and beyond the effects of individual level SES variables. These findings signify the role of neighborhood level variables on the self-efficacy of individuals.

Another study (Bolland, Lian, & Formichella, 2005) examining hopelessness among African Americans provides further evidence suggesting the impact of neighborhood characteristics on individual level control beliefs. This study held neighborhood SES constant, through selecting 13 neighborhoods with similar median income levels and poverty rates. Results revealed that neighborhood had a significant impact on hopelessness of adolescents. Because the researchers compared neighborhoods with similar socioeconomic characteristics, differences between neighborhoods are not attributable to socioeconomic differences. On the other hand, this finding indicates the importance of neighborhood ecology independent of the effect of neighborhood socioeconomic characteristics. Although the study design did not allow an examination of the specific characteristics of the neighborhoods that affected hopelessness, one possibility they suggested was the influence of neighborhood physical characteristics such as litter, graffiti, and landscaping, and of different types of social interaction (e.g., hanging out on the street corner).

Evidence supporting this possibility comes from Sampson and Raudenbush (1999). They used a systematic social observation method they developed to measure both physical and social disorder at the neighborhood level. Their findings showed that

collective self-efficacy was negatively associated with both physical and social disorder. Collective self-efficacy was both conceptualized and measured independent of individual level self-efficacy. Therefore, the findings of the study only suggest, and cannot directly indicate possible links between physical and social characteristics of neighborhoods and individual level domain specific self-efficacies.

Another study with implications for the possible link between neighborhood characteristics and individual level self-efficacies examined participants of a housing program using qualitative methods (Rosenbaum, Reynolds, & Deluca, 2002). Inner city, low income African-Americans were randomly assigned to housing facilities in neighborhoods of middle to higher socioeconomic status. In-depth interviews with the participants revealed that those moving to better neighborhoods developed higher self-efficacy. In depth inquiry of the possible sources of this observed empowerment led the authors to conclude that the increases in self-efficacy could be due to the changes in both structural and social aspects of their new neighborhood. For example, participants reported greater control in their relationships with their neighbors and block managements as well as increased feelings of security in their new neighborhoods.

Overall, existing evidence implies a possible link between adolescent self-efficacy and neighborhood characteristics. However, these studies are far from providing direct, convincing evidence regarding this link. Moreover, each study focused on a particular set of neighborhood characteristics (e.g., neighborhood level SES, poverty concentration). The interplay between different neighborhood characteristics warrants a comprehensive analysis of the differential effects and the interaction between multiple ecological levels of influence. Ideally, these influences can be better understood if the

models include individual, peer, family, and neighborhood level influences, especially when studying adolescent populations. The current study attempted to examine the magnitude of influences and interplay between these different levels of influences on the development of adolescent self-efficacies. It was hypothesized that adverse physical and social characteristics of neighborhoods and living in low income neighborhoods would have a negative influence on adolescents' self-efficacies.The current study also exploredhow neighborhood influence differs across ethnic groups.

# Chapter 3

## Neighborhood Effects on Adolescent Outcomes:Mediating Roles of Self-Efficacy

Social science researchers have increasingly become interested in neighborhood influences in recent decades. First, Bronfenbrenner's(1979a; 1979b; 1995; Bronfenbrenner, Moen, & Garbarino, 1984) ecological theory helped social scientists to appreciate the importance of developmental context and its multilayered, integrated, and dynamic nature. As a result, developmental psychologists started paying greater attention to multilayered contexts that are nested within each other, from the proximal developmental environment (child-parent interaction) to the larger community and neighborhood. Furthermore, Wilson's (1987; 1997) seminal works on the influence of inner-city poverty on male joblessness in inner-city neighborhoods persuaded sociologiststo focus on concentrated neighborhood economic adversity and its influences on human well-being.

The restructuring of US cities and the economy in 1980s was another impetus for social scientists to study inner-city neighborhoods, due to increased government attention and federal policy implications(Duncan & Raudenbush, 2000; Ellen & Turner, 1997). As a result, most early studies focused on economic indicatorswithin neighborhoods such as median income, rate of unemployment, and social welfare dependency. Eventually, new approaches to neighborhood effects such as social disorganization theory (Sampson & Groves, 1989)and development of observational techniques to measure social and physical qualities of neighborhoods (Sampson, Morenoff, & Gannon-Rowley, 2002) further expanded theory and empirical research of neighborhood effects on human development and well being.

*Models of Neighborhood Influence*

There have been various theoretical approaches that guided research on neighborhood effects on human development and behavior. Jencks and Mayer's (1990) comprehensive chapter provides a good review of the influential theoretical perspectives: epidemic models, collective socialization models, and institutional models.

First, epidemic models of neighborhood influence emphasize peers' influence on each others' behaviors. It is assumed that children learn behavioral patterns within the context of their neighborhoods. When most other individuals display problem behaviors, one can easily learn that pattern and become involved in similar problem behaviors such as violent offenses, drug use, or criminal acts. In contrast, growing up in a high quality neighborhood where people mostly are involved in socially appropriate behaviors and follow social norms and laws, children would learn these behavioral patterns and eventually grow up as "good" citizens.

Second, collective socialization models emphasize the influence of adults on young individuals' development. According to this approach, adults living in the community serve as role models to children and youth, and thus their characteristics would influence youth's behavior and developmental outcomes. For example, affluent and employed adults act as role models who teach children and youth about the possibility of success. Conversely, in neighborhoods with high rates of unemployment, adult role models would lead children to feel hopeless about their future. Similar influences occur for socially accepted behaviors and problem behaviors(e.g. Wilson, 1987, 1997).

Third, institutional models also emphasize the importance of adults, but in this case those from outside of the community, especially the service providers such as police, teachers, and those working for other neighborhood organizations. The attributes of the adults providing services reflectsthe quality of the service at those institutions. For example, low quality teachers teaching at poor neighborhood schools influence academic development and thus, future career trajectories of children(e.g., Rivkin, Hanushek, & Kain, 2005). Likewise, police in poor and high crime neighborhoods treat youth in a different way than youth from affluent neighborhoods(e.g., Smith, 1986). This treatment disparity may affect criminal records of youth.

Despite theoretical distinctions, Jencks and Mayer (1990) argued that all three of these approaches lead to similar predictions. For example, student underachievement at a school in a disadvantaged neighborhood can be explained by the existence of underachieving peers (epidemic model), or high rates of school drop-outs and unemployed people in the neighborhood that would devalue educational outcomes (collective socialization model), or teachers' low skills and low expectations of achievement from students (institutional model).Gephart(1997)has reviewed some other neighborhood influence models such as social comparison, social disorganization, and economic choice, which were not be included in the current review.

Differentiating between the varied pathways of neighborhood effects can be very difficult in empirical studies. Hence, Jencks and Mayer (1990) posited that researchers' values and ideology often determine their perspective on how neighborhoods influence individual outcomes. The purpose of the current study was not to differentiate between these models, or promote one perspective over the others. However, severalmediators of

neighborhood influence on psychological and behavioral outcomes for adolescents were examined.

The current study examined self-efficacy as an individual level variable that mediates the effects of neighborhood, family, and peers on adolescent developmental outcomes. The model suggests the role of self-efficacy as a mediator between neighborhood, family, and peers and developmental outcomes,consistent with current empirical evidence.Direct neighborhood influences on family and interpersonal processes were notexamined because these relationships are beyond the focus on the current study.

In the following section, the association between neighborhood characteristics and adolescent developmental outcomes were reviewed. Next, the literature on the link between self-efficacy and developmental outcomes were discussed.

*Neighborhood Characteristics and Developmental Outcomes*

Adolescents living in disadvantaged neighborhoods are exposed to problems of social disorganization and deteriorated physical structures, including crime, drug use, violence, noise, physical hazards, vandalism, and graffiti (LaGrange, Ferraro, & Supanic, 1992). All these factors are associated with heightened fear and anxiety, which may lead to psychological and behavioral problems. Studies on neighborhood effects provide evidence for the influence of community and neighborhood level variables on a variety of child and adolescent outcomes (e.g., Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Leventhal & Brooks-Gunn, 2000; Wheaton & Clarke, 2003; Wickrama, Noh, & Bryant, 2005). These outcomes range from mental health problems such as depression, anxiety, and internalizing problems to behavioral problems like substance use, externalizing problems, and delinquency. Some of the studies (e.g., Wheaton & Clarke, 2003;

Wickrama & Bryant, 2003) also showed that neighborhood poverty and neighborhood disadvantages may have influences beyond family structure and processes, and individual characteristics. Finally, extant literature suggests that stress factors in communities and ambient hazards may result in psychological distress, chronic fear, feelings of powerlessness, and hopelessness (e.g., Aneshensel & Sucoff, 1996; Boardman & Robert, 2000; Wickrama, Noh et al., 2005).

The following brief overview of neighborhood effects encompasses studies on the association between neighborhood characteristics and adolescent mental and behavioral outcomes, namely depression, anxiety, substance use, and delinquency. An extensive review of the literature as well as a discussion of theoretical and methodological issues are available elsewhere (e.g., Booth & Crouter, 2000; Brooks-Gunn, Duncan, & Aber, 1997a; Gephart, 1997; Leventhal & Brooks-Gunn, 2000; Sampson et al., 2002).

*Neighborhood Characteristics, Depression and Anxiety*

The increased number of challenging developmental tasks during adolescence make this period more stressful for youth, especially for those who lack protective factors and a supportive environment (e.g., Fergus & Zimmerman, 2005; Ferguson & Horwood, 2003). For example, adolescents become more vulnerable to family economic hardship during their transition from childhood to adolescence(e.g., Fergus & Zimmerman, 2005; Ferguson & Horwood, 2003; Halpern-Felsher et al., 1997). Likewise, children and adolescents are highly susceptible to neighborhood and community adversities (e.g., Aneshensel & Sucoff, 1996; Boardman & Robert, 2000; Wickrama, Noh et al., 2005). One of the negative developmental outcomes of adverse neighborhoods is adolescent distress and depression.

The studies on the relationships between neighborhood adversity and adolescents' psychological symptoms such as depression and anxiety have examined the effects of different sets of neighborhood variables, and used various research designs including surveys and quasi-experiments. For example, a survey study (Aneshensel & Sucoff, 1996) on a community based sample of Los Angeles County youth examined the association between neighborhood context and adolescent mental health indicators such as depression, anxiety, oppositional defiant disorder, and conduct disorder. The results revealed that both objective (neighborhood SES and race/ethnicity) and perceived (perceived ambient hazards and social cohesion) characteristics of the neighborhoods significantly predicted psychological symptoms.

Although these type of studies are correlational and do not infer causality, consistent findings across various studies on different samples support the conclusion of the extant literature regarding the persistent effects of neighborhood characteristics on psychological well-being. Moreover, using strict control of other factors that are related to the outcomes of interest improve statistical conclusions. For instance, a recent study (Wickrama, Noh et al., 2005) examined adolescent distress in the face of family and community adversities for African American and White adolescents. The results revealed that community poverty was positively associated with depressive symptoms after controlling for the effects of ethnicity, gender, family structure, family poverty, and size.

The number of experimental studies related to neighborhood effects is very few due to practical difficultiesand ethical issuesrelated to random assignment of individuals to different neighborhoods. The Moving to Opportunity Program, a randomized

controlled trial for people living in high-poverty neighborhoods, offers the rare opportunity for experimental investigation of changes in residential environments (Goering & Feins, 2003). Leventhal and Brooks-Gunn(2003)studied the effects of moving to low-poverty neighborhoods on the mental health of adults and youth who participated in the program in New York. The results indicated that both parents and children who moved into low-poverty neighborhoods showed fewer symptoms than those who stayed in low-income neighborhoods. Despite the positive effects of moving into low-poverty neighborhoods on the mental health of parents and youth, the study did not find any effect on parents' employment, welfare receipt, household income, and per-person income. Therefore, the improvement in mental health outcomes cannot be attributed to changes in family income and SES, which implies the robust impact of neighborhood quality on mental health.

*Neighborhood Characteristics and Substance Use*

Although neighborhood influence on various outcomes has generally been extensively studied, substance use has been one of the least studied behaviors. However, existing literature providessome evidence for a link between neighborhood adversity and substance use among adolescents. For example, greater drug involvement was observed in a majority White adolescent sample who were living in socially less cohesive neighborhoods (Brooks, Nomura, & Cohen, 1989). On the other hand, Ennettand colleagues (1997) reported that population density and residential mobility were related to less cigarette and alcohol use. This study did not report the ethnic differences in the association between neighborhood and substance use; therefore, it is not possible to generalize the results to all ethnic groups. Indeed, epidemiological studies consistently

show that African American adolescents – who are more likely to live in high density and unstable neighborhoods – consume less alcohol and smoke fewer cigarettes than their Caucasian counterparts (Felton et al., 1999). Looking at the interaction between ethnicity/race and neighborhood characteristics could provide a detailed understanding of neighborhood effects on these behaviors.

There are two lines of studies on the relationship between neighborhood characteristics and adolescent substance use. Both types of research provide evidence for a significant association and the presence of some mediating factors. For example, a recent study (Chuang, Ennett, Bauman, & Foshee, 2005)on a national sample of adolescents 12 to 14 years of age revealed that parental monitoring and peer drinking mediate the relationship between neighborhood SES and adolescent substance use. Specifically, high parental monitoring in low income neighborhoods was associated with less smoking among adolescents. On the other hand, high peer substance use in low income neighborhoods was associated with more drinking by adolescents.

Studies on perceived neighborhood characteristics revealed similar findings. Wilson and colleagues (2005), for example, reported that adolescents' perception of neighborhood disorder was related to adolescents' substance use. The more the adolescents perceived neighborhood disorder, the more they used alcohol, tobacco, and marijuana. Similarly, Lambert et al. (2004)found a strong association between adolescents' perception of neighborhood disorganization (violence, safety, drug activity) and increased smoking, alcohol and marijuana use among African American youth.

*Neighborhood Characteristics and Delinquency*

Extant literature provides evidence for an association between various neighborhood characteristics and delinquent acts of adolescents (e.g., Coulton & Pandey, 1992; Peeples & Loeber, 1994; Sampson, 1997; Sampson & Groves, 1989). One line of research focused on neighborhood socioeconomic status. Peeples and Loeber(1994), for example,examined the predictors of adolescent delinquency and problem behaviors in underclass and non-underclass neighborhoods of Pittsburg. After using strict statistical controls for behavioral hyperactivity and parental supervision, adolescents residing in underclass neighborhoods were found to be more involved in delinquent acts. This association was independent of ethnicity, indicating adverseoutcomes of residence in underclass neighborhoods for adolescents across different ethnic groups. Finally, residence in underclass neighborhoods not only predicted frequency of delinquency, but also predicted the severity of delinquent behaviors.

Another neighborhood characteristic that is related to adolescent delinquency is neighborhood poverty. A comprehensive study (Coulton & Pandey, 1992)on a sample derived from 187 census tracts in Cleveland tested the association between the geographic distribution of poverty and adolescent outcomes. The results indicated that adolescents from neighborhoods with high levels of poverty and population decline were more likely to be involved in delinquent behaviors. Crime rates in the neighborhoods and substandard housing were also positively associated with juvenile delinquency. Another finding of the study was thatneighborhoods with a long history of high poverty and those closer to the center of the city had slightly higher risk for adolescent delinquency than

other high poverty neighborhoods, implying the detrimental effects of concentrated long term poverty in certain geographical areas.

Social disorganization of neighborhoods has been hypothesized to be linked to neighborhood crime. Consistently, Sampson and Groves(1989) examined neighborhood characteristics that are associated with neighborhood disorganization and their effects on crime and delinquency rates. The results indicated that neighborhood SES, ethnic heterogeneity, and residential stability were negatively, and urbanization positively associated with crime and delinquency. In addition to social disorganization, social characteristics of neighborhoods are also related to adolescent delinquency. Rankin and Quane(2002), in a study on adolescent outcomes in 62 Chicago neighborhoods, found that parental monitoring moderated the effect of neighborhood on delinquency. Specifically, in neighborhoods where collective efficacy was low, low parental monitoring was more strongly associated with high levels of delinquent behaviors than in neighborhoods with high collective efficacy.When parental monitoring was high, there was no effect of neighborhood characteristics on adolescent delinquency.

Overall, the extant literature provides evidence for a link between various neighborhood characteristics and depression, substance use, and delinquency. Moreover, evidence suggests that peers and parental characteristics may have either mediating or moderating roles, indicating the complex nature of neighborhood effects. Further research is necessary to contribute to a comprehensive understanding of the dynamic interrelationships between neighborhood and other factors such as individual, peer, and family characteristics.

*Relationship between Self-Efficacy andPsychological and Behavioral Outcomes*

Theories on psychological health agree on the importance of control beliefs. A strong sense of control over our behaviors, environment, and our own thoughts is one of the critical indicators of psychological health (Maddux & Lewis, 1995). When the world is predictable, and behaviors, thoughts, and emotions are controllable, people are more likely to effectively deal with life challenges and stressors, establish healthy relationships, and achieve personal satisfaction. Although sense of control, competence, and efficacy feelings do not ensure good psychological health, individuals' adjustment becomes difficult in their absence. Therefore, self-efficacy beliefs became a topic of interest in studies on adjustment and healthy functioning, including studies of substance use, offending, delinquency, depression, and aggression. Extant research has shown that an important feature of depression is low self-efficacy beliefs (Maddux & Meier, 1995). Evidence also exists showing an association between self-efficacy and specific fears (Bandura, 1986), social and interpersonal anxiety (Maddux, Norton, & Leary, 1988), and substance abuse (DiClemente, Fairhurst, & Piotrowski, 1995).

Maddux and Lewis (1995) outlined three pathways of influence explaining how self-efficacy affects adjustment and adaptation. These are 1) goal-setting and persistence, 2) cognitive efficiency, and 3) emotional efficiency.

Consistent with the original propositions of self-efficacy theory (Bandura, 1977b, 1986), people with a strong sense of self-efficacy are more likely to set challenging goals and persist toward those goals. Additionally, a strong sense of efficacy leads people to persist in the face of challenges to accomplishmentof their goals. Therefore, individuals with a strong sense of efficacy are more likely to achieve and show persistence,

regardless of their actual skill level (Bandura, 1997; Schunk & Pajares, 2004). Task persistence as a result of high self-efficacy may be more significant for youth who live in adverse neighborhoods and have limited resources such as role models and support than youth with more resources and support.

A second pathway of influence is cognitive efficiency. It has been suggested that people with stronger efficacy beliefs are more efficient in using their cognitive skills. Hence, experimental studies (Bandura & Wood, 1989; Wood & Bandura, 1989) found that those with stronger efficacy beliefs used their cognitive resources more effectively than those who doubted their cognitive abilities. One important difference between the two groups wasthat people with strong self-efficacy beliefs remained focused on the task in the face of obstacles, whereas those with low efficacy beliefs become self-focused and critical regarding their qualifications. This finding suggests that people with high efficacy beliefs may be better able to negotiate environmental challenges and make better decisions. Such skills may be highly critical when smoking anddrug and alcohol use are encouragedas a result of peer pressure and peer-group norms.

Maddux and Lewis (1995) also suggest that emotional adaptivenessprovides a significant pathway to better adjustment outcomes. They argue that people with strong self-efficacy beliefs may handle stress provoking and threatening situations without debilitating anxiety. On the other hand, low efficacy beliefs and feelings of inefficiency may elevate stress and anxiety in difficult situations. Therefore, people with low self-efficacy may be more likely to show anxiety and depressive symptoms.

Below, a brief review of the extant literature is presented that providesempirical evidence of covariation between self-efficacy and depression, anxiety, substance use, and

delinquency. A representative selection of studies from the larger literature are included in this brief overview.

*Self-Efficacy and Depressive Symptoms*

There are various definitions of depression in the literature. One approach posits that depression is a mood that may be experienced to varying degrees and observed among most people (Maddux & Meier, 1995). On the other hand, depression is also defined as a mood disorder or a clinical problem that is displayed by a small segment of the population. Most studies on normal populationsemploy the first approach while the latter definition is widely used in studies on clinical samples. In the following sections, depression is used to refer to the mood and symptoms that are experienced by most people to varying degrees.

Despite the theoretical link between self-efficacy beliefs and depression, this area of research has received limited attention. Self-efficacy evaluations are beliefs that are concerned with self-devaluations, coping inability, and initiation and persistence of coping behaviors, all of which are central to an understanding of depression (Maddux & Meier, 1995). Bandura(1992) suggested at least three different pathways of self-efficacy influence on depression. The first pathway concerns the compatibility of the standards of achievement and efficacy beliefs. Individuals may feel depressed when they believe that they lack the skills to achieve a goal. Second, lack of social efficacy may impede people's ability to develop satisfying and supportive social relationships. Third, people with low self-efficacy may feel unable to control disturbing depressive thoughts. These three pathways may be highly influential, especially when outcome expectancy is high and the outcome is valued (Bandura, 1986; Maddux & Meier, 1995).

Although there is limited evidence to infer causal links between self-efficacy and depression, there is consistent evidence that shows the covariation between these two constructs (for a comprehensive review, see Maddux & Meier, 1995). For example, Devins et al. (1982) examined how self-efficacy and outcome expectancy predicted depression among patients with end-stage renal disease. Consistent with an early assumption of Bandura(1977b), Devins et al. (1982) found that self-efficacy and outcome expectancy independently predicted depression levels of the patients. A limitation of this study is that they used a global self-efficacy measure; a domain specific self-efficacy measure might prove a better predictor of depression, in line with methodological concerns(Bandura, 2006b).

Bandura and colleagues (1996)tested the mediating role of self-efficacy in predicting academic achievement among high school students. Although the major focus was not examining the association between self-efficacy and depression, this study provided evidence regarding the link between these constructs in a normal adolescent population. The test of structural models reveled that both academic self-efficacy ($\beta$ = -.23) and social self-efficacy ($\beta$ = -.22) negatively predicted depressive symptoms, controlling for the effects of various individual and family level variables. In sum, the extant literature suggests that self-efficacy is negatively related to depressive symptoms both in clinical and normal samples.

*Self-Efficacy and Anxiety*

In his very early writings, Bandura(1977b) suggested that increasing people's self-efficacy beliefs regarding certain anxiety provoking situations (e.g., phobia) may result in behavioral and psychological change. This argument for a causal relation

between self-efficacy and anxiety has been supported by findings from clinical experiments (e.g., Bandura, 1977b, 1997; Williams & Zane, 1989).

According to self-efficacy theory (Bandura, 1977b, 1986),perceived threat is a function of the ratio between appraisal of possible danger and one's perceived self-efficacy. That is, people with low self-efficacy may perceive a situation more threatening and feel higher levels of anxiety than those with strong self-efficacy. Hence, evidence indicates that people respond to the same situation with lower anxiety as their efficacy is increased through therapeutic intervention (Williams, 1995). Moreover, increasing self-efficacy was not only associated with emotional reactions, but also highly related to behavioral change.

*Self-Efficacy and Substance Use*

The association between self-efficacy and substance use has been a widely explored topic in the area of efficacy research. Most research in this area has focused on treatment-related efficacies. DiClemente and colleagues (1995) listed five types of efficacies revealed by existing studies in relation to individuals' response to treatment and recovery from addictive behaviors. These are coping self-efficacy, treatment behavior self-efficacy, recovery self-efficacy, control self-efficacy, and abstinence self-efficacy. The extant literature has provided support for the predictive power of these self-efficacy beliefs on respective behaviors. For example, abstinence self-efficacy was found to be a better predictor of smoking abstinence than past smoking behavior (DiClemente, 1981). Likewise, post-treatment control efficacy was related to relapse events, average daily drinking, and post-treatment abstinence among people who had undergone alcoholism treatment (DiClemente et al., 1995).

Despite numerous studies on the effects of self-efficacy on treatment outcomes, there is a dearth of research examining the association between self-efficacy and initiation of addictive behaviors. However, existing theory suggests possible links. Shiffman and Wills (1985) suggest that addictive behaviors initially emerge as a coping response and provide temporary relief, but then ultimately become maladaptive. People with adaptive coping skills would be less likely to choose such maladaptive, temporary solutions in response to stressful events and environments. That is, individuals with strong self-efficacy beliefs may be less likely to develop addictive behaviors, even though the environment exposes them to risk factors. Moreover, they would be more likely to control their behaviors and therefore, their substance use may be lower than those with low self-efficacy beliefs.

*Self-Efficacy and Delinquency*

Self-efficacy beliefs, by definition, are directly linked to decision making in certain conditions (Bandura, 1986). For example, control self-efficacy may facilitate avoidance of risky behaviors. Therefore, self-efficacy evaluations may indirectly affect delinquent behaviors. Adolescents who have stronger control or social self-efficacies may be less likely to become involved in behaviors that are risky, socially unacceptable, and delinquent. Several studies have provided evidence for the expected relationship between self-efficacy evaluations and delinquent acts.

Ludwing and Pittman (1999) examined the relationship between adolescent self-efficacy and delinquency, risky sexual behavior, and drug use. They found that adolescents' global self-efficacy beliefs negatively predicted all three respective problem behaviors. Self-efficacy negatively predicted delinquent behaviors,controlling for

demographics (e.g., age, ethnicity, and gender) and other psychological variables (e.g.,prosocial values and trustworthiness). Moreover, the negative association between self-efficacy and delinquency was higher for African Americans than it was for Caucasians.

A recent study (Sharkey, 2006) examined the association between street-efficacyand its sources and consequences, using a longitudinal design. Street-efficacy was defined as "the perceived ability to avoid violentconfrontations and to be safe in one's neighborhood" (Sharkey, 2006, p. 826). The results revealed that street-efficacy negatively predicted involvement in violent behaviors at Time 2 across different neighborhoods, after controlling for personal characteristics, family characteristics, and previous violent behaviors measured at Time 1.

Despite the absence of evidence indicating a causal link, theory and empirical evidence suggest a relationship between self-efficacy and problem behaviors and delinquent acts. Further investigation of this link for different groups and in neighborhoods with varying characteristics is necessary to expand our understanding of this link and possible mechanisms of influence.

*Measurement of Neighborhood Characteristics*

Neighborhood and communities serves as immediate social contexts in which individuals and families maintain their daily routine, interact with each other, and engage with institutions within their environments (Gephart, 1997). Conceptual and empirical definitions of neighborhood emphasize geographic boundaries. In general, neighborhoods are thought of as spatial units, associational networks, and perceived environments (Gephart, 1997). Due to the lack of robust theoretical propositions

regarding "important" characteristics of neighborhood context and technical difficulties in obtaining comprehensive measures, there is a wide array of conceptual definitions for neighborhood and community, mostly depending on the variable measured. Blocks, block groups (Case & Katz, 1991), zip codes (Brooks-Gunn et al., 1993), census-tracts (Peeples & Loeber, 1994), or census neighborhoods (Crane, 1991) have been used to define neighborhoods in various studies. Variables such as poverty rates, rate of low income families, male joblessness, female-headed families, welfare receipts, residential stability, college graduates, high-school dropouts, family income, community SES, segregation, ethnic/racial heterogeneity, and public housing are some of the variables measured to represent neighborhood social and demographic characteristics. In most cases, the selection of these variables was determined by the availability of the measure and the type of data set being used (Duncan, Connell, & Klebanov, 1997; Gephart, 1997).

Gephart(1997) argued that the strongest association between neighborhood and individual outcomes emerges when multifaceted measures of neighborhoods are used. She recommended using both objective measures and perceived characteristics of neighborhoods such as norms, barriers, dangers, controls, and pressures. Consistent with this argument, an innovative technique developed to measure neighborhood characteristics on both physical and social dimensions is systematic social observation (Sampson et al., 2002; Sampson & Raudenbush, 1999).

Systematic social observation is a highly standardized observation of blocks in terms of their physical and social characteristics (Sampson & Raudenbush, 1999). This measurement was developed to capture physical and social disorder in neighborhoods. Indicators of physical disorder include presence or absence of cigarette butts, garbage,

empty beer or liquor bottles, and graffiti whereas indicators of social disorder are presence or absence of adults, loitering, public drinking, adults fighting, and prostitution. In addition to these two dimensions, systematic social observations can be used to develop measures for the condition of housing units and alcohol and tobacco influence in neighborhoods.

Sampson and Raudenbush(1999) described the theoretical rationale of systematic social observation as well as its development and procedures for coding of observations. They also provided reliability and validity data. For example, social and physical disorder scores obtained from systematic social observation are significantly predicted by various neighborhood characteristics such as concentrated disadvantage, immigrant concentration, mixed land use, and collective efficacy. Perceptions of neighborhood residents and crime rate were also among the significant predictors of physical and social disorder. In sum, systematic social observations introduce a valid neighborhood-level measurement independent of any other individual level measurements.

Although the link between physical and social disorder and neighborhood crime is well established (e.g., Sampson & Raudenbush, 1999), further study is needed to examine the impact of neighborhood level disorder on adolescent psychological and behavioral outcomes. Moreover, exploring mediating factors may contribute to our understanding of the possible mechanisms of influence of neighborhoods on individual level developmental outcomes. Empirical examination of these underlying mechanisms may have important implications for prevention, promotion, and empowerment efforts.

*Limitations of the Current Literature*

Several reviews of the extant literature on neighborhood effects have concluded that neighborhood characteristics have impact on child and adolescent developmental outcomes (Gephart, 1997; Jencks & Mayer, 1990; Leventhal & Brooks-Gunn, 2000). Nevertheless, there are certain limitations of studies to date. First of all, there is a lack of consistency in the conceptual and empirical definition of neighborhood, as well as in measurement of its characteristics (Duncan et al., 1997). For example, Leventhal and Brooks-Gunn (2000), in their state of the art review, concluded that one of the most consistent findings was the importance of high SES neighborhoods for achievement, and low SES and residential instability for behavioral and emotional outcomes of children. In contrast, Sampson and Raudenbush(1999), pioneers of current neighborhood studies, found that residential stability and population density were not related to physical and social disorder,which raises questions about the validity of residential instability as a neighborhood adversity indicator. Such contradictory findings,along with arbitrary selection of variables to represent neighborhood characteristics are major problems of research to date, especially in terms of suggesting policy applications to enhance developmental outcomes of children and neighborhoods. Therefore, studies that combine various measurement perspectives are needed to further understanding of the effects of neighborhoods and to develop concrete findings that may influence policy development.

A second problem is that there is a lack of studies examining mediating processes that may uncover the underlying mechanisms of neighborhood influence (Leventhal & Brooks-Gunn, 2000). Most studies examine direct neighborhood influences on child and adolescent developmental outcomes. In their review, Leventhal and Brooks-Gunn (2000)

suggested that two mechanisms of influence are critical: norms/collective efficacy, and the role of relationships. For example, relationships with peers and peer delinquency have emerged as important mediators of neighborhood effects on adolescent delinquency. Sampson and Raudenbush(1997) found that collective self-efficacy also mediated the relationship between concentrated poverty and community rates of crime. Nevertheless, evidence is lacking regarding other mediating factors, such as individual self-efficacy beliefs.

Extant literature reviewed in the previous sections revealed evidence of a relationship between neighborhood characteristics and self efficacy, and in turn, the impact of self-efficacy beliefs on psychological and behavioral outcomes. Moreover, Social Cognitive Theory (Bandura, 1986, 1989b) suggests possible links between developmental contexts such as neighborhoods and the development of self-efficacy beliefs. Nevertheless, there is a dearth of studies testing the mediating effects of self-efficacy. The current study aims fill this gap in the literature, and potentially provide an additional mechanism of neighborhood influence on adolescent developmental outcomes.

## Overview of the Current Studies and Hypotheses

Overall, both psychological and sociological studies provide a significant amount of evidence regarding the association between self-efficacy and several individual, process, and contextual variables, as well as an association between neighborhood characteristics and adolescent developmental outcomes, and a possible mediating role of self-efficacy. The four levels of variables related to self-efficacy beliefs that were reviewed above were individual (age, gender, and ethnicity), family, peer, and neighborhood. First of all, age, gender, and ethnicity are among the individual level variables found to be associated with the self-efficacy of adolescents. Nevertheless, to date, no study has examined the association between these variables and domain specific self-efficacies. Second, parental influences on adolescent competence and self-efficacy have been reported by several studies. Specifically, family structure, socioeconomic status, and parental warmth and supportiveness are associated with adolescents' competence and self-efficacy beliefs. Third, peers both serve as role models and provide support that has implications for the development of adolescent self-efficacy beliefs. Support from peers and peers' orientation (e.g., deviance) have impacts on both adolescent self-efficacy beliefs and behavioral outcomes (e.g., substance use, delinquency). Finally, certain neighborhood characteristics (e.g., neighborhood socioeconomic status, unemployment rate, poverty, crime) have been reported as critical variables related to youth and adults' competence and self-efficacy, as well as collective self-efficacy.

To date, no study explicitly focused on how neighborhoods influence adolescents' self-efficacies in different domains. Moreover, there is a lack of research examining

multilevel influences on self-efficacy beliefs of adolescents. The current study explored direct, indirect, and moderating effects of different levels of variables on adolescents' domain specific self-efficacies. Bronfenbrenner's process-person-context-time model provided a general framework for design, generating hypothesis, and data analysis.

The review of the literature also revealed evidence for an association between several neighborhood characteristics and adolescent developmental outcomes, and the role of self-efficacy on adolescent developmental outcomes. Despite the consistency of the findings across studies, this literature has certain limitations, such as primarily focusing on direct relationships. The ecological model suggests that direct associations provide an incomplete understanding regarding human development. Rather, course and outcomes of developmentare best examined through focusing on the dynamic interactions between the process, person, and context. Therefore, research focusing on human development should integrate factors at different levels that may influence individual level outcomes for a comprehensive understanding of human behavior and development.

Informed by Bronfenbrenner's(1979a; 1995) ecological theory and process-person-context model, Figure 2 depicts the conceptual and analytical framework adopted for the current study, to examine 1) factors influencing adolescents' domain specific self-efficacy beliefs, and 2) the mediating role of self-efficacy on the association between neighborhood characteristics and adolescent outcomes. This model is also based in part on the conceptual model proposed by the Social Science Research Council that led to a series of empirical examinations of neighborhood effects on child development published in the edited volumes by Brooks-Gunn, Duncan, and Aber(1997a; 1997b). A detailed

description of the original conceptual framework is discussed by Aber and colleagues (1997).

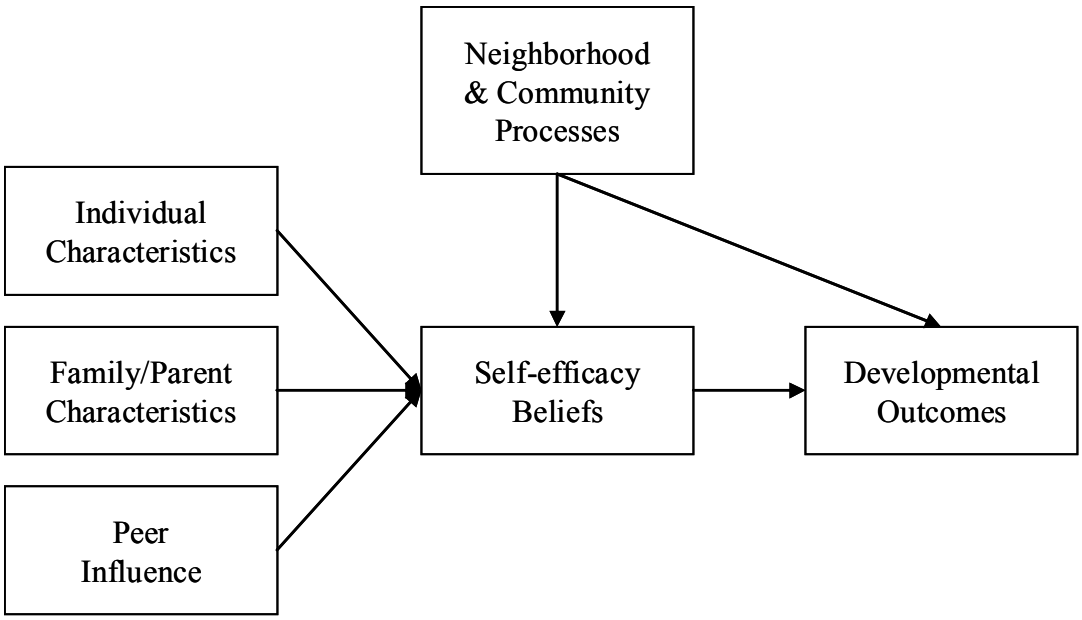


Figure 2: The conceptual model.

The present research provides a multidimensional, multilevel analysis of adolescents' self-efficacy beliefs and the role of self-efficacy as a mediator of adolescent psychological and behavioral developmental outcomes. This goal was accomplished in three consecutive studies as outlined below.

*Study I: Structure of Adolescents' Self-Efficacy Beliefs*

The first study was an examination of the psychometric qualities and structure of a multidimensional self-efficacy measure. Confirmatory factor analysis was used to test the multidimensional structure of the measure. The model fit of a theoretical model (fourinterrelated factors: academic, future, home,and neighborhood/safety) was compared to three alternative models: a one factor model, a four independent factors model, and a hierarchical (second order factor) model.

*Study II: Predictors of Adolescents' Self-Efficacy Beliefs*

The second study focused on the multilevel predictors of adolescent self-efficacy beliefs. A number of specific hypotheses were tested regarding the effect of each level of variable (individual, family, peer, and neighborhood) on adolescents' self-efficacy beliefs.All hypotheses but one predicted general associations between the predictor variables and self-efficacy (That is, the hypothesized relationships were expected to be found for all four self-efficacy domains). In one case, where relevant research evidence was available, domain specific hypothesis was tested. The hypothesized associations are depicted in Figure 3.

At the neighborhood level, three specific hypotheses were tested regarding the effects of neighborhood adversity on self-efficacy. Neighborhood adversity refers to neighborhood socioeconomic status (SES), physical disorganization and social disorganization of neighborhood.

Hypothesis 1: Neighborhood SESwouldpositively predict adolescents' self-efficacy beliefs.

Hypothesis 2: Physical disorganization of the neighborhoods would negatively predict adolescents' self-efficacy beliefs.

Hypothesis 3: Social disorganization of the neighborhoods would negatively predict adolescents' self-efficacy beliefs.

There are four specific hypotheses regarding individual level variables. Consistent with the discussion in the relevant sections, several exploratory analyses were also conducted.

Hypothesis 4: Older adolescents were expected to have lower self-efficacy beliefs in the domains of future, school, and family self-efficacies than younger adolescents.

Hypothesis 5: In contrast, older adolescents were expected to have higher neighborhood/safety self-efficacy than younger adolescents.

Hypothesis 6: Females would have lower self-efficacy beliefs than males.

Hypothesis 7: Minority adolescents would have lower self-efficacy beliefs than European-American adolescents.

Three specific hypotheses were tested regarding how family is related to adolescents' self-efficacy.

Hypothesis 8: Family socioeconomic status (education, occupation, and income) would positively predict adolescents' self-efficacy beliefs.

Hypothesis 9: Family conflict would negatively predict adolescents' self-efficacy beliefs.

Hypothesis 10: Family support would positively predict adolescents' self-efficacy beliefs.

Two specific hypotheses were tested concerning the influence of peers on adolescents' self-efficacy. These hypotheses are

Hypothesis 11: Peer support would positively predict adolescents' self-efficacy beliefs.

Hypothesis 12:Peer delinquency will negatively predict adolescents' self-efficacy beliefs.

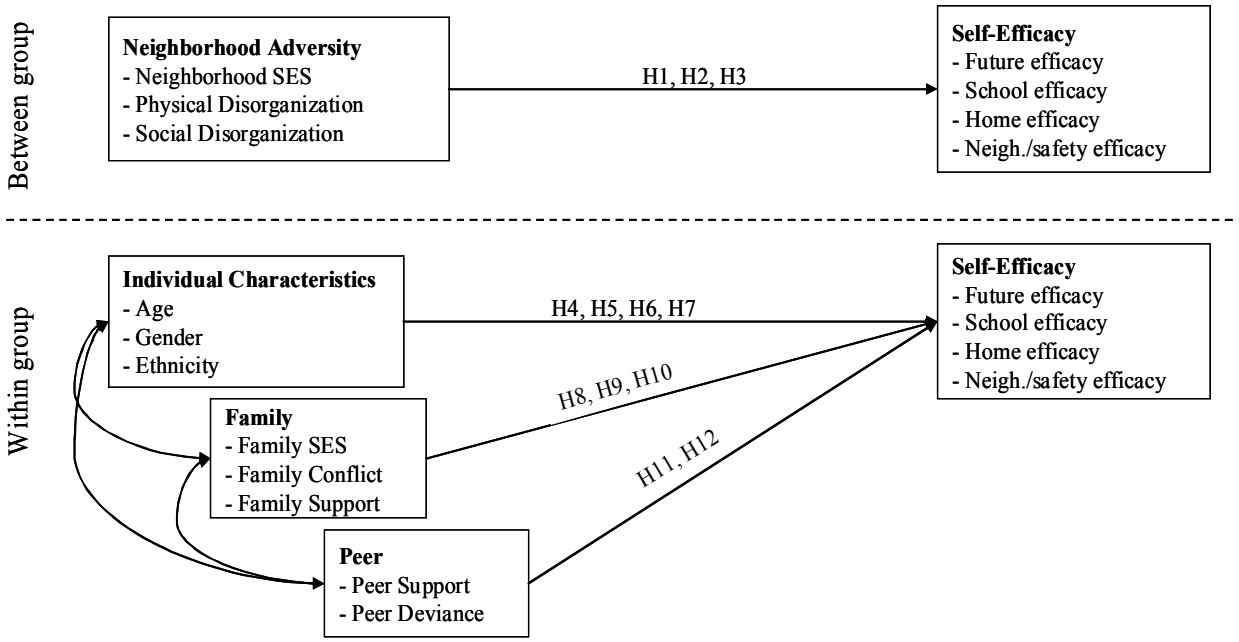


Figure 3: Multilevel model of between and within group variables and hypothesized associations.

*Study III: The Mediating Role of Self-Efficacy Beliefs*

The goal of the third study was to examine the role of self-efficacy as a mediator between neighborhood characteristics, family, and peers and adolescents' developmental outcomes: depression/anxiety symptoms, substance use, and delinquency. Extant literature provides evidence for the link between 1) neighborhood characteristics and adolescents' developmental outcomes, 2) family and peers and adolescent developmental outcomes. and 3) self-efficacy beliefs and developmental outcomes. Nevertheless, there is a dearth of studies examining the mediating role of self-efficacy. Based on existing evidence and theory, the following mediation hypotheses were tested (see Figure 4). For parsimony, separate hypotheses for each specific variable are not presented.

Hypothesis 1: Self-efficacy beliefs would mediate the association between (a) neighborhood SES, (b) neighborhood physical disorganization, and (c) social disorganization and adolescent developmental outcomes (depression/anxiety, delinquency, and substance use).

Hypothesis 2: Self-efficacy beliefs would mediate the effect of (a) familySES, (b) family support, and (c) family conflict on adolescent developmental outcomes (depression/anxiety, delinquency, and substance use).

Hypothesis 3: Self-efficacy beliefs would mediate the effect of (a) peer support and (b) peer deviance on adolescent developmental outcomes (depression/anxiety, delinquency, and substance use).

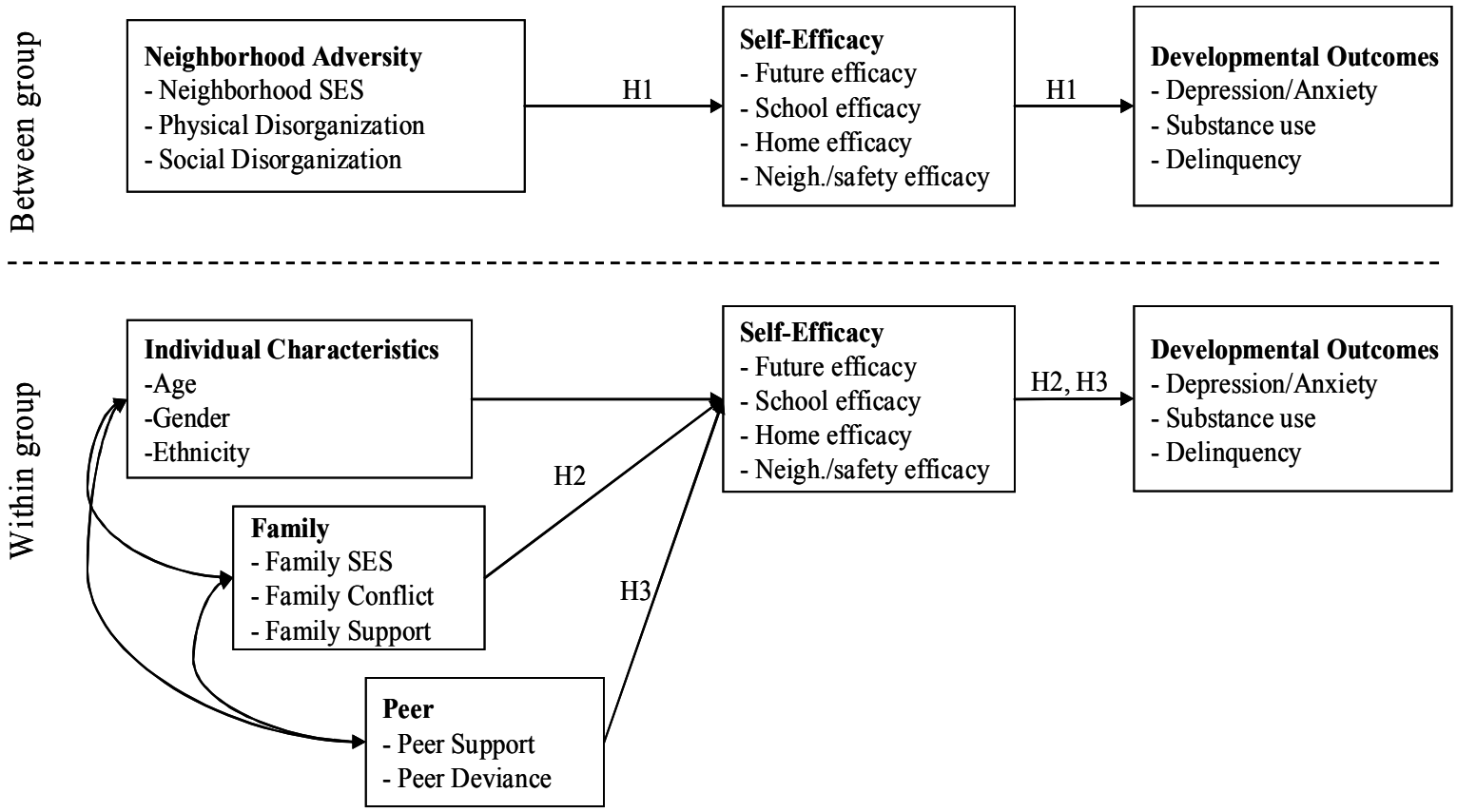


Figure 4: Multilevel model of between and within group variables and hypothesized associations.

# Chapter 4

## Method

Secondary data analysis of the Project on Human Development in Chicago Neighborhoods (PHDCN) provided the basis of the current research. PHDCN is a longitudinal study examining the development of delinquency, criminal behavior, and substance abuse from birth through adolescence which was initiated in 1990 by an interdisciplinary research team (Earls & Visher, 1997). The primary study aim was to investigate how individual personalities, family relationships, school environment, and type of community interact to contribute to delinquency and criminal behavior. Importantly, the large number of variables measured in three waves of data collection and the complex sampling method, encompassing multiple ethnic groups and communities with a wide array of socioeconomic backgrounds allow researchers to conduct studies on many facets of human development and neighborhood influences on human behavior.

The PHDCN examined all Chicago neighborhoods and categorized them into 343 clusters based on similarities including presence of parks and railroads, and various socioeconomic and demographic characteristics. These clusters were composed of relatively equal numbers of communities with low (114), medium (114), and high (115) socioeconomic status. Data for the current research come from the Longitudinal Study Cohorts which surveyed over 6,000 people, in 80 neighborhoods selected from the 343 clusters. This subset of neighborhoods was selected to represent an equal number of neighborhoods with similar socioeconomic status and ethnic composition to eliminate confounds of mixed ethnicity and socioeconomic status. The sample is clustered in seven age cohorts from birth to 18 (birth, 3, 6, 9, 12, 15, and 18 years). The current research

analyzed data from three cohorts (cohorts 9, 12, and 15) collected in two waves (Wave 1 and 2). Wave 1 data were collected from 1994 to 1997 and wave 2 data were collected from 1997 to 2000.

Following the selection of 80 neighborhoods from the 343 defined neighborhood clusters, block groups were randomly selected from each of the sample neighborhoods. Next, a complete list of dwelling units were developed for all of the randomly selected block groups. Approximately 40,000 dwellings within 80 neighborhood clusters were screened in-person for pregnant women, children, and young adults in seven age cohorts. This screening yielded an 80% response rate and identification of a total of 8,347 eligible participants across all age cohorts. Of the eligible participants, 75% were successfully interviewed (N = 6,228). The responses rate for cohorts 9, 12, and 15 in wave 1 were 75.9%, 74.3%, and 71.6%, respectively. At wave 2, 85.93% of the participants (N = 5,338) were successfully interviewed again, excluding 16 deceased wave 1 participants. Overall response rates for cohorts 9, 12, and 15 at wave 2 were 85.6%, 86.2%, and 82.7%, respectively.

At all waves, participants and/or primary caregivers were contacted by a trained interviewer in-person or via phone. All questionnaires were administered to the participants in their preferred language (English, Spanish, and Polish). The interviewer read the items and coded the responses of the participants.

The original data were collected from six ethnic groups and biracial participants. Because of the demographic characteristics of the Chicago neighborhoods included in the PHDCN, three groups, Hispanics, African-Americans, and Whites, who comprise 88.7% of the cohorts 9, 12, and 15 surveyed at Wave 1 were included in the current study (N =

2,080).The representation of the other ethnic and biracial groups was very low such that they would not allow reliable estimation of the effect of ethnicity. Therefore, they were not included in the current study.

Of the current sample, 49.7% of the participants are females and the mean age at wave 1 was 12 (range: 7 – 16, STD = 2.44). Regarding parents' education, almost half of the mothers (48.7%) and fathers (47.4%) did not have a high school degree. Fourteen percent of the mothers and 14.1% of the fathers graduated from high school, whereas 33% of the mothers and 38.4% of the fathers had some education beyond high school. However, parental education across the three ethnic groups is distributed unequally. For example, 70.7% of the Hispanic mothers had education lower than a high school degree, whereas 29.9% of the African-American and 23.8% of the White mothers did not have a high school diploma. Only 18.6% of the Hispanic mothers had education beyond high school. On the other hand, 55.2% of the African-American and 54.4% of the White mothers had some education above high school. Regarding having a bachelor's degree, 3.2% of Hispanic, 8.7% of the African American, and 23.5% of the White mothers had bachelor's degree (3.9%, 8.7%, and 24% of the fathers had bachelor's degree, respectively). Educational disparity among fathers was very consistent with the pattern among mothers. Although there was attrition of the subjects across waves of the study, the demographic characteristics of the sample and the parents did not change significantly from Wave 1 to Wave 2.

The Scientific Directors of the PHDCN imputed missing values of three variables regarding primary caregivers: education (ordinal), salary level (ordinal), and socioeconomic index (continuous). Imputations were done when at least one variable

was non-missing. All other missing data were coded as missing on all scales. Overall, missing data points are not higher than 5%. MPlus allows estimation of robust standard errors and chi-square,also referred to as Yuan-Bentler T2* test statistic, to handle missing data (Muthen&Muthen, 2007).

*Study I: Structure of Adolescent Self-Efficacy Beliefs*

Study I was an examination of the factor structure and psychometric qualities of a multidimensional self-efficacy scale.

*Participants*

The sample for Study I was a subset of the wave 2 data from age cohorts 9, 12, and 15. Overall, 1,707 of the participants (82.2%) responded to the self-efficacy measure, which is the main focus of Study I. Participants (12.8%, n = 220) who were below the age of 10 at wave 2 were excluded from the study sample, consistent with the suggestion of Petersen (1988) that adolescence encompasses the second decade of life. The final study sample was 1,487 adolescents, aged10 to 19 (M = 14, SD = 2.47).The gender of the participants was equally distributed (50.3% males and 49.7% females). Overall, 46.5% (n = 692) of the participants were Hispanic, 37.9 % African-American (n = 564), and 15.2% (n=231) White.

*Measure*

*Self-efficacy.* Self-efficacy of the participants was measured during wave 2 on four specific domains, using a multidimensional self-efficacy measure. This measure was specifically developed by the research team of PHDCN. The measure is composed

of future efficacy, school efficacy, home efficacy, and neighborhood/safety efficacy[1]. There were 5 items measuring future efficacy domains (e.g., can become successful; can go far in the world; cannot make self happy in future). Seven items measured school efficacy (e.g., can understand what they read; cannot figure out answers in school), 5 items home efficacy (e.g., can talk with parents about bad things; can make things better at home with parents), and 6 items neighborhood/safety efficacy (e.g., can be safe within a few blocks of home; cannot avoid gangs in neighborhood).

Conceptually, future efficacy assesses adolescents' beliefs regarding their capabilities to have control over their future, and to become successful and happy in their life. School efficacy items tap adolescents' perceived ability to understand math and what they read, and their capability to successfully do homework and assignments. Home efficacy measures adolescents' beliefs about their capability to maintain good relationships with parents, including talking to them about problems, getting their help and support, and influencing things at home positively. Finally, neighborhood/safety efficacy assesses adolescents' perceived capability to deal with gangs on the street, avoid fights, and walk around home and school safely.

The items were read to the participants in their own language (English or Spanish). Approximately 10% (n = 80) of the participants of Hispanic descent were administered questionnaires in Spanish and all other participants were administered the measures in English. Participants rated the items on a four-point response scale (1: very

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[1] A fifth domain, social efficacy, was also included in the scale. However, this subscale was added to the measures later in the process; thus, only 25% of the sample has valid data on social efficacy. Therefore, the current research will not use the social efficacy domain.

true; 2: sort of true; 3: sort of untrue; 4: very untrue). All nine negatively keyed items will be recoded so that low scores indicate positive self-efficacy. Then, all scores were reverse coded so that high scores indicate positive self-efficacy, for ease of interpretation.

To date, no study has examined the factor structure and psychometric qualities of this self-efficacy measure. Thus, reliability and validity information are not available. Hence, the goal of the Study I is to examine the factor structure and psychometric qualities of the scale.

*Analysis*

First, the data were examined for response sets, outliers, multicollinearity, linearity, and homoscedasticity following the recommendations in the literature (Kline, 1998). Following the data screening process, a series of confirmatory factor analyses (CFA) with a weighted least squares estimator (WLSMV)were conducted to examine the factor structure of the measure. Muthen&Muthen (2007) suggest using a weighted least squares estimator withtetrachoric or polychoric correlations when the indicators of latent factors are measured on categorical or ordinal scales. Several alternative models werecompared.

1. *A one-factor model:* The single factor model assumes that the current scale measures an overall self-efficacy construct.
2. *An uncorrelated four-factor model:* This model assumes that the scale measures four orthogonal domains of self-efficacy.
3. *A correlated four-factor model:* The correlated four-factor model is based on the hypothesis that the four domains of self-efficacy measured by separate constructs are correlated to each other.

4. *A hierarchical model:* This model assumes that the four domain specific self-efficacies (factors) are predicted by a global self-efficacy construct.

These alternative models were compared using different fit indices and chi-square difference test. Specifically, the chi-square test of model fit, comparative fit index (CFI; higher than .90), root mean square error of approximation (RMSEA; lower than .05), and weighted root mean square residual (WRMR; close to 1) were compared to decide the best fitting-model (Kline, 1998). Finally, construct reliabilities for the latent factors were computed. Construct reliabilities at or above .70 are considered satisfactory reliability estimates.

To test the stability of the factor structure, the 80 neighborhood clusters were split into two groups randomly. The first group was used to test the alternative models and the reliabilities of the factors. The final model was tested in the second group to verify the stability of the factor structure.

*Study II: Predictors of Adolescents' Self-Efficacy Beliefs*

Study II examined the predictors of adolescents' self-efficacy beliefs. Multiple levels of predictors were included in model tests. These levels were individual (gender, age, ethnicity), family (family SES, family environment, family support), peer (peer support, peer delinquency), and neighborhood (neighborhood SES, physical and social disorganization).

*Participants*

The participants in Study II were a subset of the age cohorts 9, 12, and 15 who lived in the same neighborhood during Wave 1 and Wave 2 data collection of the PHDCN. This helps to ensure that the participants would be exposed to the same

neighborhood characteristics during the course of the study. Only Hispanics, African-Americans, and Whites were included in the sample.

The sample consisted of 1,015 participants, relatively equally distributed across age cohorts 9, 12, and 15 (34.6%, 36.1%, and 29.4%, respectively). The gender of the participants was equal (50.2% female, 49.8% male). At wave 2, the mean age was 13.96 (SD = 2.45, range: 10 – 19). Almost half of the participants were of Hispanic descent (46.2%) and the remaining were African-American (36.4%) and White (17.4%).Comparison of the Study II sample with the Study I sample on key demographic variables did not reveal any significant differences between these two samples. In addition, the participants who were dropped out of the study in Wave 2 were compared to those who remained in the study. Again, there were no differences between these two groups on the key demographic variables suggesting that the reduced sample size would not affect the estimates obtained from the final sample.

*Measures*

*Self-efficacy.* Self-efficacy was the outcome variable of interest for the Study II hypotheses. The results of Study I provided the basis for the measurement of self-efficacy. Self-efficacy was measured during Wave 2 of the PHDCN.

Predictor variables are categorized into four groups: individual level variables (gender, ethnicity, and age), family variables (family SES, family environment, family support), peer variables (peer support, peer delinquency), and neighborhood level variables (neighborhood SES, neighborhood physical disorganization, and neighborhood social disorganization). All of these variables, except the neighborhood level variables, were measured during Wave 1 of the PHDCN.

*Individual level (demographic) variables.* In the current analyses, gender (male vs. female), ethnicity (Hispanic, African-American, and White), and age (age of participant at Wave 2) were used as individual level variables. Gender was coded as 0 for females, and 1 for males. Two dummy coded ethnicity variables were created to represent African-American and Hispanic ethnic origin. European-Americans were coded as the reference category in both of the dummy coded ethnicity variables.

*Family socioeconomic status.* Family socioeconomic status was measured by three indicator variables: primary caregivers' highest educational attainment, annual household income, and occupational prestige (Nakao & Treas, 1994). Primary caregivers reported their education level in one of five categories: 1) did not go to high school, 2) started but did not complete high school, 3) graduated high school, 4) some additional training or schooling after high school, and 5) graduated college or more. The annual income of the households was categorized into seven groups: 1) equal to or less than $5,000, 2) $5,001 to $9,999, 3) $10,000 to $19,999, 4) $20,000 to $29,999, 5) $30,000 to $39,999, 6) $40,000 to $49,999, and 7) equal to or more than $50,000. Annual household income reflects the total of income of all household members.

Finally, occupational prestige was measured based on the system introduced by Nakao and Treas(1994). The scores on occupational prestige index ranged from 0 to 97; lower scores indicate lower occupational prestige (e,g,, unskilled laborer). If the primary caregiver has a partner, the higher of the occupational prestige codes of the primary caregiver and his/her partner was used. For primary caregivers who were unpartnered and had been unemployed for more than 5 years, an occupational prestige score of 10 was

assigned, a score that is half a standard deviation below the lowest score on the original scale.

The three indicators of family SES were combined into a single family SES score which ranged from -3.16 to 3.52, with a mean of 0.00 and standard deviation of 1.45. Negative scores indicated family SES lower than the average family SES in the sample; positive scores referred to higher family SES.

*Family Conflict.* The conflict subscale of the Family Environment Scale (FES) (Moos & Moos, 1986)was used as an indicator of family environment. The FES is composed of 10 subscales that measure social-environmental characteristics of the family. These subscales are grouped into three domains: relationship, personal growth, and system-maintenance dimensions.

The conflict subscale assesses the amount of openly expressed anger and conflict among family members. It includes nine items (e.g., we fight a lot in our family, family members rarely become openly angry, family members sometimes get so angry they throw things). Previous studies reported both satisfactory internal consistency (.75) and 2-month test-retest reliabilities (.85) (Moos & Moos, 1986). In the present study, the family conflict subscale yielded acceptable internal consistency estimate ($\alpha = .68$).

In the current study, primary caregivers rated the items on a two point scale (0: no; 1: yes). After reverse coding the relevant items, the sum of the scores werecomputed. The higher the score, the higher the level of family conflict.

Evidence exists for the validity of the measure. For example, conflict and cohesion (another subscale of the FES) were negatively correlated in both adolescent and adult samples (-.53 and -.44, respectively) (Moos & Moos, 1986). Moreover, the extant

literature provides evidence of a relationship between family conflict and adolescent developmental outcomes. High levels of psychological impairment and low levels of satisfaction with social relationships were observed among adolescents from high conflict families (Dancy & Handal, 1980, 1984).

*Family Support*. The family support dimension of the Provision of Social Relations Scale (PSR) was used to measure amount of support adolescents received from their families (Turner, Frankel, & Levin, 1983). The PSR was originally developed to assess support perceptions in relation to five provisions (attachment, social integration, reassurance of worth, reliable alliance, and guidance). The family support subscale is composed of six items (e.g., my family lets me know they think I'm a worthwhile person, people in my family have confidence in me). In the current study, the participants rated the items on a three-point scale (1: very true; 2: somewhat true; 3: not true). The responses were recoded so that higher scores reflect higher perceived support. The mean score was computed to indicate the amount of support participants perceive from their family.

Previous studies reported satisfactory internal consistency values (ranging between .75 to .89) for the family support subscale of the PSR (Turner et al., 1983). Moreover, family support was positively correlated with family resources ($r$ = .57), and negatively correlated with anxiety ($r$ = -.31), anger ($r$ = -.19), and depression ($r$ =-.12), supporting the validity of the measure. In the present study, family support scale yielded an acceptable internal consistency estimate ($\alpha$ = .76).

*Peer Support.* Perceived support from peers was measured using the peer support subscale of the Provision of Social Relations Scale (PSR) (Turner et al., 1983). The peer

support subscale includes nine items (e.g., people who know me trust me and respect me, I feel very close to some of my friends, I have at least one friend that I could tell anything to). The participants in the current study rated the items on a three-point scale (1: very true; 2: somewhat true; 3: not true). The responses will be recoded so that higher scores will reflect higher perceived support. The mean score was computed to indicate the amount of support participants perceived from their peers.

Previous studies reported high internal consistency values (ranging from .75 to .88) for the peer support subscale of the PSR (Turner et al., 1983). Moreover, peer support was positively correlated with activities with friends ($r$ =.32), and negatively correlated with anxiety ($r$ = -.31), anger ($r$ = -.26), and depression ($r$ = -.23), supporting the validity of the measure. In the present study, peer support yielded acceptable internal consistency estimate ($\alpha$ = .72).

*Peer Delinquency.* Delinquency of peers was measured using 12 survey items developed by Huizinga and colleagues (1991). The items ask about certain delinquent behaviors of peers within the last year (e.g., skip school without an excuse, stole something less than $5, stole something worth $50, hit someone with the idea of hurting them). The participants reported how many of their peers were involved in the listed behaviors. The mean score will be computed. Previous studies reported satisfactory inter-item consistency (e.g., Sharkey, 2006). Delinquency of peers was also positively associated with adolescents' delinquent behaviors, supporting the validity of the measure (Huizinga, Esbenson, & Weihar, 1991; Sharkey, 2006).

*Neighborhood Adversity.* Neighborhood adversity was measured by three variables: neighborhood socioeconomic status, and neighborhood physical and social disorder.

*1) Neighborhood Socioeconomic Status:* The neighborhood clusters were categrizedinto three groups (low, medium, high SES) based on neighborhood socioeconomic status. This variable is based on the 1990 decennial census data. Six items were used to define socioeconomic status of the neighborhoods: neighborhood level median income, percentage college educated, percentage with household income over $50,000, percentage of families below the poverty line, percentage on public assistance, and percentage with household income less than $50,000. The last three measures were reverse coded to form the scale.

*2) Neighborhood Physical and Social Disorder:* The physical and social disorder subscales of the Systematic Social Observation (SSO) measure was used to assess neighborhood level disorder (Sampson et al., 2002; Sampson & Raudenbush, 1999). The SSO is a standardized technique for observing physical, social, and economic characteristics of neighborhoods, one block at a time. In the current study, the physical disorder (e.g., garbage litter on a street sidewalk, empty beer bottles visible in streets, tagging graffiti) and social disorder (e.g., adults loiter/congregate/hang out, people drink alcohol on block face, drunken intoxicated people on block face) components of the SSO were used.

The observations were conducted from June to October 1995 in 80 sampled Chicago neighborhoods by the National Opinion Research Center. Trained observers drove down each block at a speed of 5 mph. Both sides of each block were videotaped;

in addition, trained observers recorded characteristics of each block face in an observer log. Trained coders watched videotapes of 15,141 block faces and coded the videotape data and then the observer logs.

In order to assure inter-coder reliability, both observers coded 90 block faces. For each pair of observers, the observations were compared and differences resolved. Modifications on the coding scheme were completed. Later, a random sample of 10 percent of all block faces were coded by new observers and the results compared with the original coding. This method revealed 98 percent inter-rater agreement.

Analysis of inter-tract measurement for internal consistency reliability revealed high reliability coefficients for both physical (.98) and social disorder (.83) (Raudenbush & Sampson, 1999). Regarding validity, overall disorder scores significantly predicted homicide counts and robbery and burglary rates at the neighborhood level, controlling for residential stability, concentrated disadvantage, and population density (Sampson & Raudenbush, 1999).

*Primary Caregivers' Marital Status.* Marital status of primary caregivers at wave 1 served as a covariate in the analyses. Marital status was originally grouped into six categories: single, separated, divorced, widowed, married, and living with partner. The six categories were reduced to three: married (62.7%), partnered (27.2%), and single (10.1%); includes single, separated, divorced, and widowed). Two dummy variables representing married and partnered parents, with single as the reference group, were created.

*Analysis*

The current data were multilevel data. That is, the participants of the study are nested in 80 neighborhoods. Neighborhood variables were measured at the neighborhood level whereas all other variables were measured at the individual level. Therefore, multilevel modeling techniques (MPlus statistical package, Muthen & Muthen, 2004)were used to test the Study II hypotheses.

A multilevel regression model wasconducted to test all twelve hypotheses of Study II (see Figure 3). First, the model fit indices (chi-square test of model fit, CFI, RMSEA, SRMR) were reviewed to decide whether the model fits. Next, individual paths were inspected for the tests of the hypotheses.

Hypotheses 1, 2, and 3 were tested at the between-group (neighborhood) level, and the remaining hypotheses at the individual level. At the individual level, the paths from age, gender (0: females, 1: males) and ethnicity (D1: African American vs. all others; D2: Hispanic vs. all others; White is the reference category) to self-efficacy provided tests of hypotheses 4, 5, 6, and 7, respectively. The paths from family SES, family conflict, and family support to self-efficacy provided tests of hypotheses 8, 9, 10, respectively. Finally, the paths from peer support and peer deviance to self-efficacy provided tests of hypotheses 11 and 12, respectively.

Although the extant research reviewed suggested several interaction hypotheses (see pp. 26 – 28), testing interactions and subsequent interpretation of coefficients in the multilevel modeling context is extremely cumbersome. Therefore, interaction hypotheses were not tested directly. Rather, for interaction effects, a series of multigroup analyses were conducted. For example, the model depicted in Figure 3 was tested separately for

males and females, and for all three ethnic groups separately, to test whether the models across these groups differed. Differences in the path coefficients between groups may suggest follow-up analyses, including direct examination of interactions between the variables measured at different levels.

*Study III: The Mediating Role of Self-Efficacy Beliefs*

Study III examined role of self-efficacy as a mediator between neighborhood characteristics and adolescent developmental outcomes. The sample of the Study III was identical to that of Study II. Also, all variables included in Study II were used in the current study. Adolescent outcome variables were measured during Wave 2 of the PHDCN.

*Participants*

Please see the participants section of Study II.

*Measures*

In addition to the variables used in Study II, adolescent developmental outcomes (e.g., depression/anxiety symptoms, substance use, and delinquency) measured during Wave 2 were included.

*Depression/Anxiety Symptoms.* The Youth Self-Report measure (Achenbach, 1991) was used to assess the level of anxious/depressed symptoms of the participants. This measure is a self-report version of the Child-Behavior Checklist, a widely used instrument to measure psychological and behavioral problems for children and adolescents between the ages of 11 and 18.

The current study used the anxiety/depression subscale to measure the level of anxiety/depressive symptoms of adolescents. This dimension is measured by 18 items (e.g., cry a lot, feels unloved, worry about future). The participants responded to each item on a three point scale (0: not true, 1: somewhat true; 2: very true).

Achenbach (1991) reported high internal consistency, test-retest reliability, and validity data for the scale overall, including the anxious/depressed subscale. In the present study, depression/anxiety subscale yielded acceptable internal consistency estimate ($\alpha = .69$).

*Substance Use*. The Substance Use Interview was used to assess participants' experiences with different substances. After an initial question, such as "ever smoked cigarettes," a list of follow up questions were asked to assess the extent of substance use (e.g., number of days smoked cigarettes in whole life, number of days smoked last year, number of days smoked last month).

For the current study, three substance use variables were computed: smoking, alcohol use, and illegal drug-use. Smoking was measured by the number of days the participant smoked cigarettes during the last month. Frequency of alcohol use would be the mean number of days of alcohol use (e.g., beer, wine, and liquor). Finally, frequency of illegal drug use was measured by the number of days the participants used illegal drugs (marijuana, cocaine, crack, glue, heroin, barbiturates, tranquilizers, amphetamines, steroids; whichever is the highest) during the previous month. The frequency for all three variables were rated on a seven point scale (1: never, 7: more than 20 days).

*Delinquency.* The delinquent behaviors subscale of the Youth Self-Report measure (Achenbach, 1991)was used to assess delinquency. Twelve-items composed the

delinquent behavior subscale (e.g., destroy others' things, break rules, steals, and skips school or job). High internal consistency, test-retest reliability, and validity data are available for the delinquent behavior subscale (Achenbach, 1991).

*Analysis*

The MPlus program (Muthen & Muthen, 2004)was used to test the mediation effects at the neighborhood and individual level. Specifically, the path model depicted in Figure 4 was tested. First, model fit indices (chi-square test of model fit, CFI, RMSEA, SRMR) were examined to test overall model fit. Next, significance of the indirect effects (mediation effects) suggested by hypotheses 1, 2, and 3 were directly tested using MPlus's "model indirect" option. This option reports the significance of the variance explained by indirect effects.The model was tested for full mediation. That is, the direct paths between the exogenous variables and the adolescent outcomes were not included in the model.

For exploratory purposes, the model wasre-estimated, for males and females separately, consistent with the literature on gender differences in self-efficacy (Meece, 1991; Wingfield et al., 1996).

# Chapter 5

## Study I

## Results

Approximately fifty percent of the neighborhood clusters were randomly selected to split the sample of Study I (N = 1487) into two sub-samples. The first sub-sample (test sample; 41 neighborhood clusters, N = 750) was used to test the conceptual models, and the second sub-sample (validation sample; 38 neighborhood clusters, N = 737) was used to validate the factor structure of the final model. The test sample and validation sample did not differ from each other in terms of neighborhood level socioeconomic status ($t(1485) = .83$, $p = .41$). Moreover, there was no difference between these two samples regarding the distribution of ethnic groups ($\chi^2(2) = .42$. $p = .81$), gender ($\chi^2(1) = 3.76$. $p = .06$) and age of the participants ($t(1485) = .40$, $p = .68$), primary caregivers' education level ($t(1479) = -.43$, $p = .67$), and total household income ($t(1479) = -.51$, $p = .61$)[2].

*Hypothesized Self-Efficacy Models*

The self-efficacy items in the current studywere developed to measure four domain specific self-efficacy beliefs of adolescents: school efficacy, future efficacy, home efficacy, and neighborhood/safety efficacy. Four alternative conceptual models of adolescent self-efficacy beliefs were tested. These models were a one-factor, uncorrelated four-factor, correlated four-factor, and a hierarchical model (second order). Model fit statistics were examined, and nested models (uncorrelated four-factor versus

[2] Discrepancies in degrees of freedom values are due to missing values in demographic variables.

correlated four-factor model) were compared to each other using the chi-square test of model fit difference.

Prior to data analysis, the self-efficacy items were examined for their consistency with the suggestions provided by Bandura(2006b) on creating self-efficacy measures. He suggested that "scales of perceived self-efficacy must be tailored to the particular domain of functioning that is object of interest (p. 308)." A second central issue for the development of scales with content validity is the wording of items. Bandura suggested that self-efficacy items "should be phrased in terms of *can do* rather than *will do*." (Italics were original.) That is, the items should refer to a judgment of capability rather than expectancy, belief, or feeling.

Conceptual examination of the scale items showed that two of the items ("have control over own future" and "feel safe alone in neighborhood") were not consistent with the suggestions of Bandura(2006b). Neither of these items referred to perceived capability on a given domain. Therefore, these two items were not included in the following analyses. All other items were phrased in terms of *can do,* and referred to perceived capability in a given domain, suggesting content validity.

*Assumptions*

Before the analyses, the data were screened for the test and validation samples separately. The self-efficacy items were rated on an ordinal scale. Therefore, the weighted least squares means and variances adjusted (WLSMV) estimator was used for confirmatory factor analyses. The WLSMV estimator does not assume normality of data. Consistently, data screening did not include any tests for normality and linearity assumptions. The frequencies for each response category and the presence of missing

data were examined. There was no response category with zero frequency. Across all items, the lowest response percentage for a category was 3.2%, and the highest was 72.4% . Finally, missing data did not exceed .7% in either samples.

*Model Estimation*

The weighted least squares means and variances adjusted (WLSMV) estimator was employed to estimate all models using MPlus 4.21 (Muthen & Muthen, 2007). The independence model assuming that all items were uncorrelated was rejected, $\chi^2$ (20, N = 750) = 1150.13, $p < .001$.

Table 1.1 presents the fit statistics for the four conceptual models. First, the single factor model was fitted to the data to test whether a single latent factor predicts the responses to the self-efficacy items. The model failed to fit the data, $\chi^2$ (23, N = 750) = 141.26, $p < .001$. Next, the uncorrelated four-factor model was tested. This model revealed inadequate fit values, $\chi^2$ (22, N = 750) = 349.89, $p < .001$. The correlated four-factor model revealed acceptable relative fit index values (CFI = .95, RMSEA = .05, WRMR = 1.36) although the absolute fit index showed poor fit, $\chi^2$ (23, N = 750) = 91.43, $p < .001$. The chi-square difference test revealed that model fit for the correlated four-factor model was significantly better than uncorrelated four-factor model, $\Delta\chi^2(2) = 321.33$, $p < .001$. Finally, the second-order factor model revealed acceptable relative fit values (CFI = .94, RMSEA = .04, WRMR = 1.37) whereas the absolute fit index indicated a poor fit, $\chi^2$ (23, N = 750) = 90.69, $p < .001$. The chi-square difference test yielded no significant difference in the fit of the four-correlated four factor model and the second order factor model, $\Delta\chi^2(2) = 4.71$, $p = .09$.

Table 1.1: Model Fit Statistics for the Four Alternative Models.

| Models | $\chi^2$ | df | $\chi^2$/df ratio | Relative Fit Indexes | | |
|---|---|---|---|---|---|---|
| | | | | CFI | RMSEA | WRMR |
| Null model | 1150.13*** | 20 | - | - | - | - |
| Single Factor | 141.26*** | 23 | 6.14 | .89 | .06 | 1.73 |
| Uncorrelated four-factor | 349.89*** | 22 | 15.90 | .71 | .10 | 2.94 |
| Correlated four-factor | 91.43*** | 23 | 3.98 | .94 | .05 | 1.36 |
| Hierarchical model | 90.69*** | 23 | 3.94 | .94 | .04 | 1.37 |

*** $p < .001$

Note: Chi-square and df values are estimated values provided by WLSMV in MPlus 4.21 (Muthen&Muthen, 2007.)

*Model Modifications*

Overall, the correlated four-factor model and second-order (hierarchical) factor model have provided relatively better model fit values compared to the other two models. Bandura(2006b) suggested that multidimensional self-efficacy measures were more coherent with domain specific rather than global personal efficacy scales. Although self-efficacy domains may be correlated to each other due to the presence of common skills that may influence perceived capabilities on different domains, he suggested that domain specific efficacy beliefs may facilitate different sets of actions that would influence outcomes. That is, measuring global personal efficacy may result in limited information pertaining to predictors and outcomes of domain specific self-efficacy beliefs. Therefore, the correlated four-factor model was selected for further examination. Specifically, the modification indices provided for the correlated four-factor model were examined. The criteria for adding suggested paths were first, conceptual plausibility of the path, and second, a suggested chi-square difference significant at least $p < .05$. After each model modification, a chi-square test of model fit difference was computed.

The modification indices suggested adding a correlated residual between two of the items predicted by neighborhood/safety efficacy (item#18: can do things safely with friends in neighborhood; item#21: can be safe within few blocks of home). The

suggested decrease in chi-square was 4.39, $p < .05$, and the residual correlation was $r = .21$. The chi-square difference test ($\Delta\chi^2$ (1) = 33.14, $p < .001$) indicated a significant improvement in model fit after adding this correlated residual (see Table 1.2).

The second suggested modification was adding a correlated residual between two of the items predicted by school efficacy (item#3: cannot do work expected in school; item#5: cannot do well in school). The suggested decrease in the model chi-square was 4.39, $p < .05$, and the residual correlation was $r = .22$. The chi-square difference test ($\Delta\chi^2$ (1) = 28.03, $p < .001$) indicated a significant improvement in model fit after adding this correlated residual (see Table 1.2).

The final modification was a correlated residual between another pair of indicators of school efficacy (item#3: cannot do work expected in school; item#2: cannot figure out answers in school). The suggested decrease in model chi-square value was 4.60, $p < .05$, and correlated residual was $r = .21$. Adding this path significantly increased model fit, $\chi^2$ (1) = 27.31, $p < .001$. Following the three model modifications, the final correlated four-factor model revealed acceptable fit statistics, $\Delta\chi^2(22, N = 750) = 76.12$, $p < .001$, CFI = .95, RMSEA = .04, WRMR = 1.25.

Table 1.2: Model Modifications Results.

| | | Model fit following the modification | | | | |
|---|---|---|---|---|---|---|
| Correlated Residuals | $\Delta\chi^2$(df=1) | $\chi^2$(df) | df | CFI | RMSEA | WRMR |
| Item#2 and item#18 | 33.14*** | 87.65 | 23 | .94 | .04 | 1.33 |
| Item#6 and item#10 | 28.03*** | 80.06 | 22 | .95 | .04 | 1.29 |
| Item#4 and item#6 | 27.31*** | 76.12 | 22 | .95 | .04 | 1.25 |

*** $p < .001$

Note: Chi-square and df values are estimated values provided by WLSMV in MPlus 4.21

Following the model modifications, inspection of factor loadings showed that all indicators were significantly predicted by the respective latent factor (see Table 1.3). The loadings ranged from .42 to .79. Next, construct reliabilities of the latent self-efficacy

variables were computed. Construct reliability values arerecommended to be at or above .70 for factor loadings. School efficacy (.78) and home efficacy (.82) factors showed good construct reliabilities. The construct reliabilities of future and neighborhood/safety efficacy factors were somewhat lower than the suggested cut-off value (.69 and .63, respectively).

*Validation of Factor Structure*

In order to provide further evidence regarding the stability of the factor structure of the self-efficacy measure, the final model was tested on the validation sample. The three added correlated residuals, explained above, were not included in this model.

The independence model, suggesting no association between the variables, was rejected, $\chi^2$ (23, N = 737) = 1279.29, $p < .001$. Then the four factor model, without adding any correlated error,was fitted. Although the absolute fit index of chi-square indicated poor fit ($\chi^2$ (25, N = 737) = 65.56, $p < .001$), the relative fit indices suggested an acceptable model fit (CFI = .97, RMSEA = .03, WRMR = 1.12). All factor loadings were statistically significant, and values ranged between .37 and .80. Finally, construct reliabilities for each factor were computed. School efficacy (.82), future efficacy (.72), and home efficacy (.83) showed satisfactory construct reliability values, whereas, the reliability of neighborhood/safety efficacy (.61) was lower than what is recommended (see Table 1.3).

Table 1.3: Standardized loadings, model fit statistics, reliabilities, and latent factor correlations estimated from test and validation samples

| Subscales | Test Sample (N = 750) | | Validation Sample (N = 737) | |
|---|---|---|---|---|
| *School Efficacy* | Initial | Modified | Initial | Modified |
| 1. Can make school better for self | .76 | .75 | .76 | .76 |
| 2. Cannot figure out answers in school | .47 | .44 | .56 | .53 |
| 3. Cannot do work expected in school | .63 | .57 | .65 | .61 |
| 4. Can understand what they read | .58 | .58 | .50 | .50 |
| 5. Cannot do well in school | .65 | .61 | .67 | .65 |
| 6. Can finish assignments/homework | .69 | .68 | .67 | .67 |
| 7. Can understand math | .42 | .42 | .44 | .44 |
| Construct Reliability | .78 | .78 | .82 | .82 |
| *Future Efficacy* | | | | |
| 8. Can become successful | .71 | .71 | .72 | .72 |
| 9. Can go far in the world | .67 | .67 | .73 | .73 |
| 10. Cannot make self happy in future | .57 | .57 | .58 | .58 |
| Construct Reliability | .69 | .69 | .72 | .72 |
| *Home Efficacy* | | | | |
| 11. Can get help from parents | .79 | .79 | .76 | .76 |
| 12. Cannot get parents to listen | .46 | .46 | .50 | .50 |
| 13. Can get parents to do things they like | .67 | .67 | .65 | .65 |
| 14. Can talk with parents about bad things | .68 | .68 | .70 | .70 |
| 15. Can be self with parents | .59 | .59 | .58 | .58 |
| 16. Can make things better at home with parents | .76 | .76 | .80 | .8 |
| Construct Reliability | .82 | .82 | .83 | .83 |
| *Neighborhood/Safety Efficacy* | | | | |
| 17. Cannot avoid gangs in neighborhood | .62 | .61 | .68 | .67 |
| 18. Can do things safely with friends in neighborhood | .52 | .48 | .49 | .48 |
| 19. Cannot avoid being scared on way to school | .57 | .56 | .48 | .47 |
| 20. Cannot avoid fights in neighborhood | .43 | .42 | .50 | .49 |
| 21. Can be safe within few blocks of home | .49 | .45 | .37 | .34 |
| Construct Reliability | .64 | .63 | .61 | .60 |
| Model Fit Statistics[1] $\chi^2$ (df) | 91.42(23) | 76.12 (22) | 65.56 (25) | 59.63(25) |
| CFI | .94 | .95 | .97 | .97 |
| RMSEA | .05 | .04 | .03 | .03 |
| WRMR | 1.36 | 1.25 | 1.12 | 1.06 |
| Latent Factor Correlations[2] | 1 | 2 | 3 | 4 |
| 1. School Efficacy | - | .89 | .69 | .64 |
| 2. Future Efficacy | .93 | - | .64 | .64 |
| 3. Home Efficacy | .77 | .72 | - | .57 |
| 4. Neighborhood/Safety Efficacy | .73 | .81 | .57 | - |

[1] Chi-square and df values are estimates values provided by WLSMV estimator in MPlus.
[2] Test sample latent factor correlations are shown below the diagonal. Latent factor correlations are based on the modified models.

## Study II

## Results

*Preliminary Analyses*

Descriptive statistics for the observed variables (sample size, means, standard deviations, minimum and maximum values) are depicted in Table 2.1. The sample size for variables measured at the individual level was N = 1,015. Overall, 79 neighborhoods were encompassed. The amount of missing data did not exceed 1.6% of the total sample.

Bivariate correlations for the total sample are shown in Table 2.2. All correlations were in the expected direction. The correlations between predictor variables and self-efficacy were small to moderate (.07 to .28). Family support was positively correlated, and deviance of peers was negatively correlated to all self-efficacy domains. Other predictor variables were significantly correlated with either one, two or three of the domain specific self-efficacy beliefs. Regarding neighborhood level predictors, neighborhood level SES was positively and physical disorder was negatively related to all self-efficacy domains but home-efficacy. Social disorder was negatively correlated with school and safety-efficacy.

Overall, the correlations among the predictors were small to moderate except for neighborhood level variables. Neighborhood level SES was strongly correlated with both physical disorder ($r$ = -.69) and social disorder ($r$ = -.59). There was also a moderate positive correlation between physical and social disorder ($r$ = .38). The strong correlations between these predictor variables caused multicollinearity, and in turn, model fit problems. Multicollinearity among the predictors may result in biased estimates of standard errors (Tabachnick & Fidell, 1996). Therefore, these three

measures of neighborhood were combined to create a composite neighborhood adversity variable.

Table 2.1. Means, Standard Deviations, and Minimum and Maximum Values for the Observed Variables.

| | n | Mean | SD | Minimum | Maximum | ICC* |
|---|---|---|---|---|---|---|
| *Criterion Variables* | | | | | | |
| School Efficacy | 1015 | 3.44 | .51 | 1 | 4 | .03 |
| Future Efficacy | 1015 | 3.60 | .52 | 1 | 4 | .04 |
| Home Efficacy | 1015 | 3.23 | .63 | 1 | 4 | .02 |
| Neighborhood/Safety Efficacy | 1015 | 3.22 | .57 | 1 | 4 | .08 |
| *Individual-level Variables* | | | | | | |
| Age | 1015 | 13.96 | 2.45 | 10 | 19 | .01 |
| Sex | 1015 | | | | | .02 |
| Female | 510 | 50.2% | - | - | - | - |
| Male | 505 | 49.8% | - | - | - | - |
| Ethnicity | 1015 | | - | - | - | - |
| Hispanic | 469 | 46.2% | - | - | - | .55 |
| African American | 369 | 36.4% | - | - | - | .70 |
| European American | 177 | 17.4% | - | - | - | - |
| Family SES | 1014 | -.02 | 1.45 | -3.16 | 3.52 | .31 |
| Family Support | 1007 | 2.73 | .31 | 1.17 | 3 | .02 |
| Family Conflict | 999 | 2.58 | 1.97 | 0 | 9 | .02 |
| Friend Support | 1007 | 2.51 | .36 | 1 | 3 | .03 |
| Deviance of Peers | 1003 | 1.37 | .29 | 1 | 2.64 | .05 |
| *Neighborhood-level Variables* | | | | | | |
| Neighborhood SES | 79 | 1.93 | .78 | 1 | 3 | - |
| Physical Disorder | 79 | 1.89 | .60 | .63 | 3.24 | - |
| Social Disorder | 79 | .05 | .05 | 0 | .31 | - |

* ICC: Intra Class Correlation.

First, neighborhood SES was reverse coded so that high values reflected low SES. Then, standardized values of the three neighborhood measures were summed to create a composite neighborhood adversity score. The resulting neighborhood adversity variable was strongly correlated with neighborhood SES ($r$ = -.91), physical disorder ($r$ = .82), and social disorder ($r$ = .78). After creating the neighborhood adversity variable, the highest correlation between any two predictor variables was $r$ = -.43 (neighborhood

Table 2.2. Zero-order Correlations among the Criterion and Predictor Variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. School Efficacy | - | | | | | | | | | | | | | | | |
| 2. Future Efficacy | .52** | - | | | | | | | | | | | | | | |
| 3. Home Efficacy | .47** | .43** | - | | | | | | | | | | | | | |
| 4. Safety Efficacy | .39** | .39** | .34** | - | | | | | | | | | | | | |
| 5. Age (Wave 2) | -.04 | -.02 | -.19** | .03 | - | | | | | | | | | | | |
| 6. Sex (0 = female) | -.07* | -.05 | -.02 | -.06 | -.06 | - | | | | | | | | | | |
| 7. Hispanic [a] | -.12** | -.12** | -.06 | -.19** | -.08* | .01 | - | | | | | | | | | |
| 8. African American [a] | .09** | .08* | .03 | .04 | .05 | -.02 | -.70** | - | | | | | | | | |
| 9. Family SES | .11** | .14** | .04 | .26** | .01 | .03 | -.42** | .13** | - | | | | | | | |
| 10. Family Support | .23** | .24** | .28** | .20** | -.16** | .03 | -.02 | -.02 | .15** | - | | | | | | |
| 11. Family Conflict | -.07* | -.04 | -.07* | -.06 | .09** | .01 | -.17** | .07* | .02 | -.12** | - | | | | | |
| 12. Friend Support | .10** | .10** | .04 | .18** | .17** | -.12** | -.03 | -.07* | .08* | .28** | -.02 | - | | | | |
| 13. Deviance of Peers | -.20** | -.21** | -.16** | -.20** | .21** | .09** | -.07* | .16** | -.12** | -.32** | .11** | -.17** | - | | | |
| 14. Neighbor. SES | .08* | .08** | .02 | .22** | .05 | .03 | -.22** | -.09** | .43** | .08** | -.03 | .11** | -.09** | - | | |
| 15. Physical Disorder | -.07* | -.07* | -.02 | -.21** | -.03 | -.05 | .34** | -.01 | -.40** | -.07* | -.04 | -.08* | .08** | -.69** | - | |
| 16. Social Disorder | -.07* | -.06* | .01 | -.14** | -.03 | -.01 | .09** | .09** | -.26** | -.09** | .01 | -.08* | .13** | -.59** | .38** | - |
| 17. Neigh. Adversity [b] | -.09** | -.08** | -.01 | -.23** | -.04 | -.03 | .26** | .07* | -.43** | -.10** | .01 | -.10** | .12** | -.91** | .83** | .78** |

[a] Two dummy variables for Hispanic and African American ethnicities were created using European Americans as the reference category.
[b] Neighborhood Adversity. In the model final analyses, neighborhood adversity (a composite of neighborhood SES, physical disorder, and social disorder) was used due to high inter-correlations among the original variables, which would cause multicollinearity problems.
* $p < .05$, ** $p < .01$.

adversity and family SES), suggesting that there was no serious threat of multicollinearity due to high correlations among the predictors.

Inspection of the correlations between the dummy coded marital status variables and self-efficacy beliefs showed that none of correlations were significant. Therefore, marital status was not included in the model as a covariate.

*Testing the Hypothesized Model*

Multilevel modeling appears to have advantages over OLS regression when there is variation on the outcome variables across clusters (Heck & Thomas, 2000). Therefore, intraclass correlations for the outcome variables (self-efficacy beliefs) were inspected before testing the hypothesized model. The intraclass correlations ranged from .03 to .80, suggesting low variations on the self-efficacy beliefs across neighborhoods. That is, multilevel analysis may not result in any statistical advantage for the analysis of the current data. It is suggested that complex survey data with a design effect greater than 2 indicates that the clustering in the data needs to be taken into account during estimation (Muthen & Satorra, 1995). The design effect for the current sample (1 + (average cluster size – 1)*Intraclass Correlation) was 1.92. However, the current data were collected from diverse neighborhoods with different qualities. Therefore, aggregate modeling with complex survey data was used to estimate appropriate standard errors (see Stapleton, 2006).

MPlus 4.21 (Muthen & Muthen, 2007) software was used to compute multivariate regression analyses to test the hypotheses. MPlus "… computes standard errors and a chi square test of model fit taking stratification, non-independence of observations, and/or

unequal probability selection into account" (p. 420,Muthen& Muthen, 2007). Maximum Likelihood Robust estimator in MPlus provides corrected standard error estimates for clustered data.

In the tested models, all four criterion and predictor variables were allowed to covary with each other. That is, the hypothesized model was a just-identified model, which would perfectly reproduce the observed covariance matrix. Therefore, model fit statistics were not provided for the model test. First, the conceptual model was tested on the whole sample. Second, the same model was rerun for each ethnic group, and then for each gender, using multigroup regression analysis. For the latter analyses, regression estimates were constrained to be equal across groups, which made the model over-identified. Therefore, model fit indices were inspected for multigroup regression analyses.

*Predictors of Domain Specific Self-Efficacy Beliefs*

The purpose of the present study was to examine predictors of domain specific self-efficacy beliefs. Overall, the model explained 10% of the variance for school-efficacy and future efficacy, 11% for home efficacy, and 15% for neighborhood/safety efficacy (see Table 2.3). Results regarding each hypothesis and related constructs are presented below.

*Neighborhood Adversity and Self-Efficacy*

It was hypothesized that neighborhood SES (Hypothesis 1), neighborhood level physical disorganization (Hypothesis 2), and social disorganization (Hypothesis 3) would predict adolescents' self-efficacy beliefs. Because of the high correlations among

neighborhood level variables, these variables were combined into a composite neighborhood adversity score. Thus, the influences of specific indicators of neighborhood adversity were not examined. The results showed that neighborhood adversity negatively predicted neighborhood/safety self-efficacy ($\beta$ = -.09, $p$< .05) suggesting partial support for the hypothesis.

Table 2.3. Standardized Regression Coefficients for the Predictors of Domain Specific Self-Efficacy Beliefs.

| | School-Efficacy | Future-Efficacy | Home-Efficacy | Neigh./Safety[1] |
|---|---|---|---|---|
| *Neighborhood Characteristics* | | | | |
| Neighborhood adversity | -.04 | -.01 | .03 | -.09* |
| *Individual-level predictors* | | | | |
| Age | .01 | .03 | -.14** | .05 |
| Sex (1 = male; 0 = female) | -.06* | -.04 | -.03 | -.04 |
| Ethnicity | | | | |
| Hispanic | -.05 | -.07 | -.12* | -.15** |
| African American | .09 | .05 | -.04 | -.05 |
| Family SES | .02 | .06 | -.03 | .13** |
| *Family Characteristics* | | | | |
| Family Conflict | -.04 | -.02 | -.04 | -.06 |
| Family Support | .17** | .18** | .25** | .11** |
| *Peer Relations* | | | | |
| Friend Support | .02 | .01 | -.02 | .09* |
| Deviance of Peers | -.15** | -.15** | -.06 | -.13** |
| $R^2$ | .10 | .10 | .11 | .15 |

* $p$< .05, ** $p$< .01.
N = 1015
[1] Neighborhood/Safety-Efficacy

*Age and Self-Efficacy*

Two hypotheses regarding age were tested. First, older adolescents were expected to have lower self-efficacy beliefs than younger adolescents, except concerning neighborhood/safety efficacy (Hypothesis 4). Partial support for this hypothesis was found; specifically, age negatively predicted home self-efficacy ($\beta$ = -.14, $p$< .001), suggesting home self-efficacy decreases with age.

The second hypothesis (Hypothesis 5) concerning age posited that older adolescents would report higher neighborhood/safety self-efficacy than younger adolescents. This hypothesis was not supported.

*Gender and Self-Efficacy*

It was hypothesized that females would have lower efficacy beliefs than males (Hypothesis 6). The opposite was found; females reported higher school efficacy ($\beta$ = -.06, $p$< .05) than males. For the other domains there was no association between gender and level of self-efficacy.

*Ethnicity and Self-Efficacy*

It was hypothesized that minority adolescents, Hispanics and African-Americans, would have lower self-efficacy beliefs than European-American adolescents (Hypothesis 7). In partial support of the hypothesis, Hispanic adolescents were more likely to have lower home self-efficacy ($\beta$ = -.12, $p$< .05) and neighborhood/safety self-efficacy ($\beta$ = -.15, $p$< .01) than European-American adolescents. There was no association between Hispanic ethnicity and school and future efficacy beliefs. Moreover, no significant association was found between African-American ethnicity and self-efficacy beliefs. However, contrary to expectation, there was a trend for a positive association between African American ethnicity and school efficacy ($\beta$ = .09, $p$< .10).

*Family Characteristics and Self-Efficacy*

Three hypotheses were generated regarding family impact on self-efficacy beliefs of adolescents. Specifically, socioeconomic status of the family (Hypothesis 8), family

conflict (Hypothesis 9), and family support for adolescents (Hypothesis 10) were hypothesized to be related to adolescents' self-efficacy beliefs.

The results provided partial support for the hypothesis regarding family SES. Specifically, there was a positive association between family SES and neighborhood/safety self-efficacy ($\beta$ = .13, $p$< .001). In addition, there was a trend for a positive association between family SES and future self-efficacy ($\beta$ = .06, $p$< .10). Family conflict, however, did not predict any domain of self-efficacy beliefs. There was only a trend of negative association between family conflict and neighborhood/safety efficacy ($\beta$ = -.06, p < .10). Finally, the results supported the hypothesis regarding family support. Family support perceived by adolescents positively predicted school ($\beta$ = .17, $p$< .001), future ($\beta$ = .18, $p$< .001), home ($\beta$ = .25, $p$< .001), and neighborhood/safety ($\beta$ = .11, $p$< .01) self-efficacy beliefs.

*Peer Relations and Self-Efficacy*

The last two hypotheses focused on the association between peer relations and self-efficacy beliefs. Specifically, it was hypothesized that self-efficacy would be positively related to support from friends (Hypothesis 11) and inversely related to deviance of peers (Hypothesis 12).

Results provided partial support for both hypotheses. First, perceived support from friends positively predicted neighborhood/safety self-efficacy ($\beta$ = .09, $p$< .05). Second, deviance of peers negatively predicted school ($\beta$ = -.15, $p$< .001), future ($\beta$ = -.15, $p$< .001), and neighborhood/safety efficacy ($\beta$ = -.13, $p$< .001) beliefs. There was no association between deviance of peers and home self-efficacy.

*Predictors of Self-Efficacy Beliefs: Results for Each Ethnic Group*

As a secondary exploratory analysis, the conceptual model was tested using multigroup regression analysis. The regression coefficients for each ethnic group were set to be equal. The predictors and criterion variables were set free to correlate with each other. The results are presented in Table 2.4.

The model with constraints on all regression coefficients revealed nonsignificant chi-square model fit index, $\chi^2$ (64) = 65.79, p = .41 (CFI = .99, RMSEA = .01, SRMR = .03). Each predictor thus equally predicted the respective criterion variable across ethnic groups. In other words, the results from the initial model test did not change for the separate ethnic groups. Finally, the pattern of associations between predictors and criterion variables were generally consistent with the results of initial analysis.

*Predictors of Self-Efficacy Beliefs: Results for Each Gender*

The last secondary analysis tested the conceptual model for males and females separately (see Table 2.5). The regression coefficients for each ethnic group were set to be equal, and the predictors and criterion variables were set free to correlate with each other. The results are depicted in Table 2.5.

The model with constraints on all regression coefficients resulted in a nonsignificant chi-square model fit index, $\chi^2$ (64) = 44.67, $p$ = .36 (CFI = .99, RMSEA = .01, SRMR = .02), suggesting that each predictor equally predicted the respective criterion variable across ethnic groups. Most associations between the predictor and criterion variables were consistent with the initial findings. However, in the current model, Hispanic ethnicity negatively predicted all domains of self-efficacy for both females and males. In the initial model, Hispanic ethnicity was only associated with

home and neighborhood/safety efficacy. In the secondary analysis, Hispanic ethnicity was also associated with school ($\beta$ = -.10, $p$< .05) and future efficacy ($\beta$ = -.10, $p$< .05) in addition to home ($\beta$ = -.08, -.09 $p$< .05, females and males respectively) and neighborhood/safety efficacy ($\beta$ = -.09, $p$< .05, for both female and male adolescents) indicating that Hispanics had lower self-efficacy beliefs than European-American adolescents.

Overall, secondary analyses for ethnic groups and gender have provided results consistent with the initial model tests that utilized the whole sample. The only difference between the initial model results and secondary analyses was that Hispanic ethnicity negatively predicted all domains of self-efficacy beliefs for females and males.

Table 2.4. Predictors of self-efficacy for Hispanics, African-Americans, and European-Americans.

| | Hispanics (n = 469) | | | | African American (n = 369) | | | | European American (n = 177) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | School | Future | Home | Neigh./ Safety | School | Future | Home | Safety | School | Future | Home | Neigh./ Safety |
| *Neighborhood level* Neigh. Adversity | -.03 | -.02 | .02 | -.08* | -.04 | -.02 | .03 | -.09* | -.03 | -.02 | .02 | -.08* |
| *Individual-level* | | | | | | | | | | | | |
| Age | .01 | .02 | -.14* | .04 | -.01 | .02 | -.14** | .04 | .03 | .02 | -.16** | .04 |
| Sex | -.05* | -.03 | -.03 | -.04 | -.06* | -.04 | .03 | -.04 | -.06* | -.04 | -.03 | -.04 |
| *Family Characteristics* | | | | | | | | | | | | |
| Family SES | .02 | .03 | -.03 | .10** | .02 | .04 | .04 | .12** | .02 | .05 | -.04 | .12** |
| Family Conflict | -.03 | -.01 | -.03 | -.06 | -.04 | -.02 | -.03 | -.07 | -.05 | -.02 | .04 | -.07 |
| Family Support | .16** | .18** | .24** | .11* | .17** | .20** | .24** | .11** | .17** | .22*** | .25*** | .11** |
| *Peer Relations* | | | | | | | | | | | | |
| Friend Support | .03 | .01 | -.02 | .09* | .03 | .01 | -.02 | .09** | .03 | .01 | -.02 | .09* |
| Deviance of Peers | -.13** | -.13** | -.06 | -.12** | -.17* | -.17** | -.07 | -.14* | -.13** | -.16** | -.06 | -.12** |
| $R^2$ | .07 | .07 | .11 | .09 | .10 | .10 | .10 | .13 | .08 | .11 | .13 | .11 |

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

Model fit statistics: $\chi^2$ (64) = 65.79, $p$ = .41, CFI = .99, RMSEA = .01, SRMR = .03.

Table 2.5. Predictors of Self-Efficacy for Males and Females.

| | Females (n = 510) | | | | Males (n = 505) | | | |
|---|---|---|---|---|---|---|---|---|
| | School | Future | Home | Neigh./ Safety | School | Future | Home | Neigh./ Safety |
| *Neighborhood level* | | | | | | | | |
| Neigh. Adversity | -.02 | -.01 | .02 | -.11** | -.02 | -.01 | .02 | -.11** |
| *Individual level* | | | | | | | | |
| Age | .01 | .03 | -.13** | .05 | .01 | .03 | -.14** | .05 |
| Ethnicity | | | | | | | | |
| Hispanic | -.10* | -.10* | -.08* | -.09* | -.10* | -.10* | -.09* | -.09* |
| African American | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 |
| *Family Characteristics* | | | | | | | | |
| Family SES | .02 | .05 | -.03 | .14** | .02 | .05 | -.03 | .14** |
| Family Conflict | -.05 | -.02 | -.03 | -.05 | -.04 | -.02 | -.03 | -.05 |
| Family Support | .19** | .19** | .23** | .10** | .17** | .17** | .24** | .10** |
| *Peer Relations* | | | | | | | | |
| Friend Support | .02 | .01 | -.01 | .10* | .02 | .01 | -.01 | .09** |
| Deviance of Peers | -.15** | -.16** | -.06 | -.11** | -.14** | -.15** | -.07 | -.14** |
| $R^2$ | .10 | .10 | .11 | .15 | .09 | .09 | .10 | .14 |

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

Model fit statistics: $\chi^2$ (64) = 44.67, $p$ = .36, CFI = .99, RMSEA = .01, SRMR = .02.

## Study III

## Results

*Preliminary Analyses*

Table 3.1 presents descriptive statistics for the criterion variables. All other variables included in the model were the same as in Study 2; therefore, descriptive statistics and bivariate correlations for them are not presented here (see Table 2.1. and Table 2.2.). Zero-order correlations are depicted in Table 3.2. Regarding the criterion variables, depression/anxiety symptoms was positively correlated with delinquency ($r$ = .40, $p$< .01) but not with any other criterion variable. On the other hand, delinquency and substance use variables (days smoked, days alcohol use, days drug use) were positively correlated, with zero-order correlations ranging from .31 to .51 ($p$< .01). Depression/anxiety symptoms and delinquency were negatively correlated with all domains of self-efficacy beliefs, indicating that low levels of self-efficacy beliefs were related to high levels of depression/anxiety and delinquency. Number of days smoking was negatively correlated with school-efficacy and home-efficacy beliefs. Finally, alcohol use and drug use were negatively correlated with all but safety-efficacy beliefs.

Table 3.1. Means, Standard Deviations, Minimum and Maximum Values for the Observed Variables.

| Criterion Variables | n | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| Depression/Anxiety Symptoms | 895 | 5.59 | 4.86 | 0 | 32 |
| Delinquency | 895 | 2.93 | 2.27 | 0 | 12 |
| *Substance Use* | | | | | |
| Days smoked during last month | 1015 | 1.41 | 1.34 | 0 | 7 |
| Days drunk alcohol during last month | 1015 | 1.20 | .72 | 0 | 7 |
| Days used drugs during last month | 1015 | 1.18 | .82 | 0 | 7 |

Table 3.2. Zero-order Correlations among the Criterion Variables, and the Correlations of the Criterion Variables with the Mediator and the Predictor Variables.[1]

| | Depression/ Anxiety | Delinquency | Days smoked | Days Alcohol Use | Days Drug Use |
|---|---|---|---|---|---|
| *Outcome Variables* | | | | | |
| Depression/Anxiety | - | | | | |
| Delinquency | .40** | - | | | |
| Days smoked | .06 | .34** | - | | |
| Days Alcohol Use | .05 | .31** | .51** | - | |
| Days Drug Use | .06 | .32** | .53** | .48** | - |
| *Mediator Variables* | | | | | |
| School Efficacy | -.29** | -.23** | -.07* | -.09** | -.06* |
| Future Efficacy | -.31** | -.24** | -.04 | -.10** | -.08* |
| Home Efficacy | -.33** | -.35** | -.18** | -.16** | -.16** |
| Safety Efficacy | -.28** | -.19** | -.03 | -.05 | -.06 |
| *Predictor Variables* | | | | | |
| Family Support | -.20** | -.18** | -.12** | -.10** | -.14** |
| Family Conflict | .06 | .07* | .11** | .08* | .10** |
| Friend Support | -.10** | .03 | .09** | .07* | .03 |
| Deviance of Peers | .13** | .29** | .17** | .18** | .22** |
| Neigh. Adversity[2] | .08* | .01 | -.09** | -.06* | -.01 |
| *Demographic Variables* | | | | | |
| Age | -.02 | .32** | .33** | .32** | .25** |
| Sex | -.15** | .06 | .03 | .02 | .02 |
| Hispanic[3] | .12** | .02 | -.08** | -.05 | -.07 |
| African-American[3] | -.07* | .03 | -.06 | -.03 | .01 |
| Family SES | -.12** | -.03 | .05 | .04 | .03 |

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

[1] The correlations among the mediator and predictor variables are presented in Table 2.2.

[2] Neighborhood Adversity.

[3] The reference category for both ethnic groups is European-Americans.

*Testing the Hypothesized Model*

MPlus 4.21 (Muthen & Muthen, 2007) software was used to test the proposed mediation model. The intraclass correlations ranged from .01 to .06 for the criterion variables, and the design effect for the largest intraclass correlation was 1.51. that is, modeling clustering would not have a statistical advantage in the current data (Muthen &

Satorra, 1995). Therefore, the multilevel analysis technique was replaced with the MPlus COMPLEX option which computes corrected standard errors and a chi-square test of model fit taking into account the clustered nature of the data (p. 420,Muthen & Muthen, 2007). MLR estimator was used to estimate corrected standard errors.

Figure 5 depicts the tested mediation model. In this model, domain specific self-efficacy beliefs served as the mediator variables. The predictor variables in the model were family SES, family support, family conflict, friend support, delinquency of peers, and neighborhood adversity. Depression/anxiety symptoms, delinquency, smoking, alcohol use, and drug use during the previous month were the criterion variables. Finally, demographic variables including age, gender, and the ethnicity of the participants were included in the model as predictors of both endogenous variables and the outcome variables. The predictor variables were assessed at Time 1 and the mediator and criterion variables at Time 2. The overall model was tested first, and then the model was rerun for males and females separately to explore gender differences.

The initial model test using the Maximum Likelihood Robust estimation technique revealed a significant chi-square model fit index, $\chi^2$ (30) = 68.30, $p < .01$, however, the relative fit index values implied that the model was plausible (CFI = .98, RMSEA = .04, SRMR = .02). Inspection of modification indices indicated that adding a direct path from deviance of peers at Time 1 to adolescent delinquency at Time 2 would improve the model fit. Hence, the modified model revealed a better model fit, $\Delta\chi^2(1) = 44.20$, $p < .01$, $\chi^2_{\text{new model}}$ (29) = 57.88, p < .01, CFI = .99, RMSEA = .03, SRMR = .02.

Table 3.3 depicts the path coefficients. In the following sections, the results for the associations between the predictor variables and mediators, as well as the

demographics and mediator variables are not described because they were already examined in Study II. First, the associations between mediator variables and criterion variables, and demographics and criterion variables are presented. Second, the mediating role of self-efficacy beliefs on the association between the predictor variables and criterion variables are reported.

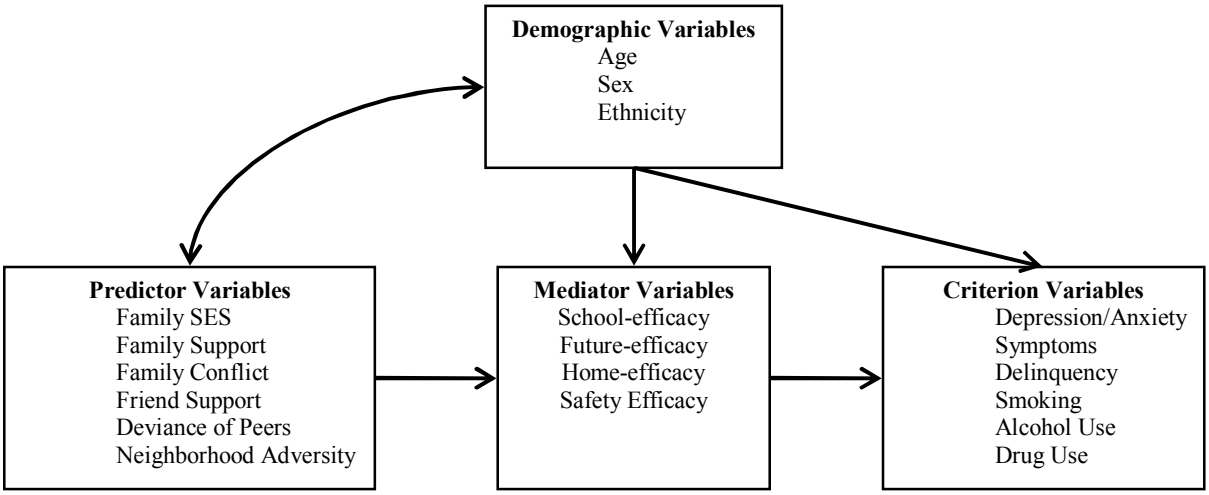


Figure 5. The Mediation Model.

*Predictors of Adolescent Developmental Outcomes*

Inspection of the path coefficients from the mediating variables to adolescent developmental outcomes revealed that different developmental outcomes were predicted by different self-efficacy beliefs and demographic variables. First, depression and anxiety symptoms were negatively predicted by future-efficacy ($\beta$ = -.14, $p < .01$), home-efficacy ($\beta$ = -.21, $p < .01$), and safety-efficacy ($\beta$ = -.11, $p < .01$) beliefs. In addition to self-efficacy beliefs, sex of the participants also negatively predicted depression and anxiety symptoms suggesting that females were more likely to show higher levels of

symptoms. Secondly, home-efficacy negatively ($\beta$ = -.22, p < .01) predicted delinquency at Time 2 whereas having delinquent peers at Time 1 ($\beta$ = .11, p < .01) and being older ($\beta$ = .26, p < .01) positively predicted delinquency. Third, smoking was negatively predicted by home-efficacy ($\beta$ = -.13, p < .01). Regarding the effects of demographics, smoking was positively predicted by age ($\beta$ = .30, p < .01) whereas Hispanic ethnicity and African-American ethnicity were negatively related to smoking ($\beta$ = -.24 and -.23, p < .01, respectively) indicating that both groups were less likely to smoke compared to European-American adolescents.

None of the self-efficacy beliefs significantly predicted alcohol use. On the other hand, age positively predicted alcohol use ($\beta$ = .30, p < .01), whereas Hispanic ($\beta$ = -.12, p < .01) and African-American ethnicity ($\beta$ = -.12, p < .01) negatively predicted alcohol use. Finally, drug use was negatively predicted by home-efficacy ($\beta$ = -.14, p < .01). Regarding the effects of demographics, age positively ($\beta$ = .23, p < .01), and Hispanic ethnicity negatively ($\beta$ = -.13, p < .01) predicted drug use. School efficacy and family SES did not predict any of the adolescent outcomes.

*Mediating Roles of Self-Efficacy Beliefs*

The major purpose of the current study was to test the mediating effects of self-efficacy beliefs on the association between family, peer, and neighborhood adversity variables and adolescent developmental outcomes. Inspection of indirect effects revealed partial support for the mediation hypotheses of the current study.

First, future-efficacy mediated the association between family support and depression and anxiety symptoms ($z$ = -2.72, p < .01). Specifically, high level of family support was associated with higher future-efficacy, and in turn lower level of

Table 3.3. Standardized Path Coefficients from the Final Model.

| | Developmental Outcomes | | | | |
|---|---|---|---|---|---|
| | Depression/ Anxiety | Delinquency | Days smoked | Days Alcohol Use | Days Drug Use |
| *Mediator Variables* | | | | | |
| School-Efficacy | -.07 | -.02 | .01 | -.01 | .03 |
| Future-Efficacy | -.14** | -.08 | .02 | -.05 | -.03 |
| Home-Efficacy | -.21** | -.22** | -.13** | -.07 | -.10* |
| Safety-Efficacy | -.11** | -.06 | -.03 | -.04 | -.05 |
| Deviance of Peers | - | .11** | - | - | - |
| *Demographics* | | | | | |
| Age | -.06 | .26** | .30** | .30** | .23** |
| Sex[2] | -.18** | .05 | .04 | .03 | .03 |
| Hispanic[3] | .04 | .06 | -.23** | -.14** | -.13* |
| African-American[3] | -.01 | .06 | -.23** | -.13** | -.09 |
| $R^2$ | .20 | .23 | .15 | .13 | .09 |

| | Mediator Variables | | | |
|---|---|---|---|---|
| | School Efficacy | Future Efficacy | Home Efficacy | Safety Efficacy |
| *Predictor Variables* | | | | |
| Family SES | .02 | .06 | -.03 | .13** |
| Family Support | .17** | .18** | .25** | .10** |
| Family Conflict | -.04 | -.02 | -.04 | -.06 |
| Friend Support | .02 | .01 | -.02 | .09* |
| Deviance of Peers | -.15** | -.15** | -.06 | -.13** |
| Neigh. Adversity[1] | -.04 | -.01 | .03 | -.09* |
| *Demographic* | | | | |
| Age | .01 | .03 | -.14** | .05 |
| Sex[2] | -.06* | -.04 | -.03 | -.04 |
| Hispanic[3] | .05 | -.07 | -.12* | -.15** |
| African-American[3] | .09 | .05 | -.04 | -.05 |
| $R^2$ | .10 | .10 | .11 | .15 |

* $p < .05$, ** $p < .01$
Model Fit Statistics: $\chi^2(29) = 57.88$, $p < .01$, CFI = .99, RMSEA = .03, SRMR = .02.
[1] Neighborhood Adversity
[2] The reference group for gender was females.
[3] The reference group for both ethnicity variables was European-Americans.

depression/anxiety symptoms. Second, future-efficacy also mediated the relationship between deviance of peers at Time 1 and depression/anxiety symptoms at Time 2 ($z$ = 2.39, $p$< .05). Deviance of peers negatively affected future-efficacy, which in turn, negatively predicted depression/anxiety symptoms.

Second, home-efficacy mediated several associations in the model. For example, family support indirectly predicted anxiety/depression symptoms through home-efficacy beliefs ($z$ = -4.49, $p$< .01). Specifically, family support predicted higher level of home-efficacy, which in turn predicted lower depression/anxiety symptoms. Next, home-efficacy significantly mediated the association between family support and delinquency ($z$ = -4.22, $p$< .01). High perceived family support was related to higher level of home-efficacy, and in turn lower likelihood of delinquency. Finally, home-efficacy mediated the effects of family support on both smoking ($z$ = -2.58, $p$< .01) and drug use ($z$ = -1.99, $p$< .01). Specifically, family support positively affected home efficacy, and in turn reduced the likelihood of smoking and drug use among adolescents.

Finally, safety-efficacy mediated three associations. First, safety-efficacy significantly mediated the effects of neighborhood adversity on depression/anxiety symptoms ($z$= 1.99, p < .05) suggesting that living in adverse neighborhoods reduces safety-efficacy which increases depression/anxiety symptoms. Second, safety-efficacy also mediated the effects of family support on depression/anxiety symptoms ($z$ = -2.30, $p$< .01). Specifically, family support positively affected safety efficacy, which in turn negatively predicted depression/anxiety symptoms. Finally, deviance of peers at Time 1 affected depression/anxiety symptoms at Time 2 via safety-efficacy ($z$ = 2.45, $p$< .01).

Adolescents with higher number of deviant peers developed lower levels of safety-efficacy, which in turn was linked to higher levels of depression/anxiety symptoms.

Contrary to the hypotheses, the effects of family SES, family conflict, and peer support did not have any significant indirect effect on adolescent outcomes via self-efficacy beliefs.

*Mediating Roles of Self-Efficacy Beliefs by Gender*

Consistent with the argument in the literature regarding gender differences in the effects of self-efficacy, the multi-group analysis method was used to test the mediation model for both males and females. Constraints were set to all paths meaning that all paths would be equal across gender groups. When the model with constraints fit the data, this suggests that the associations between the variables were equivalent for both males and females. The results are presented in Table 3.4. The initial model revealed a significant chi-square statistic ($\chi^2(130) = 169.01$, $p < .01$, CFI = .98, RMSEA = .03, SRMS = .04) suggesting that the same mediation model did not apply to both gender groups.

Inspection of the modification indices suggested that first, releasing the constraint on the path from home-efficacy to depression/anxiety symptoms, and secondly, adding a direct path from deviance of peers to drug use would improve the model fit. The first modification, releasing the constraint on the path from home-efficacy to depression/anxiety symptoms, improved the model significantly ($\Delta\chi^2(1) = 3.86$, $p < .05$) although the chi-square model fit index for the new model was still significant ($\chi^2(129) = 158.06$, $p < .05$). Adding a direct path from deviance of peers to drug use,

Table 3.4. Standardized Path Coefficients from the Multigroup Model Testing Gender Differences.

| | Outcome Variables | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Depression/Anxiety | | Delinquency | | Smoking | | Alcohol Use | | Drug Use | |
| *Mediator Variables* | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male |
| School-Efficacy | -.07 | -.09 | -.02 | -.02 | .01 | .01 | -.01 | -.01 | .05 | .04 |
| Future-Efficacy | -.12** | -.15** | -.07 | -.07 | .02 | .01 | -.06 | -.05 | -.01 | -.01 |
| Home-Efficacy[2] | -.28** | -.09* | -.24** | -.22** | -.13** | -.11** | -.08 | -.07 | -.13** | -.10** |
| Safety-Efficacy | -.12** | -.14** | -.06 | -.06 | -.03 | -.03 | -.03 | -.03 | -.06 | -.05 |
| Deviance of Peers[3] | - | - | .12** | .12** | - | - | - | - | .12** | .08 |
| *Demographics* | | | | | | | | | | |
| Age | -.06* | -.08* | .26** | .26** | .31** | .28** | .31** | .28** | .24** | .20** |
| Hispanic[*] | .03 | .04 | .03 | .03 | -.25** | -.23** | -.15** | -.14** | -.14** | -.12** |
| African-American[*] | -.01 | -.01 | .05 | .05 | -.24** | -.22** | -.13** | -.12** | -.12** | -.10** |
| $R^2$ | .21 | .14 | .23 | .22 | .17 | .13 | .14 | .11 | .12 | .08 |

| | Mediator Variables | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | School-Efficacy | | Future-Efficacy | | Home-Efficacy | | Safety-Efficacy | |
| *Predictor Variables* | Female | Male | Female | Male | Female | Male | Female | Male |
| Family SES | .02 | -.04 | .06 | .06 | -.03 | -.03 | .13** | -.15** |
| Family Support | .18** | .17** | .19** | .17** | .24** | .24** | .11** | .10** |
| Family Conflict | -.04 | -.04 | -.01 | -.01 | -.03 | -.03 | -.06 | -.06 |
| Friend Support | .02 | .02 | .01 | .01 | -.01 | -.01 | .09* | .09* |
| Deviance of Peers | -.15** | -.15** | -.16** | -.16** | -.06 | -.06 | -.13** | -.13** |
| Neigh. Adversity[1] | -.04 | -.03 | -.01 | -.01 | .03 | .03 | -.09* | -.09* |
| *Demographic* | | | | | | | | |
| Age | .01 | .01 | .03 | .03 | -.13** | -.14** | .05 | .05 |
| Hispanic[*] | -.05 | -.05 | -.07 | -.07 | -.11* | -.12** | -.15** | -.15** |
| African-American[*] | .09 | .09 | .05 | .05 | -.03 | -.03 | -.05 | -.05 |
| $R^2$ | .10 | .09 | .10 | .09 | .10 | .10 | .15 | .15 |

* $p < .05$, ** $p < .01$, Female n = 510, Male n = 505

Model Fit Statistics: $\chi^2(127) = 144.57$, CFI = 99, RMSEA = .02, SRMR = .03

[*] The reference group for both ethnic groups was European-Americans.

[1] Neighborhood Adversity

[2] The constraint on the path from home-efficacy to depression/anxiety symptoms was removed while all other paths were constrained.

[3] A direct path from deviance of peers to drug use with no constraint was added to the final model.

however, improved the model fit significantly ($\Delta\chi^2(2) = 7.64$, $p < .05$) and revealed a nonsignificant chi-square value ($\chi^2(127) = 144.57$, $p = .14$, CFI = .99, RMSEA = .02, SRMS = .03).

The model modifications indicated that the effects of home-efficacy on depression/anxiety symptoms for females ($\beta = -.28$, $p < .01$) was higher than that for males ($\beta = -.09$, $p < .05$). Moreover, the final model suggested that deviance of peers had a significant direct influence on female adolescents' drug use ($\beta = .12$, $p < .01$) whereas there was no significant effect of peer deviance on drug use for males. Except for these differences, the associations between the variables in the models were equivalent for both males and females.

Regarding the mediating effects of self-efficacy beliefs, no difference was found between males and females. That is, all mediation effects reviewed in the overall model test were the same for both genders. The results for the mediation effects are depicted on Table 3.5.

Table 3.5. Significant Indirect Effects by Gender[1]

| Relationships | Female | | Male | |
|---|---|---|---|---|
| | $z^2$ | Indirect Effect | $z^2$ | Indirect Effect |
| *Mediator: Future Efficacy* | | | | |
| Family Support → Future-efficacy → Depression/Anxiety Symptoms | -2.61** | -.02 | -2.61** | -.03 |
| Deviance of peers → Future-efficacy → Depression/Anxiety Symptoms | 2.35* | .02 | 2.35* | .02 |
| *Mediator: Home-efficacy* | | | | |
| Family Support → Home-efficacy → Depression/Anxiety Symptoms | -4.14** | -.07 | -2.04* | -.02 |
| Family Support → Home-efficacy → Delinquency | -4.12** | -.06 | -4.12** | -.05 |
| Family Support → Home-efficacy → Smoking | -2.43* | -.03 | -2.43* | -.03 |
| Family Support → Home-efficacy → Drug Use | -2.33* | -.03 | -2.33* | -.02 |
| *Mediator: Safety-efficacy* | | | | |
| Family Support → Safety-efficacy → Depression/Anxiety Symptoms | -2.40* | -.01 | -2.40* | -.02 |
| Deviance of Peers → Safety-efficacy → Depression/Anxiety Symptoms | 2.58** | .02 | 2.58* | .02 |
| Neighborhood Adversity → Safety-efficacy → Depression/Anxiety Symptoms | 2.08* | .01 | 2.08* | .01 |

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

[1] Only the significant mediating effects were included in the table.

[2] MPlus provides z-values as the tests of indirect effects, which is computed by dividing the unstandardized indirect effect by its standard error

# Chapter 6

## Discussion

The present research aimed to accomplish three interrelated goals through three separate studies. These aims were to examine 1) the structure of a multidimensional self-efficacy measure (Study I), 2) the predictors of adolescents' domain specific self-efficacy beliefs at the levels of individual, family, peer, and neighborhood (Study II), and 3) the mediating role of domain specific self-efficacy beliefs in predicting adolescents' developmental outcomes (Study III). The findings of Study I provided evidence for the multidimensional structure of a self-efficacy measure, the high intercorrelations between domains notwithstanding. The overall findings of Study II suggested that family environment and peer relations have the most pronounced influences on multiple domains of adolescent self-efficacy beliefs, whereas individual characteristics and neighborhood context provided only partial support for the hypotheses, exerting influence on specific domains. Taken together, the findings of Study 2 suggest the importance of examiningthe influence of multiple factors, across levels, on self-efficacy beliefs, and of examining predictors of self-efficacy in a domain specific manner. Finally, Study III provided evidence for the mediating role of domain specific self-efficacy beliefs in the associations between characteristics of the adolescents' developmental context and emotional and behavioral outcomes. In the following sections findings from each study are discussed, followed by a discussion of overall limitations, future directions, and implications of the research.

*Study I: Structure of Adolescent Self-Efficacy Beliefs*

The aim of the first study was to examine the structure of a multidimensional self-efficacy measure. Bandura (1997, 2006b) suggests that self-efficacy beliefs need to be measured domain specific. Nevertheless, a number of studies focusing on predictors of self-efficacy or its outcomes have utilized global self-efficacy measures. Studies have used general self-efficacy measures (Chen, Gully, & Eden, 2001; Luszczynska, Scholz, &Schwarzer, 2005), or measures with few numbers of items and low reliabilities (e.g., Boardman and Robert, 2000). Such measurement strategies contradict with the original propositions of Self-Efficacy Theory regarding the domain specificity of efficacy beliefs (Bandura, 1997) and Bandura's suggestions for developing effective measures of efficacy (2006b).

Study I provided evidence for the multidimensional structure of adolescent self-efficacy beliefs. The results of the confirmatory factor analysis suggested that adolescents' self-efficacy beliefs in the domains of school, future, home, and neighborhood/safety are distinct but interrelated constructs[3]. In addition, the structure of the scale was highly stable across two independent groups obtained by randomly dividing the overall study sample.

The correlations between the domains ranged from moderate to high, consistent with the conceptual links of respective domains. For example, the highest correlation

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[3] Even though these four domains could be explained by a second order latent factor representing global self-efficacy, Study II and Study III have provided evidence regarding the distinctiveness of the domains. That is, the associations between self-efficacy beliefs and both the predictors and the outcomes showed variations across the domains, suggesting the validity of the domain specificity perspective.

was between school and future efficacy, suggesting that adolescents who feel efficacious about their school tasks foresee a better future for themselves. In fact, evidence suggests that early academic achievement is highly related to overall life accomplishments, psychological wellbeing, health, and happiness (Newsome & Day, 1999; Prelow, Bowman, & Weaver, 2005).

On the other hand, the lowest association between domains was observed for school-efficacy and neighborhood/safety efficacy. The skill sets required for success in the school context and for avoiding risks and dangers in the neighborhood are distinct. Therefore, the association between these constructs was lower than the other bivariate correlations.

Significant correlations between the domains could also be a result, in part, of generalizations of perception of competence in one domain to another, consistent with Bandura's (1997) argument of transference. Specifically, Bandura suggested that developing skills and perceived confidence for successful accomplishment of a task may lead to development of cognitions related to the ability to execute behaviors in other domains. For domains requiring similar skill sets, the observed association would be stronger. For example, perceived efficacy of learning math may be highly related to the efficacy of learning physics, while having a weak correlation with sports-efficacy. Of note, strong associations between two domains, due to transference, does not necessarily imply that the predictors and outcomes of these two domains are the same. For example, physics efficacy of a student may be measured high due to transference from high math efficacy. Nevertheless, physics efficacy may not necessarily predict grades in a math course. Another possible explanation for the significant intercorrelations between the

domains is that personality characteristics of individuals may influence their judgments of their capabilities. For example, Schyns and von Collani(2002) examined the association between occupational self-efficacy and a set of personality variables. Their findings indicated that occupational self-efficacy was moderately correlated with both self-esteem ($r$ = .39) and internal locus of control ($r$ = .49). Similarly, Magaletta and Oliver (1999) reported that self-efficacy was significantly correlated with optimism ($r$ = .59) among college students. These studies either used measures exclusively focusing on a single domain, or global efficacy measure. However, it is possible that personality characteristics could influence efficacy beliefs in different domains in similar ways. Future studies should explore the relationship between personality characteristics and efficacy beliefs across multiple domains.

Even though there have been attempts to develop multidimensional scales of self-efficacy (e.g., Bandura et al., 1999; Martinelli, Bartholomeu, Caliatto, & Sassi, 2009; Miller, Coombs, & Fuqua, 1999; Pastorelli et al., 2001), most studies have failed to provide substantive evidence regarding scale multidimensionality. For example, Miller and colleagues (1999) examined Bandura's(1989a) Multidimensional Self-Efficacy Scale in a group of high school students. Even though there were some consistencies found with Bandura's model, overall they failed to find evidence confirming the factor structure that was originally proposed. Also, the factor structure of this particular scale was not confirmed in a sample of undergraduate students (Choi, Fuqua, & Griffin, (2001). In addition, Pastorelli et al. (2001) analyzed the factor structure of Bandura's (1990) Children's Perceived Self-Efficacy Scale among Italian, Hungarian, and Polish early and

mid adolescents. The factor structure was not consistent with Bandura's(1990) expectations regarding how the items should have loaded onto the different factors.

In a more recent study, Martinelli and colleagues (2009) attempted to develop a multidimensional self-efficacy scale for children. Following rigid guidelines, Martinelli and her colleagues generated 78 items to measure self-efficacy beliefs in four domains, including social relations, academic performance, learning, and study techniques. Based on item response theory and the results of factor analysis, the authors retained 20 items in the final scale, assessing self-efficacy in two domains: academic performance and study techniques, contrary to their original conceptual assertion that the items would constitute four factors.

A common aspect of these studies was that they all used principal component analysis and exploratory factor analysis, which are essentially data driven analytic techniques (Tabachinick&Fidell, 2001). It is possible that these studies failed to find support for scale multidimensionality because items measuring theoretically distinct but correlated dimensions may load in a single factor in principal component and exploratory factor analysis. Therefore, the studies were limited in providing evidence regarding the plausibility of their models. In the present study, the use of confirmatory factor analysis to test the factor structure of the self-efficacy measure provided evidence for the multidimensional structure of the adolescent self-efficacy beliefs, even though the domains were highly intercorrelated. In the present study, the factor structure was found to be stable across two independent samples providing additional support for the multidimensional nature of adolescents' conceptions of their capabilities.

## Study II: Predictors of Adolescents' Self-Efficacy Beliefs

The aim of the second study was to examine predictors of domain specific self-efficacy beliefs across multiple levels, including individual, family, peer, and neighborhood. The following sections present a discussion of the findings, respectively, regarding predictors of adolescent efficacy beliefs at the levels of individual, family, peer, and neighborhood.

### Individual Characteristics and Self-Efficacy Beliefs

The present study examined the effects of age, gender, and ethnicity on efficacy beliefs of adolescents. The following sections discuss the respective findings.

*Age.* The present study hypothesized that older adolescents would have lower self-efficacy beliefs in the domains of future, school, and home, and higher beliefs in neighborhood/safety efficacy. Results indicated that age was only related to home efficacy. Specifically, as predicted, older adolescents had lower efficacy beliefs regarding their capabilities of maintaining positive relationships and engaging in activities at home, and generating support from parents, compared to younger adolescents.

Several theories suggest that parent-child relationships pass through a series of transformations over the life span (see Collins & Laursen, 2004 for a review). Adolescence is a period when the young individual begins to separate him/herself from parents and define themself with reference to their own qualities and relationships, in contrast to the high interdependence between parent-child dyads at earlier ages. Evolutionary theory explains this transformation as an indication of the need for individuation from parents so as to start seeking mates elsewhere with an ambition to

transfer their genes to the next generations (Collins & Laursen, 2004). Erikson (1968), however, explains this separation as an endeavor towards autonomy striving and ego identity development. The process of separation and individuation, eventually, may result in parent-child conflict (Collins & Laursen, 2004). These transformations and the experience of higher levels of conflict with parents may lead to lower home-efficacy beliefs among adolescents. This process of change is consistent with Bandura's (1997) view that self-efficacy in any one domain may fluctuate over time depending on the current experiences of the individual.

Younniss and Smollar (1985) argue that adolescents develop more egalitarian relationships with their peers. During this period, they start comparing their peer relationships to parental relationships, which is more hierarchical. As a result, they may start perceiving their parents as less supportive, and more intrusive and punitive compared to when they were children. In turn, these changing perceptions of parents may result in reduced home-efficacy beliefs among older adolescents.

Contrary to the hypothesis, age was not related to school, future, or neighborhood/safety efficacy beliefs. Surprisingly, some previous studies of child and adolescent self-efficacy beliefs regarding academic tasks have reported a negative correlation between age and performance expectations (Pajares, 1996a; Schunk & Meece, 2006; Schunk & Pajares, 2004). In contrast, some other studies reported an increase in math and language efficacies by age (e.g., Shell, Colvin, & Brunning, 1995; Zimmerman & Martinez-Pons, 1990). Schunk and Meece(2006) argued that the extent of specificity of measures may result in different findings in studies examining the link between age and self-efficacy. For example, a highly specific scale assessing efficacy in learning

math may show a different pattern of relationship with predictors than a school efficacy measure that includes items regarding a set of different tasks. Indeed, the school-efficacy measure in the current study included a set of items tapping general academic skills as well as specific skills such as math and reading. Adolescents at different age levels may have different efficacy beliefs regarding their ability to "figure out answers in school" versus "understand math." Therefore, not finding an association between age and school-efficacy could be due to how school efficacy was measured in the present study.

In general, age has an inverse correlation with performance expectations and competence beliefs (Schunk&Meece, 2006). In contrast, the current study did not find an association between age and future-efficacy beliefs. Future-efficacy, in the present study, was measured by items assessing perceived competence in becoming successful, achieving goals, and ensuring happiness in the future. It is possible that the responses to these items may reflect adolescents' hopes, future orientations, and optimism, which may not change significantly over time. Indeed, several studies focusing on adolescents' hope, optimism, and expectations regarding the future did not find any difference between different age groups (e.g., Seginer, 1992; Seginer & Halabi-Kheir, 1998).

The final hypothesis regarding age was that older adolescents would have higher neighborhood/safety efficacy than younger adolescents, given that they would be more experienced in navigating the streets of their neighborhoods. In contrast, a relationship with age was not found. One possible explanation of the absence of an association between age and neighborhood/safety-efficacy is that younger adolescents may have overestimated their skills related to avoiding dangers in the streets. In fact, previous studies have suggested that children and early adolescents may overestimate their

capabilities even if the task is difficult for their developmental level (Pajares, 1996a; Schunk, 1996). Younger adolescents might overestimate their neighborhood/safety-efficacy due to lack of experience in navigating streets alone, whereas older adolescents might feel competent as a result of their experience of spending more time outside of their home. As a result, overestimation of capabilities by young adolescents might have obscured the expected association between age and neighborhood/safety efficacy.

*Gender*. The present study hypothesized that males would have higher self-efficacy beliefs than females. In contrast, females reported higher school-efficacy than males whereas there was no differences between males and females on the other domains. Indeed, previous studies have reported mixed results regarding gender differences in self-efficacy. In general, studies on self-efficacy beliefs in academic domains have provided evidence favoring boys over girls (Anderman & Young, 1994; Zimmerman & Martinez-Pons, 1990). However, some studies have found that girls may have higher self-efficacy than boys (Britner & Pajares, 2001), or no gender differences (Pajares, 1996b; Pajares & Graham, 1999; Smith, Sinclair, & Chapman, 2002). Consistent with the argument of Schunk and Meece(2006) regarding the impact of measurement, the specificity and content of the current self-efficacy measure may be related to finding no gender differences in future, home, and neighborhood/safety efficacy, and the finding that girls had higher school-efficacy beliefs than boys. Specifically, the subscales of the self-efficacy measure in the current study included a set of items that may require different sets of skills to successfully execute the given action. For example, two of the items on the home-efficacy subscale were 1) "can get help from parents", and 2) "can be self with parents." The task assessed by the first item requires social skills and high

interconnectedness, whereas the task assessed by the second item requires autonomy. Studies on gender socialization indicate that girls are raised to be interdependent and socially connected whereas boys are raised to be independent and autonomous (Peters, 1994). Thus, it is possible that boys and girls may respond to the two items in different ways, with the mean scores obscuring possible gender differences in this domain. Future studies should examine the measurement invariance of the self-efficacy measures across gender.

Secondary analysis examining the predictors of self-efficacy beliefs for males and females separately indicated that the effect of predictors in each of the four domains was invariant across gender. Even though Self-Efficacy Theory acknowledges possible mechanisms, such as gender socialization, which may lead to gender differences in self-efficacy beliefs, Bandura (1997) assumes that the sources of self-efficacy beliefs would be same across different groups. To date, there have been few studies examining predictors of efficacy beliefs in general, much less separately for boys and girls. Thus, the present study is one of the first to provide evidence for this particular premise of Self-Efficacy Theory.

*Ethnicity.* The present study hypothesized that minority adolescents, African-American and Hispanics, would have lower self-efficacy beliefs than European-Americans. The results provided partial support for this hypothesis. Hispanic origin youth reported lower home- and neighborhood/safety-efficacy beliefs. However, African-American origin did not predict any of the four domain specific self-efficacy beliefs. Previous studies suggested that Hispanic high school-students had lower self-efficacy beliefs in academic domains (such as writing and language) than European-

Americans (Pajares & Johnson, 1996). The current finding suggests that perhaps overall school-efficacy might differ from academic domains that are highly specific to particular tasks such as math, writing, and language.

Since most research to date examining ethnic differences in self-efficacy has focused on academic contexts, there is little theoretical or empirical basis to explain the inverse relation found between Hispanic origin and home- and neighborhood/safety efficacy. One possible explanation concerning the lower home-efficacy beliefs of Hispanics, however, may be derived from the parenting literature. Hispanic parents tend to display more authoritarian parenting style than their European-American counterparts (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). Authoritarian parenting style, characterized by high parental control and restriction on autonomy development and individuation, has been found to be consistently related to children's and adolescents' competence development (Baumrind, 1989; Darling & Steinberg, 1993; Dornbusch et al., 1987). In addition, authoritarian parents are less sensitive to their children's needs and more concerned with children meeting their parental expectations (Baumrind, 1989). In the current sample, it is possible that Hispanic parents were more likely to use an authoritarian parenting style, which in turn could have led to low efficacy beliefs in their children, especially home-efficacy.

Furthermore, in the current study some of the Hispanic adolescents may be children of first generation immigrants. Immigrants, especially those lacking resources such as education, language skills, and stable jobs, may experience higher level of financial and emotional strains that may result in problems in family relations (Bacallao & Smokowski, 2006; Foner, 1997), and less ability to provide adequate support to their

children. This in turn can result in low efficacy beliefs. The present study neither eliminated first generation immigrants from the study sample nor statistically controlled for immigration status or history. Future studies should explore the association between ethnicity and self-efficacy beliefs, taking immigration status and history into account.

With regards to neighborhood/safety efficacy, Hispanic adolescents' lower efficacy beliefs could be a consequence of living in impoverished and high-risk environments. Lower neighborhood/safety self-efficacy is likely linked to higher levels of neighborhood crime and violence, for example. In the current sample, minorities living in high poverty neighborhoods were overrepresented compared to European-Americans, who were overrepresented in high SES neighborhoods (ICPSR, 2009). Although neighborhood adversity was included in the model examined, it is possible that nonetheless its effects on self-efficacy were not fully controlled for (e.g., due to limitations in measures used). It is not clear, however, why lower self-efficacy was not also found for African Americans, who also are overrepresented in high adversity neighborhoods in the current sample. Future research is necessary to further examine possible factors contributing to the current pattern of findings.

A secondary analysis examined whether predictors of self-efficacy beliefs were invariant across three ethnic groups. When predictors were examined for each ethnic group separately, all predictors were found to equally predict the domain specific self-efficacy beliefs, across the three groups. This is consistent with several cross-cultural studies that have concluded parental support and peer deviance (the most salient predictors of self-efficacy beliefs) to result in similar outcomes in children and adolescents with varied ethnic and cultural backgrounds (Barber, Stolz, Olsen, Collins, &

Burchinal, 2005; Bean, Barber, & Crane, 2006; Liebkind, Jasinskaja-Lahti, & Solheim, 2004).

*Family Characteristics and Self-Efficacy*

The present study hypothesized that family SES and family support would positively predict adolescent self-efficacy beliefs, whereas family conflict would be inversely related to efficacy beliefs. Consistent with the hypothesis, family SES positively predicted neighborhood/safety efficacy; however, family SES had no effect on school, future, and home efficacy beliefs.

The association between family SES and neighborhood/safety efficacy could be explained by two possible mechanisms. First, parents with higher SES may be better able to reduce the likelihood of their children experiencing adversities in the neighborhood. For example, they may have more flexible work schedules compared to lower SES parents so that they could drive to and pick up their children from school. In addition, they may be more able to arrange after school programs and summer camps, and importantly, more likely to send their children to private schools (Hao & Pong, 2008; Mahoney & Eccless, 2007). These factors may provide adolescents with opportunities to experience safe environments and avoid local neighborhood adversities, leading to higher neighborhood/safety efficacy.

An alternative explanation may be that higher SES parents may be more able to protect their children from experiencing violent confrontations and engagement with law enforcement officers. For example, studies have found that children of highly educated and high income families are less likely to be arrested and become involved in the judicial system compared to children of low income parents (Patterson, 2006; Rumbaut,

Gonzales, Komaie, Morgan, & Tafoya-Estrada, 2006). Relatedly, parents with higher education are more capable of utilizing their resources to help their children when they become engaged in a delinquent activity or are confronted by delinquents at school or in the neighborhood (Patterson, 2006). As a result, adolescents whose parents have higher SES may feel more confident about their ability to be safe outside on the streets.

Regarding family support, the present study found it to be the most consistent predictor across all four domains of self-efficacy beliefs. Specifically, family support positively predicted school, future, home, and neighborhood/safety-efficacies, consistent with the hypothesis. There is ample evidence regarding the robust influence of supportive parenting practices and family environments on the healthy development of children and adolescents. For example, Baumrind(1989) concluded that studies have provided consistent evidence regarding the association between parental support, children's academic and social competence, well-being, and sense of worth. Supportive family environments provide children and adolescents with optimal conditions to explore their environments and develop their mastery skills and confidence in their abilities, which in turn promote high levels of competence and self-efficacy beliefs (Bandura, 1997, 2001, 2006a; Schunk & Meece, 2006).

Alternative explanations to the positive association between parental support and high efficacy beliefs, however, are possible. For example, intrinsic characteristics of children, such as temperament, may help explain this association. Children who are sociable and less irritable usually generate higher levels of adult attention and involvement (Belsky, 1984; Putnam, Sanson, & Rothbart, 2002). As a result, these children may receive greater levels of parental support, and in turn, develop higher self-

efficacy. Also, it is possible that pre-existing efficacy levels may increase support from parents. For example, young children with higher academic competence may be more likely to be supported by their parents in this domain (Wagner & Philips, 1992). Future studies should use longitudinal designs to examine the developmental trajectories in self-efficacy beliefs from early childhood through adolescence.

Contrary to hypothesis, family conflict did not predict adolescents' self-efficacy beliefs. The present study was the first to explore the effect of family conflict on self-efficacy beliefs. It was assumed that family environments with high conflict between members would reduce opportunities to develop mastery skills, the number of positive role models, and perceptions of support, thus, negatively influencing the development of efficacy beliefs. However, although family conflict had negative and significant zero-order correlations with school-efficacy and home-efficacy, the predicted effect did not remain in the full model, with the other predictors included. Thus, by itself, family conflict may not be sufficient to restrict mastery and competence development in children. For example, evidence suggests that supportive parenting practices may diminish or eliminate the negative consequences of inter-parental conflict on youth (Hetherington, 1989). That is, the effect of parental conflict on self-efficacy beliefs may be different at different levels of parental support. Children experiencing high conflict and low support may show negative outcomes, whereas children experiencing high conflict accompanied with high support from parents may show resilience and be more likely to overcome family difficulties. Future studies should examine the interaction between family support and family conflict to better understand the characteristics of family environments that result in children with a high sense of agency.

Alternatively, the effect of family conflict on self-efficacy beliefs may simply be less salient compared to other factors, especially family support. Although zero-order correlations of family conflict with school- and home-efficacy beliefs were significant, they were about one third of the correlation between family support and the respective efficacy beliefs.

*Peer Relations and Self-Efficacy*

The present study hypothesized that peer support would positively predict adolescent self-efficacy beliefs. Only partial support for this hypothesis was found. Peer support significantly and positively predicted neighborhood/safety efficacy, but there was no evidence for the influence of supportive peer relations on the efficacy beliefs in the domains of school, future, and home. Previous studies have suggested that supportive peer networks and friendships positively influence the social and academic competence of children and adolescents (Cauce, 1986; McFarlane et al., 1995). These studies have focused on specific type of supports and outcomes, such as the association between emotional support and peer competence. In contrast, the current study examined the association between global friend support and domain specific self-efficacy beliefs. The latter may not necessarily be influenced by support globally assessed. It is possible that more consistent relations between peer support and self-efficacy would be observed when both are measured with the same within-domain specificity.

As predicted, however, friend support was associated with neighborhood/safety-efficacy. It is possible that adolescents with supportive peer networks spend more time in the neighborhood. Thus, they may be more likely to develop skills to safely navigate their neighborhoods. Consistent with this view, research suggests that children with a

greater number of friends spend fewer hours indoors alone (Waldrop & Halverson, 1975). Relatedly, adolescents reporting high friend support may be more likely to be in the company of peers when navigating the streets around their neighborhood, walking to and back from school, and engaging in activities outside of their home. Thus, they may experience less fear associated with being alone outside, in risky environments. Related to this explanation, Bandura (1997) suggests that physiological reactions to aversive emotions and events may be a source of self-efficacy regarding the associated task.

It is also possible that friends support and self-efficacy may be caused by a third variable. For example, optimism was found to be positively associated with perceived social support among college students (Brissette, Scheier, & Carver, 2002). Optimism is also a significant correlate of competence beliefs of adolescents (Magaletta & Oliver, 1999). Therefore, it is possible that adolescents' with higher levels for optimism may report both higher friend support and greater neighborhood/safety efficacy. Future studies should explore the role of personality characteristics such as optimism in the association between support and self-efficacy beliefs.

Deviance of peers negatively predicted school, future, and neighborhood safety efficacy in adolescents. There was no effect of having deviant peers on home-efficacy. Previous studies have found that deviance and having delinquent friends were inversely associated with academic competence, achievement motivation, and future aspirations (Andrews & Duncan, 1997; Newcomb et al., 2002). In general, delinquent adolescents are less likely to invest in school work and more likely to be school dropouts (Newcomb et al., 2002). Deviant friends may provide negative role models for the adolescents, consistent with Bandura's (1997, 2006) framework. In turn, adolescents with delinquent

friends may develop lower self-efficacy beliefs regarding their academic capabilities and ability to achieve their life goals, as well as related to maintaining positive relationship with parents.

Similarly, deviant role models may reduce adolescents' neighborhood/safety efficacy beliefs. Delinquent peers who experience violence and fights, and become involved in risky behaviors may be seen as negative role models regarding the youth's own ability to safely navigate their neighborhoods. Finally, adolescents who associate with deviant peers may be more likely to become involved in delinquent behaviors (Stormshak, Comeau, & Shepard, 2004), which may elicit heightened perceptions of risk and fear. Consistent with Bandura's (1997) arguments regarding the sources of efficacy beliefs, these physiological arousals may reduce adolescents' sense of safety in their neighborhoods.

It is also possible that the association between peer deviance and self-efficacy beliefs is spurious. That is, a third factor may be causally linked both to having higher numbers of delinquent peers and to low self-efficacy beliefs. For example, Heaven (1996) reported that neuroticism is positively associated with delinquency, and neuroticism is also related to lower self-efficacy beliefs and lower internal locus of control (Judge, Erez, Bono, & Thoresen, 2002).

Although zero-order correlations indicated a negative association between peer deviance and home-efficacy, contrary to hypothesis no effect was found in the final model. It is possible that the influence of peer deviance on home-efficacy is less salient compared to other, related factors, especially family support. As noted above, family support may have a direct impact on home-efficacy through its effects on the adolescents'

developmental context, and in turn, mastery experiences. This may override the influence of peer deviance, associated with home-efficacy through mechanisms such as role modeling or verbal persuasion. Hence, Bandura (1997) suggests that mastery experiences have a stronger influence on efficacy judgments than other mechanisms such as role models, verbal persuasion, and physiological responses.

*Neighborhood Characteristics and Self-Efficacy*

The present study hypothesized that there would be significant negative effects of (low) neighborhood SES, and neighborhood level physical and social disorder on adolescent self-efficacy beliefs. Consistent with this hypothesis, at the bivariate level, school, future, and neighborhood/safety efficacy had significant negative relations with each of the three neighborhood level variables. Due to analytical concerns, the three neighborhood variables were combined to create a composite neighborhood adversity variable. The composite neighborhood adversity variable also had negative bivariate relationships with school, future and neighborhood/safety self-efficacy.

The results of the present study partially supported the hypothesis concerning the effect of neighborhood adversity on adolescent self-efficacy beliefs. Specifically, neighborhood adversity negatively predicted neighborhood/safety efficacy. However, there was no effect of neighborhood on school, future, and home-efficacy in the full model. Consistent with the assertions of Bandura (1997) regarding the sources of self-efficacy beliefs, neighborhoods with high SES and low physical and social disorder may provide adolescents with more opportunities to safely navigate their environments, walk in their neighborhood without fear, and spend time outside without concerns about violence. Such an environment may increase adolescents' sense of agency regarding

their safety in the neighborhood. In contrast, neighborhoods with low SES and high physical and social disorder may be places where adolescents do not have sufficient opportunities to explore their environment safety. In turn, they may not be able to develop efficacy regarding their ability to be safe in the neighborhood.

In addition, evidence suggests that adolescents in low-income neighborhoods are more likely to experience or witness violence (Duncan & Raudenbush, 2000; Ellen & Turner, 1997). These aversive experiences may provoke fear and restructure adolescents' cognitions regarding their ability to maintain their safety in those particular neighborhoods. Bandura (1997; 2006) suggests that personal experiences are among the most influential factors in the initial development, or change over time, in efficacy beliefs. It is also possible that the fear provoked by the knowledge of violent incidents itself may result in low neighborhood/safety-efficacy among adolescents given that physiological arousals may influence efficacy beliefs (Bandura, 1997).

Contrary to the hypothesis, neighborhood adversity did not predict school, future, and home-efficacy, even though significant zero-order correlations suggested the presence of some degree of association between neighborhood adversity and several of these efficacy-beliefs. It appears to be the case that other variables in the model have a more salient impact on these aspects of self-efficacy. Relatedly, the effect of neighborhood on adolescent self-efficacy could be mediated by other variables. For example, previous studies concluded that qualities of the neighborhood context are among the significant predictors of parent-adolescent and adolescent-peer relations (Brooks-Gunn et al., 1993; Elliott et al., 1996). Thus, neighborhood effects on self-efficacy beliefs could be indirect through family support and peer deviance. Future

studies should explore indirect effects of neighborhood quality on adolescents' sense of efficacy.

Another possible explanation for the lack of association observed is that efficacy beliefs in school, future and home-efficacy domains may be linked to neighborhood context through other mechanisms. Bandura (1997) argued that mastery experiences are more immediate predictors of efficacy beliefs than role models, verbal persuasion, and physiological responses. Neighborhood context was assumed to have an influence on adolescents' perceived competence through providing role models (Boardman & Jason, 2000). However, evidence suggests that role models may influence self-efficacy beliefs only if the observers perceive the role model to be similar to them (Schunk & Hanson, 1985). It is possible that adolescents in the current sample did not perceive available role models in the neighborhood to be similar to them, and in turn their self-efficacy beliefs in the domains of school, future, and home were not influenced by neighborhood context.

Yet another reason for the lack of neighborhood effect could be the collection timeline of variables in the current data set. In the original study of the current data, neighborhood characteristics were measured at different time points. Neighborhood SES was based on 1990 census data, and physical and social disorder were measured in 1995. On the other hand, all other predictors in the model were measured from 1994 to 1997. Furthermore, neighborhood was measured substantially earlier than the self-efficacy beliefs, which were measured in the second wave of the study from 1997 to 2000. Evidence suggests that neighborhoods are dynamic environments such that both positive and negative changes may occur in a particular neighborhood due to factors including, but not limited to, changes in property values and availability of jobs (Schwirian, 1983;

Wilson, 1997). In addition, residents of some neighborhoods may become involved in efforts to change the social environment of their neighborhoods, for example forming neighborhood watch groups or establishing alliances with police to stop crime and drug trade (Rosenbaum, 1987; Speer & Hughey, 2006). Thus, it is possible that some of the neighborhoods in the present study had undergone change between the time the neighborhood characteristics were measured and when the self-efficacy measure was administered. That is, adolescents may have been experiencing an environment that was not accurately represented by the measures obtained several years earlier. As a result, the statistical estimates might have indicated a weak association due to this methodological limitation.

In conclusion, Study II provided partial evidence for the effect of multiple levels of the developmental context on adolescent efficacy beliefs. Only family support predicted all four domains of self-efficacy beliefs, suggesting the critical role of family context in shaping adolescents' developmental experiences. The other predictor variables, across levels, only predicted self-efficacy beliefs in some domains, and not others. The pattern of different predictors being linked to different self-efficacy domains underscores the importance of the multidimensional structure of self-efficacy beliefs, and the complexity of relationships between sources of influence, across levels, and self-efficacy beliefs.

*Study III: The Mediating Role of Self-Efficacy Beliefs*

Self-efficacy beliefs are critical self evaluations which influence the motivation, goal setting, and persistence of individuals, which in turn, play major roles in determining

youth development. Therefore, elucidating the outcomes of self-efficacy beliefs, and how such beliefs may mediate effects of contextual factors on adolescent development, has important implications for both theory and practice. The third study examined the mediating role of self-efficacy beliefs in predicting adolescents' developmental outcomes such as depression/anxiety symptoms, delinquency, smoking, and alcohol and drug use.

Preliminary analyses revealed that depression/anxiety symptoms were positively associated with delinquency, consistent with previous studies (Neighbors, Kempton, & Foreland, 1992). In addition, there were positive associations among delinquency, smoking, alcohol and drug use. In contrast, depression and anxiety symptoms were not related to smoking, alcohol use and drug use, unlike previous studies suggesting a positive association between these variables (Neighbors et al., 1992; Riggs, Baker, Mikulich, Young, & Crowley, 1995). In the following sections, the correlates of adolescents' developmental outcomes are discussed. Baron and Kenny (1986) suggest that there should be significant associations between the predictor and mediator, predictor and outcome, and mediator and outcome to assume a mediation effect may be present. The associations between predictor variables and mediators (adolescent self-efficacy beliefs) were already discussed in the previous section. Therefore, the discussion in the following section encompasses bivariate associations between mediators and outcomes (adolescents' developmental problems), and predictors and outcomes, related to the conditions for testing mediation.

*Correlates of Adolescents' Developmental Problems*

With regard to the association between the mediator variables and adolescents' emotional and behavioral problems, all domains of self-efficacy beliefs were negatively

associated with depression/anxiety symptoms, delinquency, and substance use. This is consistent with early studies reporting a causal, inverse relation between self-efficacy and anxiety in clinical experiments (Bandura, 1977b, 1997; Williams, 1995; Williams & Zane, 1989). Similarly, there is evidence regarding the protective effect of self-efficacy on delinquency and drug use (Ludwing & Pittman, 1999) and smoking (DiClemente, 1981; DiClemente et al., 1995).

With respect to the exogenous study predictors and adolescents' developmental outcomes, preliminary analysis indicated that older adolescents were more likely to become involved in delinquent behaviors and to use tobacco, alcohol, and drugs. This is consistent with prior research indicating that the prevalence of problem behaviors is generally lower among children and young adolescents compared to older adolescents (Elliott, Huizinga, & Menard, 1989). Also, consistent with the literature, females were more likely to display depression/anxiety symptoms (Marcotte, Alain, & Gosselin, 1999). There was no association between gender and other problem behaviors. Concerning ethnicity, Hispanic origin was related to higher levels of emotional problems and lower smoking. African-American origin was negatively associated with emotional problems, consistent with several studies which found that African-American youth may maintain optimism and positive self-regard despite their social and economic disadvantage (Graham, 1994).

Concerning family variables, family SES was negatively related to emotional problems of adolescents, suggesting that financial strain and lack of resources may increase adolescents' depression/anxiety symptoms. On the other hand, family support was negatively associated with each of the adolescent problem measures, consistent with

previous studies positing a protective role for supportive parenting and family environment in terms of the development of childhood and adolescence problems (Yoshikawa, 1994).

Finally, family conflict was negatively associated with delinquency and substance use. Parents experiencing conflict are less likely to monitor their children and provide emotional and social support (Formoso et al., 2000), each of which serves to protect children from developing problem behaviors. In a similar vein, family conflict may reduce the level of monitoring and support provided to adolescents by parents and other family members. In turn, adolescents experiencing higher levels of family conflict are more likely to develop problem behaviors such as delinquency and substance use (Barrett & Turner, 2006; Formoso et al., 2000; Whiteside-Mansell, Bradley, Casey, Fussell, & Conners-Burrow, 2008).

Peer relations also have been found to have a substantial influence on adolescent development and outcomes, including psychological well-being (Rose & Rudolph, 2006). Consistent with this literature, the present study found that perceived support from friends was negatively associated with depression/anxiety symptoms. On the other hand, friend support was positively related to smoking and alcohol use. Previous studies have indicated that tobacco and alcohol use may develop as a result of peer influence (Brooks et al., 1989; Hoffman, Monge, Chou, Thomas, & Valente, 2007). Adolescents with peers who smoke and consume alcohol are more likely to get involved in these behaviors as a result of role modeling or conformity to peer group norms (Brooks et al., 1989), with an intention to obtain in-group approval. These mechanisms were also suggested as antecedents of adolescent delinquency. Relatedly, having deviant peers was positively

associated with both psychological and behavioral problems measured in the current study.

There is ample evidence suggesting that neighborhood context has critical influences on adolescent well-being and behavior (Brooks-Gunn et al., 1997a; Brooks-Gunn et al., 1993; Duncan & Raudenbush, 2000; Elliott et al., 1996). Consistent with previous research, the current study revealed that neighborhood adversity was positively associated with depression/anxiety symptoms. Interestingly, there was an inverse association between neighborhood adversity and smoking and alcohol use. Contrary to the studies suggesting that low-income individuals are more likely to use tobacco products and alcohol compared to their high-income counterparts, other studies suggest that the ethnic composition of the neighborhoods is a critical factor. For example, African-American youth are less likely to smoke and consume alcohol compared to European-American adolescents (Felton et al., 1999; Gritz et al., 2003). In the current study, the residents of most low income neighborhoods were primarily African-American and Hispanic. Thus, the unique characteristics of the sample might have led to finding no negative effect of neighborhood adversity on smoking and alcohol use.

Contrary to some previous studies (Brooks et al., 1989; Wilson et al., 2005), neighborhood adversity was not associated with delinquency and drug use. There is evidence suggesting that youth living in neighborhoods with high adversities and poverty level may show low levels of problem behaviors if the neighborhood is cohesive (Brooks et al., 1989; Rankin & Quane, 2002), or if collective efficacy is high (Simons, Simons, Burt, Brody, & Cutrona, 2005). Neighborhoods where adults maintain positive relationships and high collective efficacy monitor children and youth behavior

collectively and intervene with problems immediately. As a result, adult monitoring of youth may prevent development of, or reduce the frequency of problem behaviors (Rankin & Quane, 2002). In the current study, even though the neighborhood adversity variable included an indicator regarding the social disorganization of neighborhoods, it was measured through observation of behaviors such as people greeting each other on the street, chatting, loitering, or fighting during random times of days. In fact, variation was low on this variable (Sampson & Raudenbush, 1999), and it is likely that these behaviors may not reflect the actual social dynamics of the neighborhoods. Even though there may be deviant individuals on the streets, the majority of the residents may maintain cohesive relations that may positively influence adolescents. Unfortunately, the current study cannot elucidate the interactive effects of various neighborhood qualities on well-being and problem behaviors of adolescents.

*Mediating Role of Self-Efficacy*

The present study tested three hypotheses regarding the mediating role of self-efficacy beliefs in predicting adolescent outcomes from family, peer, and neighborhood contexts. First, self-efficacy beliefs were hypothesized to mediate the role of family SES, family support, and family conflict on adolescent developmental outcomes (depression/anxiety symptoms, delinquency, substance use). Second, self-efficacy beliefs were expected to mediate the role of peer support and peer deviance on adolescent developmental outcomes. Finally, it was expected that neighborhood adversity would indirectly influence adolescent developmental outcomes through its effect on self-efficacy beliefs. The results provided partial support for the hypotheses such that future-efficacy, home-efficacy, and neighborhood/safety efficacy mediated the effect of family

support, deviance of peers, and neighborhood adversity on emotional problems, delinquency, and smoking/drug use.

First, the effects of family support on depression/anxiety symptoms were mediated by the future, home, and neighborhood/safety efficacy beliefs. Bandura (1992) suggested three pathways through which self-efficacy beliefs influence depression and anxiety. These were 1) the compatibility of the standards of achievement and efficacy beliefs, 2) lack of social efficacy that impedes the individual's ability to develop satisfying relationships with others, and 3) being unable to control depressive thoughts due to low efficacy beliefs. Previous studies suggested that a supportive family environment and parenting practices provide children with opportunities to explore their interest and skills, and set goals consistent with their own aspirations (Barber et al., 2005; Juang & Silbereisen, 1999). In contrast, controlling and demanding parents may be more concerned with their own ambitions and are more likely to require their children to achieve goals they themselves set (Bean et al., 2006). When adolescents have low future-efficacy, that is, the belief that they are incapable of achieving their aspirations and goals, they may feel more depressed. The current findings suggest that the well-established association between low parental support and emotional problems in adolescents can possibly be explained, at least in part, by the mediating role of future-efficacy beliefs.

Similarly, family support is highly important for the development of social skills (Barber et al., 2005; Yoshikawa, 1994), and in turn, efficacy regarding the ability to maintain positive relationships with family members. It is possible that adolescents who lack family support are unable to develop high efficacy regarding their social skills. As a result, they may be more likely to develop depression and anxiety symptoms consistent

with Bandura's (1992) assertion that the inability to develop social relationships may result in depression.

Finally, family support indirectly influenced depression/anxiety symptoms through its effect on neighborhood/safety efficacy. The link between family support and neighborhood/safety efficacy was discussed previously. The findings suggest that adolescents with low levels of neighborhood/safety-efficacy may be more likely to experience fear and nervousness due to their perceived inability to be safe outside in the neighborhood. The elevated and relatively enduring stress of adolescents with low neighborhood/safety efficacy may result in high levels of emotional problems such as depression/anxiety symptoms (Bandura, 1992, 1997). In contrast, high parental support may increase the neighborhood/safety-efficacy of adolescents, which in turn, protects adolescents from developing emotional problems.

The effect of family support on problem behaviors such as delinquency, smoking, and drug use was also mediated by home-efficacy of adolescents. This pathway could be explained by a home-distancing mechanism. First, adolescents receiving low levels of family support could be more likely to distance themselves from their family social environment, in part due to their beliefs that they are incapable of developing and maintaining positive relationships with parents. Nevertheless, social connectedness is one of the essential human needs that individuals strive to fulfill (Ryan & Deci, 2000). Adolescents with low confidence in their abilities to maintain positive relationships with parents may be more likely to seek out friendships to fulfill their connectedness need. As a result, they may be more prone to relate with delinquent friends and peers with problem behaviors, such as smoking and drug use. Previous studies have shown that both low

parental support and negative peer influence are among the critical predictors of delinquent behaviors and substance use (Brooks et al., 1989).

Both future efficacy and neighborhood/safety efficacy beliefs mediated the effect of peer delinquency on depression/anxiety symptoms. The mechanisms of association between peer delinquency and future- and neighborhood/safety-efficacy were discussed previously. Consistent with Bandura's (1992, 1997) assertions, it is likely that adolescents with low future-efficacy feel depressed as a result of their perceived incapability of achieving their goals and aspirations regarding their future. Similarly, deviance of peer was likely to reduce neighborhood/safety efficacy, which may result in elevated fear and anxiety, and finally emotional problems, due to lack of ability to control emotional reactions and fear (Bandura, 1992).

Finally, the effect of neighborhood adversity on adolescents' emotional problems was mediated by neighborhood/safety efficacy. Previous studies have suggested various mechanisms to explain the link between neighborhood characteristics and mental health outcomes (Aneshensel & Sucoff, 1996; Wickrama, Merten, & Elder, 2005). Nevertheless, the role of self-efficacy beliefs has not been examined to date. The findings of the present study suggest that neighborhood adversity may lower the neighborhood/safety-efficacy of adolescents, which may result in elevated stress, and in turn increase depression/anxiety symptoms.

It should be noted that self-efficacy beliefs and adolescent developmental outcomes were measured in the same wave of the original study. Therefore, the associations are cross sectional, and alternative explanations of findings cannot be ruled out. For example, even though the effects of self-efficacy beliefs on developmental

outcomes were emphasized in the present study, it is also possible that adolescents' emotional and behavioral problems may cause self-efficacy beliefs, rather than the reverse. Thus, depressive symptoms of individuals may cause lower future, home and safety efficacy beliefs, at least in part. Indeed, evidence suggests that there is a negative association between emotional problems and judgments regarding competence (Hoglund, Lalonde, & Leadbeater, 2008). Furthermore, depression and self-efficacy beliefs may be related to each other spuriously. For instance, a personality trait, such as pessimism, may be a cause of both lower self-efficacy beliefs and higher levels of emotional problems (Magaletta & Oliver, 1999). Future research is necessary to examine the possible network of relationships among psychosocial variables, self-efficacy, and developmental outcomes.

Contrary to the hypotheses, the present study did not find any evidence regarding the indirect effects of family SES, family conflict, and friend support on adolescents' developmental outcomes. In fact, these variables had either no or weak associations with the self-efficacy beliefs. Their associations with the developmental outcomes were also either low or inconsistent.

In conclusion, the findings of the present study suggest that self-efficacy beliefs may mediate the effects of family, peer, and neighborhood context on adolescents' emotional and behavioral problems. Even though the indirect effect sizes were low, the effects were consistent across males and females, and supported by existing theory and empirical evidence. Understanding the role of self-efficacy beliefs in mediating the effect of contextual variables on emotional and behavioral outcomes is important, as self-

efficacy beliefs have a critical influence on individuals' responses and decision-making processes.

*Limitations*

Despite its strengths and contributions, the present study contains several limitations. One limitation was the time of measurement of neighborhood characteristics. Neighborhood level SES score was based on 1990 census data, and the systematic social observations, which formed the basis of the measure of physical and social disorganization, were conducted from June to October 1995. Thus, there was a five year gap between the measurement of neighborhood SES and neighborhood disorganization. It is possible that some of the neighborhoods have experienced a degree of transformations during this period. Thus, the indicators of neighborhood disadvantage may not represent the actual characteristics of the neighborhoods when the first wave of psychosocial data was collected. Furthermore, even though the participants who changed residential areas from Wave 1 to Wave 2 were excluded from Study II and III in order to control for the variations in their neighborhood environment, some of the participants of the current study could have moved into their current neighborhood sometime between 1990 and 1995. As a result, some of the residents of a given neighborhood could have experienced that particular neighborhood environment for a relatively short period of time. Differences in the duration of exposure to neighborhood adversities in the current study may influence the estimates regarding the effects of neighborhood context on the self-efficacy and adolescent outcome variables. Finally, the time of measurement of the neighborhood variables may be an especially critical issue with respect to using neighborhood characteristics as a predictor of self-efficacy beliefs since neighborhood

characteristics were measured many years prior to measurement of self-efficacy beliefs. This might have reduced the observed covariance between neighborhood adversity and domain specific self-efficacy beliefs, as well as emotional and behavioral problems.

Another major limitation of the study is related to the characteristics of the sample. Because of the focus of the original study, the sample was mostly derived from low-income neighborhoods. Despite the efforts to obtain a balanced distribution with respect to the ethnic composition and socioeconomic status of the participants, minorities were overrepresented due to the overall population characteristics of the study site. For example, less than one fifth of the sample in the present study was European-Americans, and among them, low incomes were underrepresented (ICPSR, 2009). In contrast, high-income groups were underrepresented among minorities. These characteristics of the sample may have influenced some of the predictions, including the effect of ethnicity on the outcome variables. Due to the high level of overlap between ethnicity and both family and neighborhood SES, it was not possible to truly estimate differential effects of ethnic origin and socioeconomic status. It is also possible that these characteristics of the sample hindered the study's potential to find a significant neighborhood impact on adolescent self-efficacy beliefs and developmental outcomes, as well as interaction effects of ethnicity in predicting self-efficacy beliefs from contextual characteristics.

It is also important to acknowledge that the current measure of self-efficacy beliefs has not been validated in other samples. Even though the present study provided evidence regarding the multidimensional structure of the self-efficacy measure, there is no evidence regarding measurement invariance across gender and ethnic groups, the stability of factor structure across different ages, and the convergent and discriminant

validity of the measure. For example, understanding math may be easier for young adolescents compared to older adolescents, given the increasing difficulty of math course content by grade. As a result, responses to this item may not only reflect an individual's efficacy beliefs but also the difficulty of the math course. Therefore, future studies are needed for extensive study of the psychometric qualities of the current measure.

Most measures in the present study were self-report, mostly adolescent self-report, except family SES and family conflict, which were measured by parent report. Self-report measures may not be reliable especially when the content of the measures trigger concerns with social desirability. For example, parents may report lower family conflict whereas adolescents may tend to attenuate their report of delinquent involvements, smoking, alcohol, and drug use. It is also possible that common method variance may result in finding associations between certain constructs. For example, the association between future-efficacy and depression/anxiety symptoms may be due to using self-report measures to assess both variables.

A limitation that pertains to the second study was that the possible interaction effects between the predictors were neither examined, nor indirect effects from one predictor through another. In terms of interactions, for example, parental SES may serve a protective factor against negative effects of neighborhood adversity, or the effect of family conflict may be more pronounced if family support is low. Concerning indirect effects among predictors, for example, neighborhood adversity could be related to adolescent self-efficacy beliefs through its effects on family support. Future studies should examine possible moderating and mediating factors to expand our understanding of the contextual characteristics in which adolescent development occurs.

Finally, a limitation that pertains to the third study was that both mediators and outcome variables were measured in the same wave of data collection. Ideally, mediation effects are best tested by experimental designs or longitudinal studies where predictors, mediators, and outcomes are assessed sequentially. Cross-sectional designs cannot eliminate the possibility of reverse causality, or underlying third variable explanations. For example, it is possible that depression/anxiety symptoms of adolescents had an effect on their efficacy beliefs, contrary to the hypothesis that self-efficacy beliefs have an effect on the emotional problems of adolescents. Furthermore, reciprocal relationships among the variables may exist.

*Future Directions*

The extant literature on contextual influences on adolescents' self-efficacy and mediating roles of domain specific self-efficacy beliefs is limited. The present study aimed to address several gaps in this literature. However, much remains to be accomplished.

A major weakness of the current literature is measurement inconsistency. Therefore, one of the foremost needs of the literature is reliable and valid multidimensional measures of self-efficacy beliefs for children and adolescents. Bandura (2006b) outlines a number of recommendations for measurement development, focused especially on the importance of domain-specificity and multidimensionality of measures. Unfortunately, most of the current research has ignored these recommendations, using global, unidimensional measures. Furthermore, existing measures have generally had low reliabilities, which may seriously attenuate estimates. Despite several attempts, efforts to develop multidimensional scales of self-efficacy beliefs have not yet provided

consistent evidence (e.g., Bandura et al., 1999; Martinelli et al., 2009; Miller et al., 1999; Pastorelli et al., 2001). The present study is unique in providing promising evidence regarding the multidimensionality of adolescents' self-efficacy beliefs and the stability of factor structure (across two randomly divided subsamples of a larger sample). Future studies should test the current measure in different samples and age groups to ensure its reliability and validity, and add new domains in relation to critical developmental tasks of the adolescence period. There is also a need for developing new measures specifically designed for other age groups, consistent with the developmental tasks specific to the age group. For example, late adolescence and emerging adulthood require individuals to commit and adapt to their first long term occupation, make career choices, obtain a degree, select a mate, and independently manage financial issues. All these tasks are unique to this period and success or failure in these tasks may have long-term effects on individuals' life trajectories. Therefore, understanding the predictors and outcomes of efficacy-beliefs in these domains may have important implications for practice.

Measurement of context has always been a challenge for researchers. Systematic social observation is unique in utilizing observation methods to obtain an estimate of neighborhood quality, independent of subjective perceptions. Nevertheless, systematic social observation, in the original study, was used to capture neighborhood disorganization at a single point in time. The characteristics of most contexts, as well as neighborhood characteristics, change over time. More importantly, the individuals' interactions with their developmental context show dramatic change over time (Bronfenbrenner, 1995), from young childhood through late adolescence. For example, a young child has limited contact with the environment outside of the home; therefore,

most influences of outside contexts would be indirect. However, adolescents may have more contact with their neighborhood context as they start spending more time with their peers outside, stay out late, and travel to school by themselves. Therefore, the characteristics of the context may have greater direct influences on older children and adolescents. Future research should focus on capturing change in context and the interaction between context and individuals, along with individuals' experiences. With the advance of latent growth curve modeling techniques, it is possible to test models examining the association between change in neighborhood context and change in self-efficacy beliefs over time. In addition, the flexibility of such models would allow researchers to test the effect of change in the context construct on developmental outcomes.

*Conclusion*

An important contribution of the current research was the examination of the sources of self-efficacy beliefs across different levels of adolescents' developmental context. The findings suggested that family and peer context, as well as neighborhood context may be critical in predicting efficacy beliefs in certain domains. Indeed, these domains were consistently linked to critical developmental outcomes including depression/anxiety symptoms and delinquency. Most available treatment programs for these problems primarily focus on individuals' cognitions and skills. These programs are very limited in their capacity to influence key factors in the developmental context, including family support, peer deviance, and neighborhood quality. Clearly, without an adequate understanding of the effects of these contexts and their mechanisms of influence, we will remain limited in our capacity to treat and prevent problems. The

findings of the present study suggest that facilitating self-efficacy development may be an important means to enhance the effectiveness of programs targeting adolescents' emotional and behavioral problems as well as the prevention of an array of problems. Future studies may substantially contribute to our understanding of the dynamic nature of individual-context interactions and their link to enhanced self-efficacy. The findings from rigorous studies may fruitfully guide the development of new, more dynamic and ecological theories and provide a positive influence on practice and policy to improve human life and critical contexts for human behavior, development, and well-being.

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