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AGENTIC FUNCTIONING IN ADOLESCENTS:

DEVELOPMENT AND VALIDATION OF A BRIEF COMPREHENSIVE MEASURE.

A Thesis in
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by
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ABSTRACT

Although prevention programs often call on youth to be personally reflective and responsive, these processes are rarely measured. This paper describes the development and validation of a 15-item measure that incorporates motivation, cognitive, and behavioral dimensions of adolescent agency. The instrument demonstrates good reliability and results in a clean one-factor solution. Agency is associated with number of hours spent physically active, positive and negative peer influence, and knowledge of a greater number of places to be physically active. It is not associated with property damage delinquency. Results vary somewhat by gender and grade. Use of this construct and measure to the field of prevention is discussed, as are study limitations and future directions.

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Chapter 1

Introduction

Many adolescent prevention programs aim to create change within the individual, either directly, through the individual (e.g., emotion management; Life Skills Training; Botvin & Griffin, 2004), or indirectly, through the context in which the individual lives (e.g., family functioning; Adolescent Transitions Program; Connell & Dishion, 2008). Both types of programs rely on coaching the adolescent to connect with personally valued outcomes (e.g., improved interpersonal skills, decreased family conflict) and to align thinking and behavior towards those goals. These processes require youth to be personally reflective and responsive. However, the measurement of these processes is rarely addressed. This paper will begin to address this omission by presenting a three-dimension conceptualization of agency, a concept that captures these processes, and a 15-item instrument that operationalizes it.

The research proposed here aims to validate a measure of adolescent agency that includes motivation, cognition, and behavioral components. First, this paper will present a conceptualization of agency that explicitly incorporates motivation, cognition, and behavioral dimensions (Kuczynski & Parkin, 2007; Schwartz, Pantin, Coatsworth, & Szapocznik, 2007). This three-dimension conceptualization draws on self-efficacy (Bandura, 1989), self-determination (Deci & Ryan, 1985), and Selection, Optimization, and Compensation (SOC; Baltes, 1997) theories. Second, agency will be discussed as it relates to prevention program goals, important developmental outcomes in adolescents (e.g., grades, physical activity), and gender. Next, the development of a 15-item measure of adolescent agency will be presented, and relevant components of self-efficacy, self-determination, and SOC scales will be discussed. The analyses plan includes exploratory factor analysis with the anticipation of identifying a three-factor

structure of agency, convergent, discriminant, and predictive validity analyses, and analysis of associations between agency, gender and grade level. This research expands the developmental and prevention science literatures through presentation of a comprehensive measure that incorporates three essential domains of agency.

What is agency?

In the purest sense, agency is the *capacity* for volitional action and behavior. This capacity arises from the prefrontal cortex, which facilitates cognitive-regulation, metacognition, and planning and evaluative thought (Nelson, Leibenluft, McClure, & Pine, 2005; Steinberg, 2005). Barring certain specific forms of brain damage, humans are born with and further develop this capacity over time. The *exercise* of this capacity for agency is engaging in a conscious ownership of what one is doing, and can range from basic physical motor directives to abstract, future oriented planning (Gallagher, 2009). In a practical sense, agency is a sense and exercise of intentional ownership over one's life, direction, and outcomes.

Three features considered to be central to any characterization of agency are "self-direction, an inner compass, and an ability to redirect efforts if and when thwarted" (Schwartz, Pantin, Coatsworth, & Szapocznik 2007, p. 135). This definition of agency indicates that any conceptualization of agency should include motivation (i.e., inner compass), cognition (i.e., self-direction), and behavior (e.g., redirect efforts). A conceptualization of agency that does not include these dimensions would not be sufficient because the human experience is not simply thoughts, or actions, or desires, but is at least the sum of these. Leveraging agency is necessary to achieve desired outcomes and goals. Motivation describes the meaning or intrinsic value of the goal. Cognition directs thought processes toward goal-attainment. Behavior is the tangible action taken toward achieving the desired outcome.

Each dimension plays a unique and complementary role in agentic functioning.

Literatures on motivation styles based in self-determination theory (SDT; Ryan & Deci, 2000), cognitive evaluations of self-efficacy (Bandura, 1989), and goal-oriented behavioral strategies like Selection, Optimization, and Compensation (SOC; Baltes, 1997) provide inferences about outcomes likely to be associated with these dimensions of agentic functioning. The following review of each dimension and its relevance to agency demonstrates the importance of incorporating these dimensions into the operationalization and understanding of agency.

Dimensions of Agency

Motivation

Human motivation is a key activating ingredient for agency. Motivation is the affective energy related to goals and behaviors. Motivation styles can be identified on a continuum ranging from intrinsic to extrinsic and demonstrate consistent associations with well-being. Pursuits that are intrinsically interesting and rewarding are associated with positive outcomes (Ryan & Deci, 2000). Conversely, goals with little intrinsic interest or reward for the individual have a negative affective impact and are associated with lower levels of well-being across multiple life domains (Deci, Koestner, & Ryan, 1999). Thus, the significance of motivation to agency is that motivation provides the passion and drive to pursue one's goals. The more intrinsically motivating a goal is the better personal outcomes will be.

Underlying the experience of intrinsic motivation is the fulfillment of three fundamental psychological needs of autonomy, competence, and relatedness (Grolnick, Deci, & Ryan, 1997; Ryan & Deci, 2000). The first need, autonomy, is characterized by volitional action that is sanctioned by the individual's highest level of reflection. Autonomy is experienced when actions

and beliefs are authentic and congruent with the whole self (Ryan & Deci, 2006). Autonomy influences performance and creativity, relationship quality, general well-being, and psychopathology (Ryan & Deci, 2006; Sheldon, Ryan, Deci, & Kasser, 2004). As perceived autonomy diminishes, well-being, fulfillment, and intrinsic motivation decline. The second need, competence, is realized by a sense of effectiveness, which is necessary in order for individuals to feel fulfilled by their actions and behaviors (Ryan & Deci, 2000). Competence is socially-contextually influenced through reward, feedback, and communication (Ryan & Deci, 2000). Competence-affirming information while one is in action enhances intrinsic motivation. Conversely, information that indicates a lack of competence reduces intrinsic motivation. The third need, relatedness, is a fundamental human need and basis for intrinsic motivation (Ryan & Deci, 2000). Through relatedness individuals experience a sense of connectedness to others which leads to feeling secure which provides the individual the safety necessary for intrinsic motivation to flourish (Grolnick et al., 1997). Thus, as the fulfillment of these three needs increases, so does the experience of intrinsic motivation. Conversely, as these needs go unmet, intrinsic motivation declines.

At the other end of the motivation continuum, extrinsic motivation styles have been associated with engagement in risk behaviors. For example, Williams and colleagues (2000) reported on two studies that evaluated the association between extrinsic life goals and adolescent health risk behaviors. In the first study, adolescent smokers endorsed extrinsic values (e.g., wealth, fame) significantly more than non-smoking adolescents. In the second study, in addition to cigarette smoking, risk behaviors of chewing tobacco, alcohol consumption, marijuana use, and sexual intercourse were also included (Williams, Cox, Hedberg, & Deci, 2000). Their study results indicated a positive association between extrinsic values and risk behavior scores. Similarly, in a study on college students, Rockafellow & Saules (2006) studied the association between extrinsic motivation for athletic involvement in college with substance use. Extrinsically

motivated athletes consumed greater quantities of alcohol, and engaged more often in binge drinking, marijuana smoking, and tobacco chewing (Rockafellow & Saules, 2006). In sum, these studies indicate that extrinsic motivation orientations are associated with higher rates of health-risk behaviors and a greater range of them.

Motivation provides the passion and the energy to pursue personal ideals, and to avoid undesired outcomes. Motivation style indicates what kind of goals the agent will opt to pursue. An understanding of agency would be incomplete without acknowledging the fuel that drives the individual. Discussing motivation leads to the next critical dimension of agency, which is cognition.

Cognition

Thinking and certain types of thought processes are essential to the exercise of agency. The human brain has an immense capacity for evaluative and intentional thought. Without such deliberative ability, one's highest ideals (e.g., travel through time) or simplest goals (e.g., mend this sock) may never be reached. Where motivation provides the drive towards a goal, cognition provides the thought processes to achieve that end. The cognitive dimension of agency involves multiple types of evaluative thoughts. One type of agentic cognition is planning (Bandura, 2001). The individual identifies what steps are necessary in order to achieve the desired goal and creates plans accordingly. Another type of agentic cognition is restructuring. As obstacles and unforeseen circumstances arise, the individual thinks about new strategies for goal pursuit, which may include selecting a new goal (Bandura, 2001; Schwartz, Pantin, Coatsworth, & Szapocznik, 2007). Finally, another hallmark of cognitive agency, is thinking and believing that one is capable of achieving identified goals (i.e., self-efficacy). An extensive body of literature on self-efficacy (see Bandura, 1989 for a brief summary) attests to the critical importance of belief in one's ability

for goal attainment, such that higher self-efficacy is associated with higher goal attainment outcomes.

Self-efficacy research has proven to be highly informative and useful for predicting outcomes in multiple life domains. For example, efficacy beliefs influence career aspirations and trajectories in youth. Bandura, Barbaranelli, Caprara, & Pastorelli (2001) conducted a study of adolescents aged 11 – 15 years to evaluate the association between academic efficacy and career efficacy. Academic efficacy directly affected career efficacy. Further, academic efficacy influenced both the type of career and position level for which adolescents demonstrated interest. Similarly, Creed, Patton, & Prideaux (2007) evaluated the association of career decision-making self-efficacy with career planning and career exploration in high school students. Their results indicated that high career decision-making self-efficacy was associated with increased career planning and career exploration at two-year follow-up.

In addition to promoting positive outcomes, self-efficacy is also valuable in preventing negative outcomes. Self-efficacy has been implicated in preventing substance use relapse. Levin, Iglin, & Moos (2007) conducted a study of the association between abstinence-efficacy and 5-year treatment outcomes for alcohol dependency. Abstinence efficacy levels at program discharge predicted alcohol use and dependency at 5-year follow-up. Likewise, Tate, Wu, McQuaid, Cummins, Shriver, Krennek, et al. (2008) conducted a study of abstinence efficacy in patients with comorbid depression and substance dependence. Individuals who entered the program with low abstinence efficacy dropped out of the program within 60 days. Those with high abstinence efficacy demonstrated longer survival times in the program, and longer abstinence from alcohol and drug use. In summary, research on self-efficacy demonstrates that it promotes desired outcomes and prevents negative outcomes.

The role of cognition in the exercise of agency is an important one. Cognitive agency means that one thinks about how to achieve a desired goal, what to do when that goal is

obstructed, and believes that the goal can be attained. Where motivation provides the fuel, cognition provides the belief and the strategy. What remains is for the agent to transfer this motivation and cognition into action.

Behavior

Behavior is a critical component in the expression of agency. The actions one takes directs the trajectory one is on, and can lead the individual into situations that provide opportunities or that constrain possibilities (Magnusson & Cairns, 1996). It is therefore critical that one's behavior is carried out so that opportunities are maximized and obstacles are minimized. Simply taking action is associated with life satisfaction (Sheldon & Elliot, 1999). However, carrying out actions that have no intrinsic value or intentionality behind them is of little value, and may be detrimental. Although behavior is critical, it is important that behavior actually align with meaningful pursuits and with confident, purposeful thinking. In many ways, behavior defines agency as motivations and cognitions are realized through action. To this point, Schwartz et al. (2007) have proposed that agency may be the underlying mechanism that engenders the Selection, Optimization, and Compensation processes (SOC; Baltes, 1997).

Through SOC theory, Baltes and colleagues have demonstrated significant associations between behavioral goal attainment strategies and global and domain-specific well-being (e.g., Baltes, & Heydens-Gahir, 2000; Freund & Baltes, 2002). SOC theory is straightforward. Selection refers to the goals one chooses, Optimization refers to enhancing the resources that one has, and Compensation refers to using aids for declining or absent resources. Research indicates important associations between SOC strategies and well-being. Self-report of SOC demonstrates associations with general well-being across the lifespan (Freund & Baltes, 2002; Gestsdottir & Lerner, 2007). Across young and old adults, Freund & Baltes (2002) demonstrated significant

correlations between SOC strategies and subjective indicators of well-being from the Ryff Inventory of Well-Being (Ryff, 1989). The strongest relationship was found between SOC and Purpose of Life (e.g., motivation). Participants who reported use of Loss-Based Selection (i.e., behavioral restructuring of goals due to some loss) reported higher levels of self-acceptance. And Optimization demonstrated the strongest and most consistent correlations across all well-being constructs (Freund & Baltes, 2002).

In a longitudinal study of early adolescents, preliminary evidence demonstrated that the three SOC components are not yet differentiated in 5th and 6th graders. However, SOC as a unified structure is positively related to the 5 C's of positive youth development (i.e., competence, confidence, character, connection, and caring) (Gestsdottir & Lerner, 2007). Further, the unified SOC structure was negatively related to substance use, delinquency, and depression (Gestsdottir & Lerner, 2007). Thus, extant research demonstrates that exercise of SOC behavior demonstrates consistent associations with indicators of well-being.

Evaluating action and behavior is necessary for a comprehensive understanding of agency. It is in this domain that agency moves from abstraction to tangible reality. For agency to be actualized the individual must carry out actions toward goal attainment. This includes identifying options and selecting from among them. Once the goal has been selected, resources are identified to optimize success or likelihood of goal attainment. Finally, as problems arise the individual must be able to restructure actions and plans in order to compensate for lost or changing resources. It is through these actions that ownership over one's life is realized.

Agency as a Multi-faceted Reciprocal Experience

Although many theories highlight a dimension of agency and demonstrate associations with desired outcomes, the motivation, cognition, and behavioral literatures largely remain

isolated from one another. Thus, at this point, it may well benefit the academy to begin to weave together relevant theory and findings into a larger, cohesive story about human development: one that adequately defines and describes human agency. Each of these processes plays a distinct and necessary role in agency, yet a singular dimension by itself does not give rise to the experience of agency. An agentic orientation likely results from a *reciprocal interplay* between motivation, cognition, and behavior.

Further, an agentic orientation is not likely when these processes occur in isolation from one another (e.g., when values are disconnected from thinking and behavior). Considering these dimensions together, it is clear that agency is a complex and multi-faceted experience. Inhibited functioning in any one of these three domains will likely diminish or complicate the exercise of agency in one's life. A comprehensive instrument that measures these three dimensions may prove useful in identifying how adolescents are experiencing their lives, how they are reflecting and deciding upon a course of action and what actions they are carrying out to reach those goals.

Agency as a Goal of Prevention

Prevention programs geared toward helping adolescents overcome problems and develop skills rely on the adolescents' agency for the program to be effective. The process of youth connecting with program lessons and goals hinges primarily on the adolescent becoming cognizant of the array of motivational, cognitive, and behavioral choices available to them and their role in selecting from that range of possibilities. Youth may or may not be consciously aware of the central role they take in their own development and life course (Larson, 2006). Prevention programs attempt to influence youth ownership over their own lives and seek to provide them with appropriate and important skills for doing so (Dishion & Stormshak, 2007; Lerner, Theokas, Jelicic, 2005). Thus, prevention programs aim to move youth from a state of

being reactive, unaware, and unprepared towards being deliberate, conscious, and skillful. For this process to be developmentally effective, program curricula must consider the whole person (Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002). This means addressing what inspires and interests youth, their ability to think critically and reflectively, and identifying behaviors that are conducive to achieving desired goals (Scales, Benson, Roehlkepartain, Sesma, Jr. & van Dulmen, 2006).

Many effective programs incorporate domains of motivation, cognition, and behavior functioning into the curricula (discussed in greater detail below). However, these three processes are not always measured as a cohesive, reciprocal structure. If they are measured, they are measured as independent and discrete processes without consideration for the interplay between them (i.e., how does motivation change as efficacy and behavior change?). From an agentic perspective, these domains represent an overall orientation towards life and are essential to adolescents' sense of ownership over their lives. Therefore, they are important to measure. By doing so researchers may be able to better describe adolescent development and may also find intriguing program results.

Agency Promoting Components of Prevention Programs

Bond & Hauf (2004) outlined 10 characteristics of successful intervention programs. One characteristic of successful programs is that they have clearly defined goals and purposes. This characteristic has a two-fold function. One, it serves to guide program creation and implementation. Two, it facilitates determining if goals have been reached. Clearly stated purposes, in essence, focus the goals of the intervention and allow for quantification of results. Here I posit that many existing programs implicitly aim to increase adolescent agency by explicitly working to increase intrinsic motivation (or decrease extrinsic/amotivation), by

promoting cognitive problem solving skills and increasing self-efficacy, and by coaching adolescents in adaptive behavior. By including agency-promotion as a clearly stated goal, and by measuring changes in overall levels of agency as measured by motivation, cognition, and behavior, program evaluations may yield some useful insights on what processes prevention programs are affecting and to what degree. This point is demonstrated by evaluating Life Skills Training through an agency-promotion perspective.

Life Skills Training (LST; Botvin & Griffin, 2004) is a school-based prevention program delivered over the course of 15 lessons in 7th grade, with 10 booster sessions in 8th grade and 5 booster sessions in 9th grade. Program lessons include drug-related information and skills, social skills competencies, and general self-management skills (Botvin & Griffin, 2004). The primary goal of LST is to prevent and reduce drug use in early adolescents. LST contains components directly related to promoting agentic motivational, cognitive, and behavioral functioning for adolescents. This program aims to align youth's thinking and behaviors with socially or personally valued outcomes such as not using drugs or being competent in social interactions. Following is an articulation of this alignment between LST and the promotion of agency through its three facets.

According to self-determination theory (Deci & Ryan, 1985), autonomy, competence, and relatedness are inherent to intrinsically valued goals. To the extent that adolescent participants have latent desires to acquire better social or problem solving skills, or achieve better communication with their parents, or gain skills to become a confident, contributing member of society (Larson, 2006), prevention programs are implicitly geared towards improving these outcomes for which adolescents often hold intrinsic interest. Conceptually, prevention programs influence adolescent motivation toward achieving these goals by scaffolding opportunities for autonomy, competence, and relatedness. Life Skills Training has components that influence motivation for valued social and personal outcomes. For example, LST promotes autonomy,

competence and relatedness through components that promote personal and social skills, self-management, well-being, adaptive coping, and self-improvement. As adolescents experience the fulfillment of these needs the process of internalization and integration grows such that the latent desire for growth becomes activated and manifest through intrinsic motivation (Grolnick, Deci, & Ryan, 1997; Larson, 2006). However, intrinsic motivation is not measured in LST research although competence, one underlying component of motivation, is (Botvin & Griffin, 2004; Botvin, Griffin, Paul, & Macaulay, 2003).

Cognition and behavior processes are clearly influenced by the LST program. Outcome evaluations demonstrate changes in cognitions through increases in resistance and decision-making skills, knowledge of the consequences of drug use, and knowledge about norms (Botvin & Griffin, 2004). Behavior is also influenced by LST, most notably in the prevention of actual drug use outcomes, but also in areas of interpersonal communication and ability to avoid high-risk situations (Botvin & Griffin, 2004).

LST influences the three agency processes but measures them as discrete and domain-specific components. However, LST may also be influencing adolescents' overarching orientation towards life. That is, this program may be promoting the development of a higher-order ownership of one's life that generalizes from the lessons and the domains of the lessons to other areas of life such as academics or career, political engagement, romantic relationships, or problems in general. For example, assertiveness and refusal skills are important life skills that are adaptive in many contexts, not just situations involving drugs or social interactions. A finer grain understanding of the underlying, reciprocal processes of change in motivation, cognition, and behavioral dimensions and generalization of these changes to other aspects of life may greatly enhance outcomes measurement, program adaptation, and future program development.

Table 1-1 depicts three other well-known programs, their goals, and how those programs' components align with the three dimensions of agency. To the extent that such programs can be

conceptualized as promoting agentic functioning, they may realize greater effects or greater insight into the processes of change. Such results can be used to determine what dimensions of agentic functioning are being influenced by the program and which dimensions may benefit from altering dosage or other such program tailoring (Collins, Murphy, & Bierman, 2004).

Table 1-1: Family and school-based program components that promote agency

Program	Program Goals	Motivation: Valued personal and social outcomes; Autonomy, Competence, Relatedness	Cognition: Knowledge, Thoughts, Strategies	Behavior: Actions
Strengthening Families Program (SFP) Kumpfer & Alvarado, 2003	Prevent and reduce substance use and behavior problems in adolescents; Improve parenting and family practices	Familial, parent-child bonding; communication-competence; Reaching goals; Meaningful family involvement; Self-regulation	Conflict and stress skills; Understanding consequences; Peer pressure skills; Understanding family roles and values	Parent ability to show love and affection, and set appropriate limits; Child prosocial behaviors and less substance use
Positive Parenting Program (Triple P) Sanders, 1999	Improve parenting skills of children with early-onset conduct problems	Increase parenting competence; understanding healthy parent-child interactions; Parent self-regulation and problem-solving ability	Positive child-management skills; Understanding link between parent-child relationship and child's competencies	Respond positively in parent-child interactions; Use effective discipline techniques; Have realistic expectations of child
Promoting Alternative Thinking Strategies (PATHS) Greenberg et al., 2003	Promote social-emotional competencies; Reduce problem behaviors; Integration of affective, behavior, and cognitive understanding	Emphasis on internalizing and owning self-responsibility for actions; Social bonding; Academic success; Self-regulation	Identifying and understanding emotions; Interpersonal problem solving skills; Planning skills	Self-control; Social problem solving

Agency and Developmental Outcomes

Agency is relevant to a broad range of developmental outcomes across the lifespan. In adolescence, competence in multiple domains becomes increasingly important both for short-term and long-term positive development (Masten, Roisman, Long, Burt, Obradovic, Riley, et al., 2005). As youth move into middle school and high school their physical activity patterns change (Pate & Sirard, 2000), grades become more important as navigating secondary education and career selection becomes a higher priority (Erikson, 1956), increased participation in unstructured leisure may translate into increased engagement in delinquent behaviors (Caldwell & Smith, 2006), and peer relationships take center stage (Nelson et al., 2005). In the midst of these many important issues, youth must also begin to develop strategies for overcoming obstacles (Lerner et al., 2001). Following is a brief review of each of these issues in turn and the salience of the motivation, cognitive, and behavioral agency processes to them.

Physical activity

Physical activity has increasingly become a public health concern as rates of obesity and diabetes prevalence continue to rise due to sedentary behaviors, poor diets, and eating habits (Centers for Disease Control and Prevention, 2009; Nelson, Gordon-Larsen, Adair, & Popkin, 2005). Many prevention and after-school programs have begun to focus on increasing youth engagement in physical activity in order to establish healthful behavior early in life and to offset other problems (e.g., boredom, delinquency, drug use; Caldwell, Baldwin, Walls, & Smith, 2004; Digelidis, N., Papaioannou, A., Lapidis, K., & Christodoulidis, T., 2003; Hartz, B., & Petosa,

R., 2006; Fortier, Sweet, O'Sullivan, & Williams, 2007). Influencing motivation, cognitive and behavioral processes are each salient to helping youth to be more physically active.

Intrinsic motivation, self-efficacy, and goal-oriented behavior are related to physical activity (PA) outcomes. Youth who have intrinsic PA goals engage in free-time PA more often and report higher quality of life (Gillison, Standage, & Skevington, 2006). Individuals who report high efficacy and control beliefs are more likely to be physically active and to stay in shape (Ryan, 2005). Youth who engage in sports with a task-orientation (vs. an ego-orientation) report higher levels of enjoyment (McCarthy, Jones, & Clark-Carter, 2008). Youth who embody agentic traits across the three dimensions of agency (i.e., intrinsic motivation, high efficacy, and task-orientation) towards physical activity experience better physical activity outcomes.

Grades

Youth academic achievement is consistently a primary concern for parents, researchers, government, schools, and youth themselves. Many federal, state, local, and prevention programs focus on supporting youth academic skill development and accomplishment. Some programs focus directly on school subject (e.g., No Child Left Behind; Science, Technology, Engineering, Mathematics education programs, NSB 2007; 21st Century Learning Centers) while others focus on increasing other competencies whose underdevelopment impede the learning process (e.g., social-emotion management skills – PATHS; Greenberg, Weissberg, O'Brien, Zins, Fredericks, Resnick, et al., 2003).

Increasing youth learning and school achievement entails promoting motivation, cognitive, and behavioral processes. Youth who are more intrinsically motivated and have mastery goals (vs. performance goals) earn higher GPA's (Gilman & Anderson, 2006). Youth who believe in their ability to be successful in a school subject demonstrate higher GPA's

(Gutman, 2006; Long, Monoi, Harper, Knoblauch, & Murphy, 2007). Youth who demonstrate self-discipline behaviors such as spending time on homework, attending class, and lower amounts of time watching T.V. earn higher grades (Duckworth & Seligman, 2005). In summary, youth who report higher levels across the three domains of agency perform better in school.

Delinquency

Youth who engage in delinquent behaviors such as property damage and physical harm to others not only create difficulty for others but also for themselves. The longer delinquent behaviors continue the more likely it is that the youth's range of desirable life options diminishes. Youth delinquency and violence is a primary focus of some prevention and intervention efforts (e.g., Fast Track, Conduct Problems Prevention Research Group, 2002). Programs that seek to alter delinquency must take into account the motivation, cognitive, and behavioral reasons for engaging in delinquent behavior.

Youth who are intrinsically motivated, who experience purpose in life (i.e., motivation) are less likely to engage in general deviant behaviors (Scheier & Botvin, 1996). Similarly, youth with high levels of cognitive efficacy are less likely to engage in deviant behaviors and polydrug use (Scheier & Botvin, 1996). Behaviorally, adolescents who engage in goal directed behavior are less likely to report engaging in delinquent activities (Kort-Butler, 2009; Palen & Coatsworth, 2007). In short, youth who are more agentic across the motivation, cognition, and behavioral domains are less likely to participate in delinquent acts.

Peer Influence

Social interactions become increasingly important during adolescence (Nelson, et al., 2005). Although it is a commonplace belief that peer influence is often negative (Arnett, 2006), research has demonstrated that peers can be a protective influence in the lives of young people (Syvertsen, Flanagan, & Stout, 2009). However, not all peer influence is positive and the ability to establish and maintain an identity that is independent of peers is a critical developmental milestone (Erikson, 1956; Marcia, 1966). Programs that promote social and relationship skill development (i.e., Life Skills Training, Botvin & Griffin, 2004) consider the motivation components of social interactions, the cognitive processes of navigating social relationships, and the behavioral components of interacting with others.

Youth who are more intrinsically motivated report lower levels of peer influence than extrinsically motivated youth (Caldwell, Bradley, & Coffman, 2009). Similarly, there is a negative correlation between youth problem solving ability and levels of reported peer pressure (Dubow, Arnett, Smith, & Ippolito, 2001). Youth who demonstrate prosocial problem solving behaviors are more socially accepted (i.e., influential; Pakaslahti, Karjalainen, & Keltikangas-Jarvinen, 2002). Youth who are more agentic across motivation, cognition, and behavior are more likely to experience less peer pressure and to have more influence in peer groups.

Perceived Constraints

A perceived constraint is an obstacle that a person believes to be an impediment of progress towards a goal. These constraints may be internal (e.g., lack of knowledge) or external (e.g., lack of venue), surmountable or insurmountable, and real or not real. Fundamentally, however, the constraint in some way keeps the individual from progressing. Three theories focus

on this perception from varying angles. The Theory of Planned Behavior (Ajzen, 2002) posits that behavioral beliefs, normative beliefs, and control beliefs influence perception of the target behavior. This perception in turn influences behavioral intention, which directly precipitates action. Locus of control (Rotter, 1965) focuses on the extent to which an individual believes behavior reinforcement depends on oneself (e.g., personal ability; internal) or on outside forces (e.g., luck; external). Self-efficacy (Bandura, 1989) focuses on the extent to which people believe themselves capable of carrying out a specific action and how difficult or easy they believe it will be to do so. The overarching orientation of each of these theories is in the cognitive domain of agency.

Helping youth gain the skills to navigate personal and contextual constraints is often a component of prevention programming. Programs include this skill acquisition both explicitly as a tangible skill to be learned (e.g., TimeWise; Caldwell, 2004) and implicitly through synthesis of multiple program components (e.g., Strengthening Families Program; Kumpfer & Alvarado, 2003). The TimeWise program exemplifies both approaches and addresses the motivational, cognitive, and behavioral elements of overcoming obstacles. As youth gain ability in these domains, they may become more agentic and perceive fewer hindrances in their lives.

As mentioned earlier in this paper, SOC theory has also demonstrated that individuals who are able to use compensation and loss-based selection as behavioral strategies demonstrate better outcomes (Freund & Baltes, 2002). Thus, individuals who are able to use such strategies to overcome constraints, whether real or perceived, experience a wide range of well-being outcomes (e.g., self-acceptance, competence, life satisfaction; Freund & Baltes, 2002)

Motivation, cognition, and behavior can be directed towards overcoming perceived constraints. As youth identify intrinsically motivating activities they can develop strategies to accomplish them and carry out those strategies. Although perceived constraints primarily fall

under the cognitive domain of agency, all three domains of agency may be leveraged to change perception and the individual's relationship to the obstacle.

Agency and Individual Characteristics

Gender

Gender may play a role in the extent to which an adolescent is able to express agency or the manner in which it is expressed. Gender differences in the expression and experience of agency may also relate to personal outcomes such as academic success, physical activity, or engagement in delinquent acts (Kort-Butler, 2009; Long, Monoi, Harper, Knoblauch, & Murphy, 2007; Shen, McNaughtry, & Martin, 2008).

Kort-Butler (2009) conducted a study on adolescent coping styles, gender, and differences in delinquency and depression outcomes. Three coping styles were conceptualized. Avoidant coping was characterized as a minimal behavioral response where problems are avoided and the primary response is emotional. Action coping was characterized by high behavioral response marked by impulsivity and little consideration for consequences. Approach coping was characterized by exerting effort to achieve a goal, and subsequent reflection on ways to improve reaching a solution to a problem. The approach coping style most closely reflects an agentic style, whereas the avoidance and action styles respectively represent non-agentic styles due to the emphasis on no action or on action carried out with little thought. In Kort-Butler's (2009) study male adolescents were significantly more likely to report using an action coping style, and female adolescents were significantly more likely to report an avoidant coping style. This study also found that females who employ avoidant or action coping are more likely to engage in delinquent

behaviors. There were no gender differences in the use of approach coping (Kort-Butler, 2009). This study demonstrates variation by gender in types of non-agentic coping styles, but that both genders are equally likely to employ an agentic style of coping.

In a study employing self-determination theory (Deci & Ryan, 2000) and theory of planned behavior (Ajzen, 2002) concepts, Shen and colleagues (2008) studied urban adolescents' competence, autonomy, subjective norms, and attitudes towards physical education and physical activity in their leisure time. Their results indicated that females report significantly lower levels of physical activity, lower perceived competence for physical education, less positive attitudes for physical activity, and less support from teachers. In the realm of physical activity, the females in their study report low levels of agentic motivation (i.e., competence), cognition (i.e., attitudes) and behavior (i.e., physical activity) and higher barriers (i.e., lack of teacher support; Shen, McCaughy, & Martin, 2008). These results demonstrate that females in that study were less likely to manifest agency towards physical activity.

Long and colleagues (2007) conducted a study of academic motivation and achievement in urban adolescents. Their study incorporated interest, self-efficacy, and achievement goal orientations - variables that readily map onto agency as conceptualized here. Their results indicated that gender was significantly associated with academic achievement and achievement goals in 8th grade such that females had better grades and more strongly endorsed learning (vs. performance or work-avoidance) goals than did their male peers. In this study 8th grade females demonstrated higher levels of agency for learning and academics (Long, Monoi, Harper, Knoblauch, & Murphy, 2007).

Taken together, these studies demonstrate that males and females can vary across the motivation, cognition, or behavioral elements of agency and these variations are associated with important outcomes for adolescents. Although gender differences are not always found or are

found inconsistently, understanding the differential experience each gender has within the three domains of agency expands our ability to respond to the expression of agency unique to each gender.

In summary, agency is a global concept with broad implications for adolescent development. As such, it is a concept that should be measured, particularly within the context of prevention programs. Programs that seek to influence daily functioning and positive development in the lives of youth need to incorporate motivation, cognition, and behavior components both in curricula and in measurement. This will enable researchers to track if program initiatives are generalizing from program-specific content areas to other areas of adolescents' lives.

Existing Scales Relevant to Agency

A literature review was conducted to identify scales that incorporate motivation, cognition, and behavioral elements as conceptualized by self-determination (Deci & Ryan, 1985), self-efficacy (Bandura, 2001), and SOC (Baltes, 1997) theories. These theories were chosen to reflect the three dimensions of agency specifically because of their strength in predicting well-being and goal attainment outcomes. The review resulted in many potentially relevant scales, however no single instrument was found that incorporated all three dimensions as conceptualized here. Following is a review of the two most salient scales identified and their relevance to and departures from the three-dimension conceptualization of agency.

Motivated Strategies for Learning Questionnaire (MSLQ)

The late Paul Pintrich developed a conceptual framework for researching self-regulation (Schunk, 2005). His framework is comprised of four phases of regulation that correspond to domains in which that regulation would be necessary. The four phases are (1) forethought, planning, activation, (2) monitoring, (3) control, and (4) reaction, reflection. The four corresponding domains of regulation are (1) cognition, (2) motivation, (3) behavior, and (4) context. These phases share conceptual overlap with Bandura's articulation of the four cognitive-regulatory mechanisms of agency (i.e., forethought, intention, self-reflection, and self-reaction; Bandura, 2001). However, Pintrich's model puts greater emphasis on monitoring and control components. The domains of Pintrich's regulation share terminological overlap with the present conceptualization of agency, however evaluating the framework and the questionnaire that operationalizes it reveals important departures from the three-dimension model of agency.

The Motivated Strategies for Learning Questionnaire (MSLQ) was designed to measure the effectiveness of a "Learning to Learn" college course and was developed over the course of ten years (Pintrich, Smith, Garcia, & McKeachie; 1993). The MSLQ is comprised of two major scales to assess self-regulation for learning. One scale measures motivation in three areas: value (e.g., intrinsic and extrinsic orientation), expectancy (e.g., self-efficacy), and affect (i.e., test anxiety). The second scale measures learning strategies across scales for cognitive, metacognitive, and resource management strategies (Pintrich et al., 1993).

The value scale for intrinsic/extrinsic orientation aligns with the SDT perspective of motivation. However, within the MSLQ, self-efficacy is included as a motivation component. The present conceptualization of self-efficacy holds that it is a cognitive process, not one of motivation. Further, the MSLQ was designed specifically for college students and relates specifically to learning. In many ways, the MSLQ conceptualization is appealing and relevant, however the departures from the proposed model are significant enough that it is not appropriate for the present measurement goals.

The Multi-CAM Questionnaire

The Multi-Cam questionnaire is designed to measure control expectancy, agency, and means-ends beliefs in children and early adolescents (Little & Wanner, 1997). The structure of the item wording allows the researcher to measure these beliefs in any domain of functioning, which provides significant flexibility in its application. Control expectancy beliefs measure child belief in personal ability to achieve a desired outcome. Means-ends beliefs measure belief that certain means (e.g., effort, luck) are useful for achieving outcomes (e.g., good grades, making a friend). Agency beliefs measure belief in personal ability to utilize a certain mean towards a specific end (e.g., belief in ability to use effort make good grades). The Multi-CAM also measures motivation styles according to the SDT motivation continuum, and contains a scale for action-control behaviors that measures behavioral coping responses to problems.

The Multi-CAM demonstrates some clear relevance to the three-dimension model of agency. First, the measure is designed such that items can be worded to be applied to any domain of interest. This allows flexibility to potentially measure global traits as opposed to specific dimensions. Second, the measure is designed for use with children and young adolescents, the latter of which is the target population of interest. Third, the measure incorporates motivation, cognitive, and behavioral dimensions. The instrument measures motivation according to the SDT perspective, which is desired in a measure of agency. The CAM (Control, Agency, Means) scales measure cognitive dimensions, primarily through beliefs about ability and utility. And behavior is measured as it relates to coping with problems. Clearly, this measure contains many elements desired in an instrument that measures agency. However, the Multi-CAM does not meet the desired criteria in a couple of important ways.

One, behaviors are only measured as coping mechanisms in the face of problems. Although coping with problems is an important element of agency, it is only one of many contexts in which agency can be expressed. It is also important to measure how youth are engaging in their world outside of the context of problems. A conscious ownership of behavior incorporates not only reactive states (e.g., responding to a problem), but also includes proactive states (e.g., goal initiation and pursuit). Additionally, the action-control behavior scale includes two coping responses that represent emotions and not behavior specifically (“I feel down about it” and “I don’t get upset about it”). Realistically, a person may respond to a problem by “feeling down about it” but also engage in “seeking out others” despite the emotion or because of it.

Two, the Multi-CAM measures cognitive processes primarily at the level of belief and perception. While efficacy beliefs are an important dimension of agency, so too are other cognitive processes such as problem-solving strategies, reflection, and engagement with goal pursuit. Thus, although the Multi-CAM very closely aligns with the proposed conceptualization of agency, it is missing some key components for fully measuring agentic behavior and cognition as presented here.

In summary, these two instruments most closely fit the proposed three-dimension framework of agency but did not meet the criteria deemed most essential to a definition of agency. Specifically, these instruments did not include sufficient items in either the motivation, cognition, or behavioral domains as articulated by SDT, self-efficacy, and SOC, or were too specific in content or directed towards a population other than adolescents.

Study Aims and Analysis Plan

Because of the absence of an agency measure that contains the motivation, cognition, behavior components, the focus of this project was to develop and validate a measure of agency that reflected these processes. The desired pilot instrument was to reflect multiple facets of cognitive agency incorporating social cognitive theories' concept of self-efficacy (Bandura, 1989), and concepts related to human agency: intention, forethought or planning, and self-reflection (Bandura, 2001), and the restructuring of efforts (Schwartz et al., 2007). The key area of motivation to be tapped by the pilot instrument was intrinsic motivation (Ryan & Deci, 2000). The focus was to identify if youth feel a sense of purpose, interest, passion, or satisfaction in their daily lives and activities. Additionally, the instrument was to tap actual goal-oriented behaviors as conceptualized by SOC theory. The behavior section was to identify if youth actively seek out goals and ways to accomplish them in addition to restructuring their behaviors where appropriate. The cognitive and behavioral dimensions thus should reflect both proactive and reactive processes. There were additional criteria for the pilot measures, as follows. The measure should be written so that early adolescents could comprehend them. The instrument was also to be global, or general, in nature. Finally, the measure should be brief for ease of administration in school settings.

The focal aim of this project is to evaluate the measurement properties of a brief, comprehensive measure of adolescent agency that incorporates motivational, cognitive, and behavioral dimensions of agency. Five research questions will guide the evaluation of this instrument:

- 1) Is this pilot measure reliable?
- 2) Does a three-factor solution appear?

- 3) Does it discriminate agency factors from non-agency factors?
- 4) Does the measure converge with instruments that measure constructs similar to agency?
- 5) Does the measure predict, or correlate, with behavioral measures of the agency construct?

Analysis Plan

The analysis plan will proceed through three primary steps. First, descriptive analyses will be conducted on the sample and the variables of interest. Next, instrument reliability analyses will be conducted, comprised of internal consistency and factor analyses, to answer research questions 1 and 2. Then validity analyses will be run to determine convergent, discriminant, and concurrent validity of the scale to address research questions 3,4, and 5. All reliability and validity analyses will be run separately for gender and grade level. There are a small number of participants in the control condition so the sample will not also be broken down by treatment condition. Following are details on all of the above listed analyses.

Descriptive Statistics

Descriptive analyses will be conducted for the following variables: gender, grade level, and treatment condition. In addition, summary statistics including means and standard deviations will be calculated for the 15 items of the pilot agency measure, and the scales and items that will be used to conduct validity analyses (self-efficacy for restructuring scale, self-efficacy for physical activity scale, free-time affect scale, 2 peer influence items, 2 self-selected physical

activity items, 1 delinquency item, and 2 perceived constraints items). Further detail on these scales and items follows in the Instrument Reliability section below.

Instrument Reliability

Internal Consistency

Internal consistency analyses (e.g., vs. test-retest, etc.) will be conducted because this instrument was administered once and is self-report (Windsor, Clark, Boyd, & Goodman, 2004). The overall instrument and each subscale are expected to demonstrate acceptable reliability. Internal consistency values of $\geq .70$ indicate that scale items reliably measure the same construct.

Factor Analysis

Motivation, cognition, and behavior are expected to be discrete types of agentic processes. As such, the agency subscales should measure these processes discretely, and they should load onto a higher-order factor of agency.

Instrument Validity

Convergent, discriminant, and predictive construct validity will be evaluated by correlating existing construct scales and items with the agency instrument. Table 1-2 lists the scales to be used, the type of validity, and anticipated strength of relationship with the agency measure. Table 1-3 lists the items represented by each scale in Table 1-2.

Table 1-2: Hypothesized Construct Correlations: Convergent, Discriminant, Predictive Validity

Scale/Items	Validity Type	Association	Strength
Self-efficacy for restructuring (SE-RE)	Convergent	Positive	Moderate
Self-efficacy for physical activity (SE-PA)	Convergent	Positive	Moderate
Free-time affect (FTA)	Convergent	Positive	Moderate
Physical activity preferences, attitudes	Discriminant	None	N/A
Physical activity knowledge	Discriminant	None	N/A
Academic achievement	Concurrent	Positive	Moderate
Self-selected physical activity	Concurrent	Positive	Moderate
Peer influence	Concurrent	Negative	Moderate
Delinquency	Concurrent	Negative	Low to moderate
Perceived constraints to physical activity	Concurrent	Negative	Low to moderate

Table 1-3 Scales' items for validity analyses.

Self-efficacy for Restructuring (SE-RE)

I am able to turn a boring situation into something interesting.
 How easy is it to make things more challenging when being physically active?
 I am able to make things more fun when I am being physically active.
 I am able to enjoy physical activity, even if I have to do it.

Self-efficacy for Physical Activity (SE-PA)

I can be physically active on any given day
 It is easy to find ways to be physically active during free-time
 I am a physically active person.
 How often do you set goals for yourself related to being physically active?

Free-Time Affect (FTA)

How many of your free-time activities are good for you?
 I like free-time activities a little beyond my ability.
 I like a challenge in my free-time.
 I like my free-time activities to challenge my skills.

Self-selected physical activity

Number of minutes spent physically active over the weekend
 Why do you do physically active things in your free-time? How often is it because...it will bring you better health?

Peer influence

The only way I'll be physically active is if my friends are too.
 How many of your friends are physically active?
 Why do you do physically active things in your free-time? How often is it because...you have to be active to keep up with peers/others?

Delinquency

How often have you purposely damaged someone's property or belongings?

Academic achievement

What grades do you generally get in school?

Perceived constraints

When you are not physically active in your free-time, how often is it because...
 ...you'll be embarrassed?
 ...school, homework, chores take too much time?

Convergent Validity

This pilot measure is anticipated to correlate with scales in the existing instrument (i.e., PPALTY). These scales conceptually and theoretically relate to specific dimensions of the agency measure. Specifically, the self-efficacy restructuring (SE-RE) scale and the self-efficacy for physical activity (SE-PA) scale should positively correlate with the cognitive sub-scale of the agency measure; the free-time affect (FTA) scale should positively correlate with the agentic motivation sub-scale. Moderate correlations are hypothesized because although motivation and cognitive elements are measured in it, the PPALTY survey is specific to physical activity, whereas the agency measure is global in nature.

Discriminant Validity

The piloted measure is anticipated to weakly correlate with other variables in the existing PPALTY instrument. Items related to physical activity preferences, physical activity behaviors of peers, and knowledge of places for local physical activity do not measure motivation, cognition, or behavior related to free will, therefore, their correlations should not be strongly associated with the agency instrument.

Concurrent Validity

Associations between cumulative agency scores and the following outcomes will be evaluated: (1) *Self-selected physical activity* such as volitionally chosen weekend physical activities and reasons for engaging in physical activity, (2) *peer influence* such as only being physically active if friends are, and engaging in physical activity to keep up with peers, (3) *perceived constraints to physical activity* such as being too embarrassed to engage in physical activity or being too busy with school and chores to be physically active, (4) *delinquency* as

reported by damaging others' property, (5) *academic achievement* as reported grades typically received. This analysis will enable a better understanding of what specific levels and types of agentic functioning are associated with desired outcomes.

Chapter 2

Methods

Intervention

The present intervention is a pilot study of an adaptation of TimeWise: Taking Charge of Leisure Time (Caldwell, 2004). TimeWise (TW) is a universal preventive intervention program designed to promote adolescent engagement in healthy free-time activities. The curriculum focuses on increasing intrinsic motivation, reducing boredom, and increasing self-efficacy to engage in interesting, and healthful, free-time behaviors, in order to reduce drug use onset. The curriculum consists of six lessons, each with two activities. The curious reader can find specifics of TW theory and lessons covered in greater depth elsewhere (Caldwell et al., 2004). The present pilot intervention adapts the TW curriculum to specifically address promoting *physically active leisure* (e.g., sports, running), whereas the original curriculum does not focus *solely* on physical activity (e.g., reading, and art are included).

The focus of the TimeWise project is to increase identification of and access to free-time physical activity opportunities and to decrease boredom and sedentary behaviors during free time. The framework of TimeWise promotes identifying personally motivating activities, overcoming perceived obstacles to those activities, and taking action to engage in them. Thus, conceptually the program design promotes agentic functioning in the context of physical activity. Such functioning may generalize to other life domains as well.

Because the pilot adaptation focuses on physical activity, physical education (P.E.) teachers delivered the curriculum. The teachers adapted the curriculum according to availability of nearby physically active resources and to student needs. Suggestions for curriculum adaptation

were offered to teachers. Process evaluation data were collected from teachers for each lesson's activities in order to understand what changes were made to the program. P.E. teachers taught the TW curriculum six times over the course of one semester for approximately 45 minutes for each lesson.

Identifying a control group at the onset of the intervention in Fall 2008 was not possible. A comparison group was identified in Spring 2009, and so were only administered the survey once, in late Spring 2009, which was during the post-test survey for youth in the intervention condition. The comparison group included 7th and 8th grade students enrolled in PE/Health classes in two of the same seven schools.

Participants

Students

There were 911 students enrolled in 7th or 8th grade physical education during the Spring 2009 semester. Of these students, 791 participated in the intervention condition, and 120 were in the comparison condition. Of the 791 students in the intervention condition, 297 were not surveyed due to: being absent or refusing assent (n=48), consent refusal (n=90), suspension or school transfer (n=159); this yielded a 62% response rate for the intervention group. Of the 120 students in the comparison condition, 23 were not surveyed: absent or assent refusal (n=13), consent refusal (n=6), suspension or transfer (n=4); this yielded an 81% response rate for the comparison condition.

In this sample, 52% were female. The sample was primarily non-White: 68% were Black, 24% were Hispanic, 6% were White, and 2% were of Asian or Pacific Islander descent. All

students were attending schools in urban, under-resourced, ethnically diverse areas within a medium-sized city in Pennsylvania.

Informed Consent

Informed consent was delivered to, and gathered from, teachers and principals by the primary research assistant for the project. Students brought home parental passive informed consent forms and student assent forms were distributed during students' homeroom (See Appendix B).

Classrooms and Schools

All 7th and 8th grade P.E teachers (n=10) in the school district taught TimeWise. The intervention curriculum was delivered during gym and health class sections in 7th and 8th grade. These classrooms represented seven schools across the district.

Data Collection Procedure

Data collection was scheduled during homeroom time. Four research assistants briefly introduced themselves and the survey procedure, distributed surveys and pencils, and answered student questions as needed. On average, the survey took 30-40 minutes for students to complete. Those students who did not receive consent or did not assent were given something else to do during this period. No personally identifiable information was collected for any student. Surveys were collected in April of 2009.

Instrument

Physically Active Leisure

Data were collected using the Promoting Physically Active Leisure Time in Youth (PPALTY-H). This instrument contains scales for: Self-efficacy for physical activity (PA; $\alpha = .81$), Motivation for PA ($\alpha=.93$), Behavior change in PA ($\alpha=.73$), Attitudes towards PA ($\alpha=.71$), Perceived constraints to PA ($\alpha=.96$), Free-time affect ($\alpha=.70$), Self-efficacy for restructuring PA ($\alpha=.88$), Social support for PA ($\alpha=.86$), and Engagement in PA ($\alpha=.86$). See Table 1-3 for specific items for each scale.

Adolescent Agency

In addition to these scales, a pilot scale of adolescent agency was included in the instrument at post-test. Prior to developing a scale for agency, eight “proxy” items were selected from existing scales in the PPALTY-H to determine if they would reduce to a proxy agency factor. Principal components and principal axis factor analyses were conducted on these items. Examples of the items are: “I feel good when my free-time activities challenge my skills” and “I can keep up my interest in physical activities.” Both data reduction analyses resulted in a one-factor solution with strong factor loadings on each item. Principal axis factoring demonstrated that 49.84% of the variance was accounted for by the proxy agency factor. These preliminary results demonstrated that an agency factor can be identified specific to physical activity and free-time domains, and provided impetus to develop an agency instrument that was domain-free. The performance of this global agency scale is the primary focus of this paper.

The adolescent agency measure is comprised of three subscales of five questions each. The three subscales represent the primary facets of agency: motivation, cognition, and behavior. Subscale questions were designed to measure discretely each of these components of agency. Response options were “1- never, almost never”, “2 - sometimes”, “3 – quite often” and “4 – always, almost always”. Table 2-1 contains the 15-item measure delineated by motivation, cognition, and behavior subscales and the concepts they were constructed to map onto (i.e., intrinsic motivation, self-efficacy).

The motivation subscale items were written according to the self-determination theory’s concept of intrinsic motivation (Ryan & Deci, 2000). These items were written to tap into adolescents’ sense of purpose, interest, and inspiration in their day-to-day lives. One reverse-coded item (M4) was included which maps onto the concept of amotivation. The cognition subscale was written according to Bandura’s (2001) conceptualization of human agency which is comprised of four domains: intention, forethought, self-reflection, and self-reaction, and his social-cognitive theory of self-efficacy (Bandura, 1989). This subscale contains one question salient to each of these areas, and overall was written to reflect agentic cognitive processes. The behavior subscale was modeled after Freund & Baltes (2002) Selection, Optimization, & Compensation questionnaire. This subscale contains questions written to discretely tap selection and compensation, and two items that reflect a combination of selection and optimization behaviors. All items were written toward the reading and comprehension level of early adolescents.

Table 2-1 Agency pilot measure items by subscale.

	Motivation	Concept
M1	Most of what I do during the day is important to me.	Intrinsic motivation
M2	I like having a sense of purpose when I do things.	Intrinsic motivation
M3	I do things that I know will bring me satisfaction.	Intrinsic motivation
M4	During the day, most of what I do has no purpose.	Amotivation/extrinsic motivation
M5	I feel inspired to do things that interest me.	Intrinsic motivation
	Cognition	
C1	I think about the steps I will need to take to get or accomplish the things I want.	Forethought, planning
C2	When I am doing something, I think about why I am doing it.	Intention
C3	I think about what is really important to me.	Reflection
C4	I believe that I can reach my goals.	Self-efficacy
C5	I think of different ways to reach my goals.	Planning, restructuring
	Behavior	
B1	I take action to do the things I want to do.	Selection
B2	If I need it, I ask for help to reach my goals.	Compensation
B3	When I find something I am interested in, I take action to explore it.	Selection/Optimization
B4	If I am doing something the wrong way, I try to figure out the right way to do it.	Compensation
B5	I try to find ways to do things that are really important to me.	Selection/Optimization

Scale: 1=never, almost never; 2=sometimes; 3=quite often; 4=always, almost always

Analytic Strategy

Participants

All analyses will be conducted on the respondent data by grade and gender, yielding 4 groups (i.e., 7th grade males, 8th grade males, 7th grade females, 8th grade females). Although there was a treatment and a comparison condition, analyses will not be conducted according to these groups. Although the prevention program may change the levels at which youth respond to the agency measure, the program is not designed to change the inter-correlations between the dimensions of agency. Based on this rationale, respondent data will not be analyzed according to treatment group.

Reliability Analyses

Internal Consistency

Internal reliabilities will be assessed for the subscales and full scale using Cronbach's alpha (Equation 1).

$$\text{Equation 1: } \alpha = \frac{n}{(n-1)} \left[1 - \frac{\sum_{i=1}^n \sigma_{Y_i}^2}{\sigma_x^2} \right]$$

where:

- n is the total number of scale items
- Y_i represents the individual items in the scale
- x refers to the total scale score

Factor Analysis

The nature of these analyses is exploratory and guided by the theory that agency is comprised of three processes (i.e., motivation, cognition, behavior). Analyses will be focused on validating a 3-dimension construct of agency and will consequently focus on extracting three factors from the data. Exploratory factor analysis was chosen for two reasons. One, this measure is a pilot. Two, it is not certain that a 3-factor structure will emerge.

First, the factor correlation matrix will be examined to identify levels of correlations between each factor. Next, exploratory factor analysis (EFA; Equation 2) will be conducted for each of the individual subscales to verify that each subscale represents one discrete factor.

$$\text{Equation 2: } Y_{fi} = a_1F_{1i} + a_2F_{2i} + a_3F_{3i} + \dots + a_mF_{mi}$$

where:

- Y_{fi} is the factor score for person i , on factor f
- a_1 is the regression coefficient for variable 1, a_2 is the regression coefficient for variable 2
- F_{1i} is the score on variable 1, for person i , F_{2i} is the score on variable 2 for person i
- m is the number of latent factors.

Validity Analyses – Convergent, Discriminant, Concurrent Validity

To assess construct validity, correlational analyses (Equation 3) will be run to compare the agency measure with several subscales and items within the PPALTY instrument. The self-efficacy for restructuring (SERE), self-efficacy for physical activity (SEPA), and free-time affect (FTA) scales are expected to positively correlate (converge) with the agency instrument due to some conceptual similarities. Physical activity preferences and knowledge items are not expected to correlate with agency (discriminate). Behavioral measures of academic achievement and self-selected physical activity are hypothesized to positively relate (concur) with agency, and other

behavioral measures such as peer influence, delinquency, and perceived constraints are hypothesized to negatively relate (concur) with agency. (see Table #-# for scales and validity types)

Equation 3:
$$r_{xy} = \frac{s_{xy}}{s_x s_y}$$

where:

- r = correlation between the two scales x and y
- s = variance.

Chapter 3

Results

The aim of the present research is to develop and validate a 3-dimension measure of agency that is comprised of motivation, cognition, and behavior dimensions. Analyses and results fundamental to this aim evaluate the reliability and validity of the agency instrument. Before reviewing these analyses, this chapter begins by addressing missing data in the dataset. Next, descriptive statistics are discussed for the sample and for the individual items that comprise the scales to be used in reliability and validity analyses. Internal consistency and factor analyses results are evaluated, followed by convergent, predictive, and discriminant validity analyses.

Missing Data

Data for this sample were collected using a 3-form “planned missingness” design (Graham, 2009). Therefore, a single dataset was imputed with NORM 2.03 (Schafer, 1997) using estimation-maximization (EM) algorithm parameters. A single imputed dataset provides a complete dataset for reliability and factor analyses which are the focal points of this study. Imputing a single dataset for data quality analysis is considered acceptable when good parameter estimates, but not standard errors or confidence intervals, are needed (Graham, Cumsille, & Elek-Fisk, 2003; Graham, 2009).

Descriptives

Sample

There were a total of 562 participants in this study. There were 268 males (47.5%), of them 132 were in 7th grade, and 135 in 8th grade. There were 295 females (52.5%), of whom 152 were in 7th grade, and 143 were in 8th grade. No individual level data were collected on ethnicity from the youth. Summary statistics from the school district are provided in the Participants section in the Methods chapter.

Agency

Youth in this sample generally report high levels of agency across the motivation, cognition, and behavioral subscales. The response scale for this instrument was a 4-point Likert-type scale: “1-never, almost never”, “2-sometimes”, “3-quite often”, “4-always, almost always”. Relative to each other, male youth report slightly higher levels of agency than females, and 7th graders report higher levels of agency compared to their 8th grade counterparts: $M_{7M} = 46.24$, $M_{8M} = 45.75$, $M_{7F} = 45.09$, and $M_{8F} = 44.59$. Mean totals by subscale indicate gender and age related trends. Across the three subscales, males and 8th grade females report the lowest mean totals on the motivation subscale. Seventh grade males and females report higher levels of motivation than their 8th grade peers, and means are comparable by grade. Motivation subscale mean totals were: $M_{7M} = 14.91$, $M_{8M} = 14.61$, $M_{7F} = 14.97$, and $M_{8F} = 14.60$. Males and 7th grade females reported highest mean totals on the cognition subscale. Males report higher levels of cognition than females, and 7th grade males and females report higher levels of cognition than their 8th grade peers. Cognition subscale mean totals were: $M_{7M} = 15.82$, $M_{8M} = 15.75$, $M_{7F} = 15.39$, and $M_{8F} = 14.98$. On the behavior subscale, males report higher levels of behavior than females, and 7th

grade females report the lowest level of behavior. Behavior subscale mean totals were: $M_{7M} = 15.50$, $M_{8M} = 15.39$, $M_{7F} = 14.73$, and $M_{8F} = 15.01$. Item means and standard deviations for individual agency items are shown in Table 3-1.

Self-Efficacy for Restructuring (SERE)

The Self-Efficacy for Restructuring (SERE) scale was comprised of 4 items with a 4-point Likert-type scale. The response categories were recoded from the original scale so that higher responses (i.e., 3 or 4) indicated higher efficacy. In general, youth reported modest levels of efficacy for restructuring. Males in both grades reported higher levels than females in both grades. Males and females in 7th and 8th grades had the highest mean response for: “When you want to, how easy is it for you to make things more challenging when being physically active?”, $M_{7M} = 3.23$, $SD_{7M} = .81$, $M_{8M} = 3.03$, $SD_{8M} = .83$, $M_{7F} = 2.83$, $SD_{7F} = .84$, and $M_{8F} = 2.77$, $SD_{8F} = .96$. Males in both grades had the lowest mean response for: “I am able to turn a boring situation into something more interesting”, $M_{7M} = 2.73$, $SD_{7M} = .96$, and $M_{8M} = 2.82$, $SD_{8M} = .83$, respectively. Females in 7th and 8th grade had the lowest mean response on the item: “I am able to enjoy physical activity, even if I have to do it”, $M_{7F} = 2.56$, $SD_{7F} = .81$, and $M_{8F} = 2.56$, $SD_{8F} = .94$. All youth report being able to make physical activity more challenging for themselves. However, males report less ability to change a boring situation than females. Females report lower ability to figure out how to enjoy physical activity. Item means and standard deviations are shown on Table 3-2.

Table 3-1 Means and standard deviations of youth responses on agency items.

Item#	Agency Items by Subscale	Males				Females			
		7th Grade (n=132)		8th Grade (n=135)		7th Grade (n=152)		8th Grade (n = 143)	
		<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
M1	Most of what I do during the day is important to me	3.00	0.97	2.84	0.91	2.89	0.92	2.91	0.88
M2	I like having a sense of purpose when I do things	2.97	0.96	3.06	0.89	2.96	0.93	3.01	0.87
M3	I do things that I know will bring me satisfaction	3.03	0.95	2.93	0.92	2.91	0.96	2.86	0.98
M4	During the day, most of what I do has no purpose	2.70	1.03	2.56	1.02	3.01	0.96	2.71	1.03
M5	I feel inspired to do things that interest me	3.23	0.85	3.21	0.88	3.19	0.94	3.11	0.92
	<i>Motivation subscale mean total (Total possible=20)</i>	<i>14.91</i>		<i>14.61</i>		<i>14.97</i>		<i>14.60</i>	
C1	I think about the steps I will need to take to get or accomplish the things I want	3.05	0.88	2.97	0.96	3.01	0.91	2.98	0.92
C2	When I am doing something, I think about why I am doing it	2.99	0.93	3.11	0.83	2.78	1.00	2.79	1.01
C3	I think about what is really important to me	3.24	0.84	3.20	0.82	3.17	0.90	2.99	0.95
C4	I am confident I can reach my goals	3.32	0.88	3.17	0.95	3.32	0.88	3.18	0.99
C5	I think of different ways to reach my goals	3.22	0.87	3.30	0.79	3.11	0.88	3.04	0.95
	<i>Cognition subscale mean total (Total possible=20)</i>	<i>15.82</i>		<i>15.75</i>		<i>15.39</i>		<i>14.98</i>	
B1	I take action to do the things I want to do	3.01	0.90	3.07	0.80	3.06	0.89	3.00	0.96
B2	If I need it, I ask for help in order to reach my goals	2.98	0.96	2.92	0.96	3.02	0.95	2.85	0.96
B3	When I find something I am interested in, I take action to explore it	3.16	0.87	3.06	0.94	3.15	0.91	3.02	0.90
B4	If I am doing something the wrong way, I try to figure out the right way to do it	3.12	0.89	3.13	0.91	2.68	0.86	2.93	0.94
B5	I try to find ways to do things that are really important to me	3.24	0.89	3.20	0.92	2.83	0.84	3.20	0.94
	<i>Behavior subscale mean total (Total possible=20)</i>	<i>15.50</i>		<i>15.39</i>		<i>14.73</i>		<i>15.01</i>	
	Agency mean total (Total possible=60)	46.24		45.75		45.09		44.59	

Self-Efficacy for Physical Activity (SEPA)

The youth in this sample reported relatively high levels of self-efficacy for physical activity (SEPA). Each question had a 4-point Likert-type scale, which was recoded from the original scale so that higher responses indicated higher efficacy for physical activity. All youth reported the lowest mean score on the item: “How often do you set goals for yourself related to being physically active?”, $M_{7M}=2.98$, $SD_{7M}=.81$, $M_{8M}=2.86$, $SD_{8M}=.82$, $M_{7F}=2.66$, $SD_{7F}=.82$, and $M_{8F}=2.66$, $SD_{8F}=.95$. Males in 7th grade had the highest mean for: “I can be physically active on any given day”, $M_{7M}=3.39$, $SD_{7M}=.80$. Males in 8th grade had the highest mean score on: “I am a physically active person” $M_{8M}=3.29$, $SD_{8M}=.85$. Females in 7th and 8th grade reported the highest mean score on the item: “It’s easy to find ways to be physically active during my free-time”, $M_{7F}=3.22$, $SD_{7F}=.85$, $M_{8F}=3.18$, $SD_{8F}=.92$. All item means and standard deviations are shown in Table 3-2.

Free-Time Affect (FTA)

The Free-Time Affect (FTA) scale was comprised of 4 items. The response scale was a 4-point Likert-type scale that was recoded so that higher responses indicated higher levels of positive affect. Males in both grades reported higher levels than the females, and males in 8th grade had the highest levels of FTA. All groups reported the lowest mean response to: “I like free-time activities a little beyond my ability”, $M_{7M}=2.85$, $SD_{7M}=.81$, $M_{8M}=3.03$, $SD_{8M}=.83$, $M_{7F}=2.57$, $SD_{7F}=.87$, and $M_{8F}=2.66$, $SD_{8F}=.89$. Males in 7th grade, and females in 7th and 8th grades had the highest mean response to the item: “How many of your free-time activities are

good for you?” with the scale: “1-none, almost none”, “2-some”, “3-most of them”, and “4-all, almost all”; $M_{7M}=3.24$, $SD_{7M}=.82$, $M_{7F}=2.86$, $SD_{7F}=.83$, $M_{8F}=2.81$, $SD_{8F}=.89$. Males in 8th grade had the highest mean score for: “I like my free time activities to challenge my skills”, $M_{8M}=3.25$, $SD_{8M}=.79$. All item means and standard deviations are shown in Table 3-2.

Physical Activity

Weekend Time Spent Physically Active

In general, youth reported modest levels of physical activity over the weekend. This time was calculated by combining responses on 12 items asking how many minutes the youth spent (walking/jogging or running/other physical activity) on (Saturday/Sunday) in the (morning/afternoon and evening). The response scale was: “1 – 0 minutes”, “2 – about 10 minutes”, “3 – about 20 minutes”, “4 – about 30 minutes”, “5 – about 40 minutes”, “6 – about 50 minutes”, “7 – about an hour (60 minutes) or more”. Several steps were taken to recode these variables into a summary of hours spent physically active over the weekend. First, responses for all 12 items were summed. A sum of 12 corresponds with 0 minutes of physical activity over the weekend. Therefore, 12 was subtracted from the sum and the result was multiplied by 10 (to reflect minutes). Items whose result was 0 were recoded as 1. These procedures resulted in a summary score of 1 (reflecting 0 mins of activity), or a range from 10 to 720 minutes. Next, the summed score of minutes was divided by 60 to reflect hours spent physically active over the weekend. Means for each group indicate that males were more active over the weekend than females. Means for each group indicate that males were more active over the weekend than females. Males in 8th grade were the most active, $M_{8M}=4.98$, $SD_{8M}=2.59$, had the lowest percent of youth being

Table 3-2 Means and standard deviations for convergent validity scales.

	Males				Females			
	7th Grade		8th Grade		7th Grade		8th Grade	
	(n=132)		(n=135)		(n=152)		(n = 143)	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Self-Efficacy for Restructuring (SERE)								
Able to turn a boring situation into something more interesting	2.73	0.96	2.82	0.83	2.68	0.86	2.75	0.90
When you want to, how easy is it for you to make things more challenging for yourself when you are being physically active	3.23	0.81	3.03	0.83	2.83	0.84	2.77	0.96
Able to make things more fun for yourself when you are physically active	3.07	0.91	2.96	0.85	2.71	0.88	2.65	0.93
Able to enjoy physical activity even if you feel like you have to do it	2.98	0.94	2.90	0.82	2.56	0.81	2.56	0.94
	<i>SERE mean totals</i>		<i>12.01</i>		<i>11.71</i>		<i>10.79</i>	
	<i>(Total possible=16)</i>						<i>10.73</i>	
Self-Efficacy for Physical Activity (SEPA)								
I can be physically active on any given day	3.39	0.80	3.25	0.81	3.19	0.77	3.10	0.87
It's easy to find ways to be physically active during my free time	3.38	0.84	3.20	0.88	3.22	0.85	3.18	0.92
I am a physically active person	3.24	0.87	3.29	0.85	2.79	0.91	2.70	0.93
How often do you set goals for yourself about being physically active	2.98	0.81	2.86	0.82	2.66	0.82	2.66	0.95
	<i>SEPA mean totals</i>		<i>12.99</i>		<i>12.60</i>		<i>11.87</i>	
	<i>(Total possible=16)</i>						<i>11.64</i>	
Free-Time Affect (FTA)								
How many of your free time activities are good for you	3.24	0.82	3.14	0.86	2.86	0.83	2.81	0.89
I like free time activities a little beyond my ability	2.85	0.81	3.03	0.83	2.57	0.87	2.66	0.89
I like a challenge in my free time	2.98	1.00	3.21	0.87	2.61	0.87	2.73	0.99
I like my free time activities to challenge my skills	3.18	0.95	3.25	0.79	2.63	0.86	2.73	0.85
	<i>FTA mean totals</i>		<i>12.25</i>		<i>12.63</i>		<i>10.66</i>	
	<i>(Total possible=16)</i>						<i>10.93</i>	

of youth being physically active for less than 2 hours over the weekend 11.1% (n=15), with 3.7% (n=5) reporting 0 mins of physical activity. The 7th grade males spent slightly less time being physically active $M_{7M}=4.67$, $SD_{7M}=2.78$, had a higher percent reporting < 2.0 hrs of PA at 18.8% (n=25), and 1.5% (n=2) reporting 0 mins of PA. The 7th grade females were less active than the males, $M_{7F}=3.52$, $SD_{7F}=2.49$, had a much higher rate of reporting < 2.0 hrs of PA at 28.9% (n=44), and 3.9% (n=6) reported 0 mins of PA over the weekend. The females in 8th grade reported the least amount of time spent physically active, $M_{8F}=3.45$, $SD_{8F}=2.60$, had a comparable rate of < 2.0 hrs of PA as the 7th grade females, 29.3% (n=42), and the highest rate of youth reporting 0 mins of PA, 6.3% (n=9). In general these trends correspond with prior research indicating males are more physically active than females and that physical activity declines among females as they get older (Troiano, Berrigan, Dodd, Masse, Tilert, & McDowell, 2007; Voorhees et al., 2005). Item means and standard deviations are listed in Table 3-3.

Reasons for Being Physically Active

A few clear patterns emerged when youth were asked about their reasons for being physically active in their free time. Youth were provided the stem “Why do you do physically active things in your free time? How often is it because...”. The response scale was a 5-point Likert-type scale: “1 – never”, “2 – not very often”, “3 – often”, “4 – very often”, and “5 – all the time”. The lowest mean response for all 4 groups was on the item “...you enjoy sweating and working hard”. On this item, males had higher mean responses than females, and 8th graders had higher mean responses than 7th graders: $M_{7M}=3.46$, $SD_{7M}=1.35$, $M_{8M}=3.55$, $SD_{8M}=1.31$, $M_{7F}=2.52$, $SD_{7F}=1.29$, and $M_{8F}=2.70$, $SD_{8F}=1.33$. The highest mean response for 7th and 8th grade males was for the item: “...because it’s fun”: $M_{7M}=4.10$, $SD_{7M}=1.23$, $M_{8M}=3.99$, $SD_{8M}=1.27$. The highest mean response

for females was on the item "...it will bring you better health": $M_{7F}=3.89$, $SD_{7F}=1.26$, $M_{8F}=4.16$, $SD_{8F}=1.23$. All means and standard deviations are listed in Table 3-3.

Peer Influence

One item was selected to evaluate potentially positive peer influence: "How many of your friends are physically active?". The response scale was a 5-point Likert-type scale: "1 – none", "2 – less than half", "3 – about half", "4 – more than half", and "5 – all, almost all of them". Males reported higher mean levels of physically active peers than females: $M_{7M}=3.70$, $SD_{7M}=1.29$, $M_{8M}=3.65$, $SD_{7M}=1.31$, $M_{7F}=3.36$, $SD_{7F}=1.14$, and $M_{8F}=3.27$, $SD_{8F}=1.33$. Two items were chosen to reflect extrinsic peer influence for physical activity. The first was, "They only way I'll be physically active is if my friends are too", with the response scale "1 – strongly agree", "2 – agree", "3 – disagree", and "4 – strongly disagree". Males in both grades and females in 8th grade reported similar mean levels on this item, and 7th grade females had the highest mean response – indicating less extrinsic influence for physical activity: $M_{7M}=2.76$, $SD_{7M}=1.02$, $M_{8M}=2.78$, $SD_{8M}=.89$, $M_{7F}=2.97$, $SD_{7F}=.89$, and $M_{8F}=2.76$, $SD_{8F}=.94$. The second extrinsic peer influence item was "Why do you do physically active things in your free-time? How often is it because...you have to be active to keep up with your peers/others?". The response scale for this item was "1 – all the time", "2 – very often", "3 – often", "4 – not very often", and "5 – never". Males reported higher levels of extrinsic influence than females: $M_{7M}=2.86$, $SD_{7M}=1.35$, $M_{8M}=2.94$, $SD_{8M}=1.38$, $M_{7F}=3.44$, $SD_{7F}=1.28$, and $M_{8F}=3.26$, $SD_{8F}=1.28$. In general, females reported lower mean responses to these items than males, indicating less peer-influenced reasons for physical activity, and this may be a result of having less physically active peers. Means and standard deviations for these items are listed in Table 3-3.

Table 3-3 Means and standard deviations for concurrent validity scale items.

	Males				Females			
	7th Grade (n=132)		8th Grade (n=135)		7th Grade (n=152)		8th Grade (n = 143)	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Self-Selected Physical Activity (SSPA)								
Number of HOURS spent physically active over the weekend	4.67	2.79	4.98	2.59	3.52	2.49	3.45	2.60
Why do you do physically active things in your free time? How often is it because								
...you enjoy sweating and working hard?	3.46	1.35	3.55	1.31	2.52	1.29	2.70	1.33
...you like to feel totally involved in an activity?	3.90	1.28	3.76	1.30	3.57	1.28	3.57	1.19
...because it's fun?	4.10	1.23	3.99	1.27	3.59	1.40	3.63	1.19
...it will bring you better health?	4.07	1.17	3.91	1.15	3.89	1.26	4.16	1.23
Peer Influence								
How many of your friends are physically active	3.70	1.29	3.65	1.31	3.36	1.14	3.27	1.33
The only way I'll be physically active is if my friends are too	2.76	1.02	2.78	0.89	2.97	0.89	2.76	0.94
Why do you do physically active things in your free time? How often is it because								
...you have to be active to keep up with your peers/others?	2.86	1.35	2.94	1.38	3.44	1.28	3.26	1.28
Delinquency								
How often have you purposely damaged someone's property or belongings?	2.30	1.48	2.33	1.49	2.00	1.40	2.39	1.50
Grades								
What grades do you generally get in school?	5.96	1.45	5.49	1.69	6.07	1.54	5.82	1.45
Perceived Constraints								
When you are not physically active in your free time, how often is it because...								
...school, homework, chores take too much time?	2.74	1.24	2.55	1.27	2.73	1.27	2.67	1.38
...you'll be embarrassed?	1.85	1.13	2.01	1.23	1.85	1.16	1.96	1.18
...because it is difficult to get to the activity location?	2.20	1.14	2.09	1.12	1.82	1.05	1.97	1.06
...because you don't feel like you have very many skills?	2.03	1.32	2.09	1.32	1.91	1.21	2.20	1.28

Delinquency

Delinquency was measured by the item: “How often have you purposely damaged someone’s property?”. The response scale for this item was “1 - never”, “2 – before, but not this year”, “3 – once or twice a year”, “4 – once or twice a month”, “5 – once or twice a week”, and “6 – almost every day, daily”. In general, all youth reported low levels of property damage delinquency. While the rates reported by males hardly differed by grade, females in 8th grade reported higher levels than their 7th grade female counterparts: $M_{7M}=2.30$, $SD_{7M}=1.48$, $M_{8M}=2.33$, $SD_{8M}=1.49$, $M_{7F}=2.00$, $SD_{7F}=1.40$, and $M_{8F}=2.39$, $SD_{8F}=1.50$. These figures are listed in Table 3-3.

Academic Achievement

Academic achievement was measured by self-report of grades: “What grades do you generally get in school?”. The response scale for this item was on an 8-point Likert-type scale, recoded so that higher responses indicated better grades: “1 – mostly D’s and F’s”, “2 – mostly D’s”, “3 – mostly C’s and D’s”, “4 – mostly C’s”, “5 – mostly B’s and C’s”, “6 – mostly B’s”, “7 – mostly A’s and B’s”, and “8 – mostly A’s”. Females reported higher mean responses for grades typically received than males, and 8th grade males and females reported lower grades than their respective 7th grade counterparts: $M_{7M}=5.96$, $SD_{7M}=1.45$, $M_{8M}=5.49$, $SD_{8M}=1.69$, $M_{7F}=6.07$, $SD_{7F}=1.54$, and $M_{8F}=5.82$, $SD_{8F}=1.45$. These figures are listed in Table 3-3.

Perceived Constraints

Perceived constraints was measured with 4 questions, beginning with the stem: “When you are not physically active in your free-time, how often is it because...”. The response scale was a 5-point Likert-type scale: “1 – never”, “2 – not very often”, “3 – often”, “4 – very often”, and “5 – all the time”. The highest mean response for each group was on the item: “...school, homework, chores take too much time”: $M_{7M}=2.74$, $SD_{7M}=1.24$, $M_{8M}=2.55$, $SD_{8M}=2.55$, $M_{7F}=2.73$, $SD_{7F}=1.27$, and $M_{8F}=2.67$, $SD_{8F}=1.38$. The lowest mean response for 7th and 8th grade males, and 8th grade females was to the item: “...you’ll be embarrassed”: $M_{7M}=1.85$, $SD_{7M}=1.13$, $M_{8M}=2.01$, $SD_{8M}=1.23$ and $M_{8F}=1.96$, $SD_{8F}=1.18$. For 7th grade females, the lowest mean response was on the item “...it is difficult to get to the activity or location”, $M_{7F}=1.82$, $SD_{7F}=1.05$. Means and standard deviations for all 4 perceived constraints items are listed in Table 3-3.

Knowledge and Preferences

Youth knowledge of physical activity was measured by the item “I know of many places where I live to do physically active things”. The response scale was a 5-point Likert-type scale where higher responses indicate a greater number of places known. Younger males and females report slightly greater number of places known: $M_{7M}=3.26$, $SD_{7M}=1.31$, $M_{8M}=3.19$, $SD_{8M}=1.25$, $M_{7F}=3.23$, $SD_{7F}=1.31$, and $M_{8F}=3.09$, $SD_{8F}=1.29$. Youth activity preference was measured by the item “I prefer physical activity programs where there is an adult instructor or leader”. This item was measured on a 4-point Likert-type scale coded such that lower responses indicate a higher liking for adult presence. Youth generally reported a liking for such programs and females reported less liking than males: $M_{7M}=2.24$, $SD_{7M}=.90$, $M_{8M}=2.19$, $SD_{8M}=.85$, $M_{7F}=2.37$, $SD_{7F}=.93$,

and $M_{8F}=2.37$, $SD_{8F}=.90$. Means and standard deviations for the knowledge and preference items are listed in Table 3-4.

Table 3-4 Means and standard deviations for discriminant validity items.

	Males				Females			
	7th Grade		8th Grade		7th Grade		8th Grade	
	(n=132)		(n=135)		(n=152)		(n = 143)	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Knowledge and Preferences								
I know of many places where I live to do physically active things	3.26	1.31	3.19	1.25	3.23	1.31	3.09	1.29
I prefer physical activity programs where there is an adult instructor/leader	2.24	0.90	2.19	0.85	2.37	0.93	2.37	0.90

Reliability

Agency Instrument

The pilot instrument and its motivation, cognition, and behavior subscales demonstrated good reliability across each group of youth. The removal of one motivation item (“During the day, most of what I do has no purpose”) significantly improved motivation subscale alphas for each group by $.06_{7M}$, $.08_{8M}$, $.12_{7F}$, and $.11_{8F}$. For the 7th grade males, full agency scale $\alpha = .93$, motivation $\alpha = .78$, cognition $\alpha = .82$, and behavior $\alpha = .81$. For the 8th grade males, full scale $\alpha = .90$, motivation $\alpha = .74$, cognition $\alpha = .70$, and behavior $\alpha = .72$. For the 7th grade females, full scale $\alpha = .90$, motivation $\alpha = .75$, cognition $\alpha = .74$, and behavior $\alpha = .77$. For the 8th grade females, full scale $\alpha = .92$, motivation $\alpha = .78$, cognition $\alpha = .83$, and behavior $\alpha = .77$. The overall scale and subscales met and often exceeded the .70 standard for acceptability. Full agency and subscale reliability coefficients, item-total correlations, and alpha if item deleted are listed in Table 3-5.

Self-Efficacy for Restructuring (SERE) Scale

Reliabilities for the self-efficacy for restructuring scale demonstrated acceptable alpha levels for a 4-item scale. Cronbach’s alpha for 7th grade males $\alpha_{7M} = .67$, 8th grade males $\alpha_{8M} = .70$, 7th grade females $\alpha_{7F} = .72$, and 8th grade females $\alpha_{8F} = .66$.

Table 3-5 Cronbach's alpha reliability, item-total correlation, and alpha if deleted for agency and subscales.

	Males				Females			
	7th (n=132)		8th (n=135)		7th (n=152)		8th (n=143)	
	Alpha if Del	ITC	Alpha if Del	ITC	Alpha if Del	ITC	Alpha if Del	ITC
Full Scale Alpha	0.93		0.90		0.90		0.92	
Motivation Subscale Alpha	0.78		0.74		0.75		0.78	
Most of what I do during the day is important to me	0.73	0.66	0.68	0.65	0.71	0.54	0.77	0.53
I like having a sense of purpose when I do things	0.72	0.64	0.65	0.69	0.67	0.64	0.70	0.64
I do things that I know will bring me satisfaction	0.73	0.64	0.69	0.63	0.69	0.63	0.70	0.64
I feel inspired to do things that interest me	0.71	0.70	0.71	0.58	0.67	0.66	0.73	0.73
Cognition Subscale Alpha	0.82		0.70		0.74		0.83	
I think about the steps I will need to take to get or accomplish the things I want	0.77	0.72	0.61	0.61	0.66	0.67	0.80	0.69
When I am doing something, I think about why I am doing it	0.81	0.55	0.73	0.34	0.73	0.44	0.80	0.63
I think about what is really important to me	0.79	0.63	0.68	0.51	0.68	0.65	0.81	0.66
I am confident I can reach my goals	0.78	0.71	0.61	0.65	0.70	0.58	0.80	0.71
I think of different ways to reach my goals	0.76	0.71	0.62	0.65	0.70	0.52	0.78	0.66
Behavior Subscale Alpha	0.81		0.72		0.77		0.77	
I take action to do the things I want to do	0.78	0.62	0.64	0.68	0.73	0.66	0.69	0.72
If I need it, I ask for help in order to reach my goals	0.77	0.64	0.69	0.5	0.72	0.59	0.75	0.57
When I find something I am interested in, I take action to explore it	0.74	0.71	0.67	0.56	0.73	0.60	0.74	0.52
If I am doing something the wrong way, I try to figure out the right way to do it	0.77	0.61	0.71	0.46	0.74	0.53	0.75	0.50
I try to find ways to do things that are really important to me	0.78	0.67	0.64	0.66	0.71	0.63	0.69	0.74

Alpha if deleted coefficients shown are for subscales. ITC = item-total correlation for each item with the full agency scale.

Self-Efficacy for Physical Activity (SEPA) Scale

Reliability coefficients for the self-efficacy for physical activity were somewhat low but still acceptable for a 4-item scale. The alpha level for the females was lower than for the males. Cronbach's alpha for 7th grade males $\alpha_{7M} = .62$, 8th grade males $\alpha_{8M} = .68$, 7th grade females $\alpha_{7F} = .59$, and 8th grade females $\alpha_{8F} = .56$.

Free-Time Affect (FTA) Scale

The reliabilities for the free-time affect scale demonstrated good consistency for all groups except the 8th grade males. Cronbach's alpha for 7th grade males $\alpha_{7M} = .74$, 8th grade males $\alpha_{8M} = .54$, 7th grade females $\alpha_{7F} = .76$, and 8th grade females $\alpha_{8F} = .74$.

Self-Selected Physical Activity (SSPA) Scale

The self-selected physical activity scale demonstrated good reliability across the 4 groups. Cronbach's alpha for 7th grade males $\alpha_{7M} = .77$, 8th grade males $\alpha_{8M} = .84$, 7th grade females $\alpha_{7F} = .84$, and 8th grade females $\alpha_{8F} = .70$.

Perceived Constraints Scale

The perceived constraints scale demonstrated acceptable internal consistency across the 4 groups. Although reliabilities were lower than desired, they were considered acceptable due to the small number of items in the scale. Cronbach's alpha for 7th grade males $\alpha_{7M} = .57$, 8th grade

males $\alpha_{8M} = .64$, 7th grade females $\alpha_{7F} = .65$, and 8th grade females $\alpha_{8F} = .56$. Scale statistics indicated that the alpha level for the 7th grade males would be improved by removing the item "...school, homework, chores take too much time". However, this item had the highest mean response on this scale and was considered substantively important and was therefore not removed.

Factor Analyses

Principal axis factor analyses with oblique rotation was conducted in SPSS 15.0 for each group. The minimum eigenvalue for a factor was set to 1.0. Some consistent results emerged across the 4 groups. First, for each group, one clear factor emerged with strong factor loadings from each item. This factor represents agency. Second, this factor accounted for a substantial portion of variance, ranging from 39.52% for 8th grade males, to 47.43% for 7th grade males. Third, a second possible factor emerged for the 8th grade males, and for both groups of females. The loadings for this second factor did not represent a clean or interpretable solution. Factor loadings ranged from small to medium in both positive and negative directions. The largest eigenvalue for this second factor was 1.154 for the 7th grade females. Evaluations of the scree plots indicate a significant drop between the first and second factors. Given the uninterpretable nature of the factor loadings, the low eigenvalues, and the drop in the scree plot, this second factor was removed from interpreting factor analysis results for the three groups. Third, two items consistently had consistently low factor loading scores across 3 groups. For both groups of males and the 7th grade females, the item "When I am doing something, I think about why I am doing it" had the lowest loading in these groups. The second item with a consistently low loading was "If I am doing something the wrong way, I try to figure out the right way to do it." For 8th grade

females, this item had the lowest loading, and for both groups of males, this item had the second lowest loading.

The variance accounted for by the one factor solution was 47.43% for 7th grade males, 39.52% for 8th grade males, 40.44% for 7th grade females, and 45.53% for 8th grade females. The factor analysis did not result in a 3-factor solution. This suggests that the processes are not discrete or the instrument does not discretely measure them. Principal axis factor results and the factor matrices for each group are provided in Tables 3-6 through 3-9, and a comparative summary across groups can be found in Table 3-10.

Internal Consistency Summary

Given that the scale demonstrated good reliability both from an internal consistency and a factor analytic perspective, an overview of how youth score on agency, and items hypothesized to converge with this construct. The agency instrument is comprised of 15 items; 5 items reflect each of the 3 hypothesized dimensions. The highest score for each item is a 4, which results in a total possible score of 20 on each subscale. There are three subscales with a total of 20 possible points each, which yields a total possible score of 60 on the full instrument. The percentage of mean points for the full agency instrument were as follows: 7M = 77%, 8M = 76%, 7F = 75%, and 8F=74% (Fig. 3-1). Similarly, total possible points by subscale demonstrate that youth report comparable levels of agentic functioning across each domain (Fig. 3-2). From this perspective, there is little difference of agency between genders and grades.

The highest possible level of self-efficacy for restructuring (SERE) was 16 (i.e., 4 items with a 4-point scale). There was an 8% range across the four groups, with males in 7th grade scoring the highest, 8th grade males second highest, and 7th and 8th grade females reporting the same and lowest level: 7M = 75%, 8M = 73%, 7F = 67%, and 8F = 67% (Fig. 3-3). Relative to

the total 16 possible points on the self-efficacy for physical activity scale (SEPA), males in 7th grade scored highest, second were 8th grade males, third were 7th grade females, and lowest were 8th grade females: 7M = 81%, 8M = 79%, 7F = 74%, and 8F = 73% (Fig. 3-4). This pattern of results mirrors those of the SERE scale, and similarly span an 8% range. Relative to total possible points (i.e., 16) on the free-time affect scale (FTA), males scored highest and similarly to each other and females also scored similarly to each other: 7M = 77%, 8M = 79%, 7F = 67%, and 8F = 68% (Fig. 3-5). This scale had a range of 12% between males and females.

The scores on the agency and SERE, SEPA, and FTA scales demonstrate similar patterns across groups suggesting a similarity across constructs. However, youth tend to report somewhat higher levels of agency as compared to the other constructs. Although youth appear to report comparable levels of agency across groups, the imputation of a single dataset does not allow for hypothesis testing. Therefore proving or disproving statistical difference between groups is not possible without additional imputation. Eyeballing the data suggests that there likely are not differences between the groups of youth on the agency measure. Therefore, conducting analyses on the group as a whole would likely not bias the results. Nevertheless, the remaining results are conducted by group, consistent with the preliminary analysis plan.

Table 3-6 Factor analysis and factor matrix of agency scale for 7th grade males (n=132).

Principal Axis Factoring for Agency							Factor Matrix for Agency Items	
Factor	Initial Eigenvalues			Extraction Sums of Squares			Question	Factor 1
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %		
1	7.156	51.115	51.115	6.639	47.425	47.425	Most of what I do during the day is important to me	0.685
2	0.921	6.581	57.696				I like having a sense of purpose when I do things	0.668
3	0.840	6.003	63.699				I do things that I know will bring me satisfaction	0.670
4	0.758	5.411	69.110				I feel inspired to do things that interest me	0.735
5	0.656	4.687	73.797				I think about the steps I will need to take to get or accomplish the things I want	0.753
6	0.636	4.545	78.342				When I am doing something, I think about why I am doing it	0.570
7	0.572	4.082	82.424				I think about what is really important to me	0.656
8	0.458	3.275	85.699				I am confident I can reach my goals	0.741
9	0.421	3.006	88.704				I think of different ways to reach my goals	0.741
10	0.372	2.657	91.361				I take action to do the things I want to do	0.646
11	0.356	2.543	93.904				If I need it, I ask for help in order to reach my goals	0.664
12	0.326	2.328	96.232				When I find something I am interested in, I take action to explore it	0.742
13	0.287	2.047	98.279				If I am doing something the wrong way, I try to figure out the right way to do it	0.637
14	0.241	1.721	100.000				I try to find ways to do things that are really important to me	0.708

Table 3-7 Factor analysis and factor matrix of agency scale for 8th grade males (n=135).

Principal Axis Factoring for Agency							Factor Matrix for Agency Items		
Factor	Initial Eigenvalues			Extraction Sums of Squares			Question	Factor 1	Factor 2
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %			
1	6.071	43.367	43.367	5.532	39.515	39.515	Most of what I do during the day is important to me	0.687	-.123
2	1.046	7.468	50.835	0.445	3.179	42.694	I like having a sense of purpose when I do things	0.737	-.189
3	0.917	6.548	57.383				I do things that I know will bring me satisfaction	0.657	
4	0.858	6.128	63.511				I feel inspired to do things that interest me	0.613	0.272
5	0.777	5.554	69.065				I think about the steps I will need to take to get or accomplish the things I want	0.655	-.234
6	0.707	5.047	74.111				When I am doing something, I think about why I am doing it	0.363	-.159
7	0.677	4.834	78.946				I think about what is really important to me	0.545	0.179
8	0.598	4.272	83.217				I am confident I can reach my goals	0.693	
9	0.491	3.508	86.725				I think of different ways to reach my goals	0.682	0.233
10	0.451	3.220	89.945				I take action to do the things I want to do	0.728	-.272
11	0.409	2.919	92.864				If I need it, I ask for help in order to reach my goals	0.539	0.101
12	0.366	2.616	95.480				When I find something I am interested in, I take action to explore it	0.591	
13	0.334	2.385	97.866				If I am doing something the wrong way, I try to figure out the right way to do it	0.490	0.143
14	0.299	2.134	100.000				I try to find ways to do things that are really important to me	0.707	0.206

Table 3-8 Factor analysis and factor matrix of agency scale for 7th grade females (n=152).

Principal Axis Factoring for Agency							Factor Matrix for Agency Items		
Factor	Initial Eigenvalues			Extraction Sums of Squares			Question	Factor 1	Factor 2
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %			
1	6.197	44.264	44.264	5.662	40.44	40.44	Most of what I do during the day is important to me	0.573	0.110
2	1.154	8.241	52.505	0.642	4.58	45.02	I like having a sense of purpose when I do things	0.679	0.187
3	0.984	7.027	59.532				I do things that I know will bring me satisfaction	0.665	
4	0.799	5.707	65.239				I feel inspired to do things that interest me	0.725	-.368
5	0.731	5.222	70.461				I think about the steps I will need to take to get or accomplish the things I want	0.704	0.208
6	0.665	4.752	75.213				When I am doing something, I think about why I am doing it	0.475	0.410
7	0.611	4.365	79.578				I think about what is really important to me	0.687	
8	0.577	4.118	83.696				I am confident I can reach my goals	0.628	-.369
9	0.497	3.547	87.244				I think of different ways to reach my goals	0.536	
10	0.451	3.222	90.465				I take action to do the things I want to do	0.696	0.169
11	0.392	2.803	93.268				If I need it, I ask for help in order to reach my goals	0.612	0.174
12	0.343	2.452	95.721				When I find something I am interested in, I take action to explore it	0.642	-.140
13	0.335	2.390	98.111				If I am doing something the wrong way, I try to figure out the right way to do it	0.563	-.133
14	0.265	1.889	100.000				I try to find ways to do things that are really important to me	0.662	

Table 3-9 Factor analysis and factor matrix of agency scale for 8th grade females (n=143).

Principal Axis Factoring for Agency							Factor Matrix for Agency Items		
Factor	Initial Eigenvalues			Extraction Sums of Squares			Question	Factor 1	Factor 2
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %			
1	6.852	48.945	48.945	6.374	45.527	45.527	Most of what I do during the day is important to me	0.558	-.132
2	1.062	7.587	56.532	0.594	4.245	49.772	I like having a sense of purpose when I do things	0.687	-.353
3	0.869	6.207	62.739				I do things that I know will bring me satisfaction	0.670	-.151
4	0.759	5.420	68.159				I feel inspired to do things that interest me	0.763	
5	0.683	4.876	73.035				I think about the steps I will need to take to get or accomplish the things I want	0.721	0.210
6	0.641	4.576	77.611				When I am doing something, I think about why I am doing it	0.650	0.133
7	0.590	4.214	81.825				I think about what is really important to me	0.686	
8	0.506	3.611	85.436				I am confident I can reach my goals	0.750	
9	0.443	3.168	88.604				I think of different ways to reach my goals	0.703	0.428
10	0.382	2.729	91.332				I take action to do the things I want to do	0.762	-.240
11	0.353	2.518	93.851				If I need it, I ask for help in order to reach my goals	0.592	0.106
12	0.341	2.434	96.285				When I find something I am interested in, I take action to explore it	0.538	
13	0.290	2.069	98.354				If I am doing something the wrong way, I try to figure out the right way to do it	0.521	0.306
14	0.230	1.646	100.000				I try to find ways to do things that are really important to me	0.774	

Table 3-10 Factor analysis results summary.

	Males		Females	
	7 th (n=132)	8 th (n=135)	7 th (n=152)	8 th (n=143)
% Variance	47.43%	39.52%	40.44%	45.53%
	Factor Loading Patterns			
Most of what I do during the day is important to me	0.685	0.687	0.573	0.558
I like having a sense of purpose when I do things	0.668	0.737	0.679	0.687
I do things that I know will bring me satisfaction	0.670	0.657	0.665	0.670
I feel inspired to do things that interest me	0.735	0.613	0.725	0.763
I think about the steps I will need to take to get or accomplish things I want	0.753	0.655	0.704	0.721
When I am doing something, I think about why I am doing it	0.570	0.363	0.475	0.650
I think about what is really important to me	0.656	0.545	0.687	0.686
I am confident I can reach my goals	0.741	0.693	0.628	0.750
I think of different ways to reach my goals	0.741	0.682	0.536	0.703
I take action to do the things I want to do	0.646	0.728	0.696	0.762
If I need it, I ask for help in order to reach my goals	0.664	0.539	0.612	0.592
When I find something I am interested in, I take action to explore it	0.742	0.591	0.642	0.538
If I am doing something the wrong way, I try to figure out the right way to do it	0.637	0.490	0.563	0.521
I try to find ways to do things that are really important to me	0.708	0.707	0.662	0.774

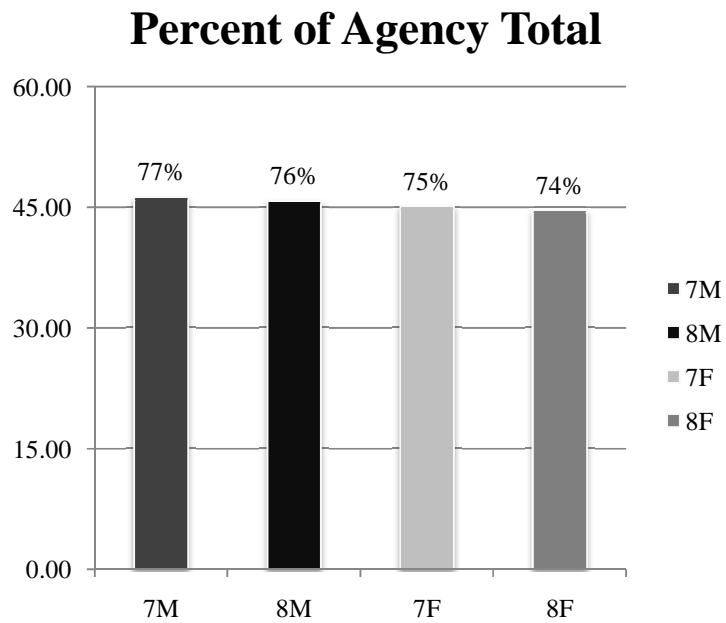


Figure 3-1 Percent of total possible agency points by gender and grade.

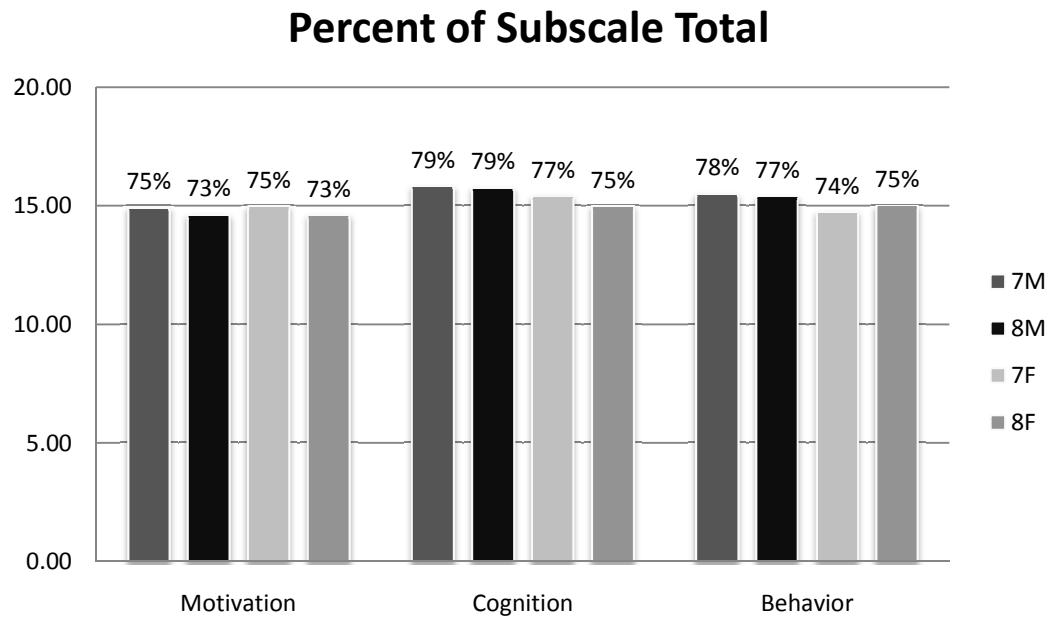


Figure 3-2 Percent of total possible agency subscale points by gender and grade.

Percent of Total Possible SERE Scale Points

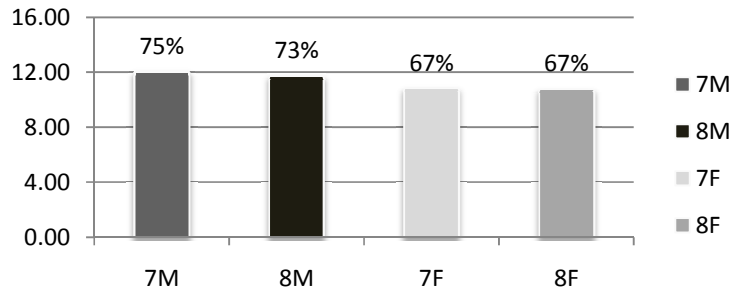


Figure 3-3 Percent of total possible SERE scale points by gender and grade.

Percent of Total Possible SEPA Scale Points

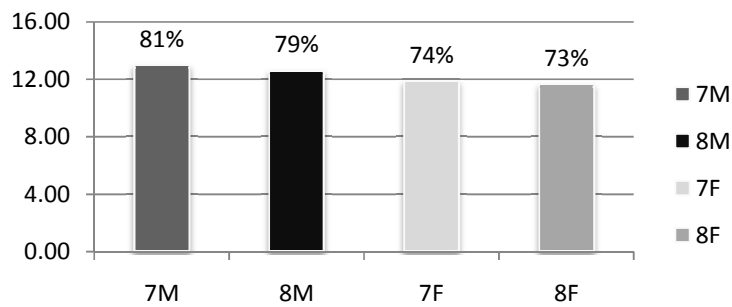


Figure 3-4 Percent of total possible SEPA scale points by gender and grade.

Percent of Total Possible FTA Scale Points

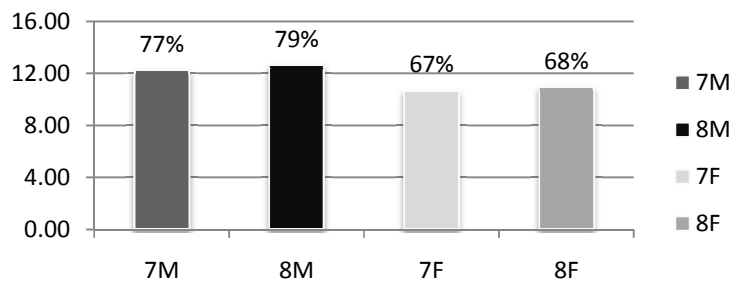


Figure 3-5 Percent of total possible FTA scale points by gender and grade.

Validity Analyses

Convergent Validity

The inter-dimension correlations among the motivation, cognition, and behavior subscales are shown in Tables 3-11 and 3-12. Across all 4 groups, the dimensions are highly correlated. For males the dimensions demonstrate somewhat higher correlations. The strongest inter-dimension correlation for 7th grade males was between cognition and behavior, $r = .828$, $p < .01$. For 8th grade males, the strongest correlation was between motivation and behavior, $r = .824$, $p < .01$. For 7th grade females, the strongest correlation was between motivation and behavior, $r = .774$, $p < .01$. For 8th grade females, the strongest correlation was between cognition and behavior. Although the dimensions are slightly less correlated in the female groups than the male groups, all correlations were strong and positive. These correlations demonstrate convergent validity across subscales, suggesting that these dimensions are related components of agency.

Three scales were used to determine the convergent validity of the agency scale: self-efficacy for restructuring (SERE) scale, self-efficacy for physical activity (SEPA), and free-time affect (FTA). Bivariate correlations were run using SPSS 15.0. Because these data contain one imputed dataset, significance levels from correlation analyses may not be

Table 3-11 Correlations among agency dimensions by group.

	Males								Females							
	7th Grade (n=132)				8th Grade (n=135)				7th Grade (n=152)				8th Grade (n=143)			
	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>
Agency	1				1				1				1			
Mot	.925**	1			.933**	1			.907**	1			.892**	1		
Cog	.943**	.814**	1		.923**	.795**	1		.911**	.741**	1		.938**	.749**	1	
Beh	.941**	.806**	.828**	1	.937**	.824**	.781**	1	.927**	.774**	.755**	1	.933**	.756**	.815**	1

** p<.01; Mot=motivation, Cog=cognition, Beh=behavior.

Table 3-12 Correlations among agency dimensions - full sample.

	All Groups (N=562)			
	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>
Agency	1			
Mot	.912**	1		
Cog	.928**	.770**	1	
Beh	.934**	.788**	.794**	1

** p<.01; Mot=motivation, Cog=cognition, Beh=behavior.

accurate. Instead, significance levels were obtained from regression analyses (Graham, personal communication). Each scale was significantly correlated with the full agency scale and with each subscale.

For seventh grade males, the three scales demonstrated strong, positive correlations with the agency scale and its subscales. Pearson's correlation between agency and $r_{\text{SERE}} = .594$, $p < .01$, $r_{\text{SEPA}} = .525$, $p < .01$, $r_{\text{FTA}} = .626$, $p < .01$. Correlations for 8th grade males were slightly lower, but still positive and strong: $r_{\text{SERE}} = .606$, $p < .01$, $r_{\text{SEPA}} = .435$, $p = .01$, $r_{\text{FTA}} = .561$, $p < .01$. Correlations for both groups of females were lower than for those of the males. For 7th grade females, $r_{\text{SERE}} = .518$, $p < .01$, $r_{\text{SEPA}} = .387$, $p < .01$, $r_{\text{FTA}} = .364$, $p < .01$, and 8th grade females, $r_{\text{SERE}} = .390$, $p < .01$, $r_{\text{SEPA}} = .352$, $p < .01$, $r_{\text{FTA}} = .371$, $p < .01$. Across all 4 groups of youth, the cognitive subscale demonstrated the lowest correlations with these scales relative to the motivation and behavior subscales.

Overall, these correlations support the convergent validity of the full agency measure. As anticipated, these scales are positively correlated with the agency. These scales are related yet not fully, which is likely due to the convergent scales' domain-specific focus on physical activity and free-time, whereas the agency scale is a global measure.

Concurrent Validity

Self-Selected Physical Activity

Two measures were used to evaluate the predictive validity of the agency instrument. For self-selected physical activity (SSPA), one summary item of hours spent physically active over the weekend (SSPA-Hrs), and one 4-item scale of reasons for physical activity (i.e., "because it's

Table 3-13 Agency construct validity correlations for males.

Validity Type/Construct	Males							
	7th Grade (n=132)				8th Grade (n=135)			
	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>
<u>Convergent</u>								
SERE	.594**	.613**	.509**	.556**	.606**	.583**	.500**	.608**
SEPA	.525**	.517**	.470**	.491**	.435**	.394**	.370**	.447**
FTA	.626**	.617**	.538**	.609**	.561**	.507**	.456**	.598**
<u>Concurrent</u>								
SSPA - HrsPAWknd	.253**	.216*	.255**	.238**	.183*	.100	.221**	.184*
SSPA - Reasons for PA	.695**	.619**	.636**	.695**	.558**	.499**	.561**	.499**
PeerInfPos	.464**	.410**	.443**	.449**	.324**	.281**	.313**	.308**
PeerInfNeg	-.206*	-.152	-.221*	-.202*	-.069	-.054	-.058	-.080
PeerInfNeg2	-.357**	-.334**	-.349**	-.321**	-.282**	-.293**	-.247**	-.250**
Delinquency	-.011	-.019	.017	-.030	.062	.017	.079	.073
Grades	.141	.089	.123	.179*	.213*	.222**	.247**	.131
Perceived Constraints	-.033	.027	-.003	-.108	-.133	-.150	-.169*	-.058
<u>Discriminant</u>								
Knowledge	.354**	.319**	.325**	.348**	.292**	.293**	.282**	.244**
Preference	-.328**	-.370**	-.275**	-.287**	-.124	-.103	-.093	-.148

** p<.01, * p<.05. Construct names in bold demonstrate significant correlations for all 4 groups of youth. Scale correlations are in bold when significantly correlated with the full Agency measure. Other correlations bolded when a correlation with agency subscale is significant but no significance is found with the full agency measure. Mot=motivation, Cog=cognition, Beh=behavior, SERE=self-efficacy for restructuring, SEPA=self-efficacy for physical activity, FTA=free-time affect, SSPA=self-selected physical activity.

Table 3-14 Agency construct validity correlations for females.

Validity Type/Construct	Females							
	7th Grade (n=152)				8th Grade (n=143)			
	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>	<u>Agency</u>	<u>Mot</u>	<u>Cog</u>	<u>Beh</u>
<u>Convergent</u>								
SERE	.518**	.541**	.403**	.485**	.390**	.455**	.317**	.327**
SEPA	.387**	.367**	.310**	.387**	.352**	.389**	.292**	.307**
FTA	.364**	.349**	.301**	.351**	.371**	.358**	.333**	.340**
<u>Predictive</u>								
SSPA - HrsPAWknd	.084	.127	.025	.084	.171*	.185*	.156	.138
SSPA - Reasons for PA	.498**	.494**	.447**	.435**	.437**	.462**	.382**	.378**
PeerInfPos	.307**	.300**	.238**	.307**	.371**	.400**	.324**	.315**
PeerInfNeg	-.082	-.066	-.070	-.087	.005	-.007	.025	-.008
PeerInfNeg2	-.209**	-.217**	-.173*	-.187*	-.298**	-.288**	-.301**	-.234**
Delinquency	-.018	.043	-.014	.004	-.036	-.090	.011	-.034
Grades	.280**	.268**	.229**	.272**	.129	.119	.142	.095
Perceived Constraints	-.045	-.035	-.035	-.052	.006	-.052	.050	.005
<u>Discriminant</u>								
Knowledge	.270**	.281**	.188*	.275**	.180*	.167*	.174*	.156
Preference	-.193*	-.196*	-.135	-.200*	.072	.092	.021	.095

** p<.01, * p<.05. Construct names in bold indicate significant correlations for all 4 groups of youth. Scale correlations are in bold when significantly correlated with the full Agency measure. Other correlations bolded when a correlation with agency subscale is significant but no significance is found with the full agency measure. Mot=motivation, Cog=cognition, Beh=behavior, SERE=self-efficacy for restructuring, SEPA=self-efficacy for physical activity, FTA=free-time affect, SSPA=self-selected physical activity.

fun”; SSPA-Reasons) were used for bivariate correlations with the agency measure. For 7th grade males, $r_{\text{SSPA-Hrs}} = .253$, $p < .01$, and $r_{\text{SSPA-Reasons}} = .695$, $p < .01$. For 8th grade males, $r_{\text{SSPA-Hrs}} = .183$, $p < .05$, and $r_{\text{SSPA-Reasons}} = .558$, $p < .01$. For 7th grade females, $r_{\text{SSPA-Hrs}} = .084$, ns, and $r_{\text{SSPA-Reasons}} = .498$, $p < .01$. For 8th grade females, $r_{\text{SSPA-Hrs}} = .171$, $p < .05$, and $r_{\text{SSPA-Reasons}} = .437$, $p < .01$. Thus, the agency scale is only predictive of youth’s reasons for being physically active for all groups.

Construct correlations are provided in Tables 3-13 and 3-14.

Peer Influence

Three items were used to evaluate the predictive validity of the agency instrument for peer influence. One item (“number of physically active peers”; PeerPos) taps the potentially positive influence having physically active peers might have. Higher agency may be demonstrated by having a greater numbers of active peers. Two items were used to tap the potentially negative relationship between agency and peer influence (“only active if peers are”; PeerNeg1, and “physically active to keep up with peers”; PeerNeg2). The negative peer items had 4-point and 5-point scales and were therefore not used as a single scale. For 7th grade males, $r_{\text{PeerPos}} = .464$, $p < .01$, $r_{\text{PeerNeg1}} = -.206$, $p < .05$, $r_{\text{PeerNeg2}} = -.357$, $p < .01$. For 8th grade males, $r_{\text{PeerPos}} = .324$, $p < .01$, $r_{\text{PeerNeg1}} = .069$, ns, $r_{\text{PeerNeg2}} = -.282$, $p < .01$. For 7th grade females, $r_{\text{PeerPos}} = .307$, $p < .01$, $r_{\text{PeerNeg1}} = .082$, ns, $r_{\text{PeerNeg2}} = -.209$, $p < .01$. For 8th grade females, $r_{\text{PeerPos}} = .371$, $p < .01$, $r_{\text{PeerNeg1}} = .005$, ns, $r_{\text{PeerNeg2}} = -.298$, $p < .01$. Higher reports of agency are associated with greater numbers of physically active peers, and a greater ability to be physically active regardless of peer activity. Construct correlations are listed in Tables 3-13 and 3-14.

Delinquency

One item measured delinquency according to frequency of damaging someone else's property (Delinq). Low responses indicate less frequent engagement in property damage. This item was not significantly correlated with agency for any group, $r_{7M} = -.011$, ns, $r_{8M} = .062$, ns, $r_{7F} = -.018$, and $r_{8F} = -.036$. This ns finding may be because this delinquency item measures only one type of delinquency. As a post-hoc analysis, the delinquency item was dichotomized into never and ever responses, which also resulted in ns outcome. These correlations are provided in Tables 3-13 and 3-14.

Grades

One item was used to correlate agency with grades. This item was scaled such that higher responses indicated higher grades. Bivariate correlations between agency and grades were $r_{7M} = .141$, ns, $r_{8M} = .213$, $p < .05$, $r_{7F} = .280$, $p < .01$, and $r_{8F} = .129$, ns. Although the correlation between agency and grades was not significant for 7th grade males, the correlation between the behavior subscale and grades was significant, $r = .180$, $p < .05$. There is a modest correlation between agency and grades for 8th grade males and 7th grade females. Correlations are listed in Tables 3-13 and 3-14.

Perceived Constraints

One scale comprised of 4 items was used to correlate perceived constraints with agency. The responses for this scale were scored such that lower responses indicate lower levels of perceived constraints. Higher agency should be associated with low reports of perceived constraints. Pearson correlations were $r_{7M} = -.033$, ns, $r_{8M} = -.133$, ns, $r_{7F} = .045$, ns, and $r_{8F} =$

.006, ns. Although the correlation between the full agency scale and the constraints scale for 8th grade males was not significant, the correlation between the cognitive subscale and constraints was significant, $r = -.169$, $p < .05$.

Given the unexpected results for this analysis and the singular significant association for one group on one subscale, some additional in-depth analyses were conducted. Bivariate correlations were run between agency, agency subscales, and the individual perceived constraints scale items to identify if non-significance on some items was masking significance on other items. These additional correlations indicated that this was the case to some extent. For males, some significant correlations were found between the agency scale, and/or a subscale, and “don’t feel like [I] have many skills” item. Correlations for males in 7th grade were $r_{7M} = -.158$, $p < .10$ on the full agency instrument, and $r_{7M} = -.184$, $p < .05$ between the behavior subscale and the skills item. Correlations for males in the 8th grade were $r_{8M} = -.228$, $p < .01$ for the full agency instrument and the skills item, and $r_{8M} = -.213$, $p < .05$ with the motivation subscale, $r_{8M} = -.275$, $p < .01$ with the cognition scale, and $r_{8M} = -.153$, $p < .10$ on the behavior subscale. All other correlations between the full agency measure, its subscales, and the perceived constraints items were non-significant. These correlations suggest that this scale generally does not predict levels of perceived constraints, with the exception of lack of skills as a constraint for males. These construct correlations are shown in Tables 3-13 and 3-14.

Discriminant Validity

Two items were used to evaluate the discriminant validity of the agency measure. One item reflects youth knowledge of local activity options (Know), the other reflects youth preference for activities with an adult instructor present (Pref). The correlations between the agency scale and Know were $r_{7M} = .354$, $p < .01$, $r_{8M} = .292$, $p < .01$, $r_{7F} = .270$, $p < .01$, and $r_{8F} =$

.180, $p < .05$. These correlations are all significant and positive, indicating a relationship between agency and knowledge of local options. The correlations between the agency scale and Pref were $r_{7M} = -.328$, $p < .01$, $r_{8M} = -.124$, ns, $r_{7F} = -.193$, $p < .05$, and $r_{8F} = .072$, ns. These correlations indicate a trend towards a negative relationship between agency and a preference for adult presence. Taken together, these correlations indicate that agency *is* related to knowledge and preferences. Construct correlations are shown in Tables 3-13 and 3-14.

Chapter 4

Discussion

This research endeavor had two primary objectives. The first was to articulate multiple meta-domains of agency. The conceptualization of agency presented here proposes that agency is exercised through specific types of motivation, cognitive, and behavioral functioning as described by intrinsic motivation (Deci & Ryan, 2000), intentional thinking and self-efficacy (Bandura, 1989, 2001), and goal-oriented, SOC behaviors (Baltes, 1997). The interrelationships between these domains of functioning are essential to the expression of agency. Intrinsic motivation orients the individual toward desired outcomes. Cognitive strategies and experiences shape the individual's thoughts to achieve the target. Behaviors manifest these thoughts and desires into tangible reality. These domains of functioning are conceptually distinct, and are also generally distinct in the literature. Thus, this description of agency is a preliminary step towards integrating disparate literatures into a larger whole that tells a more complete story about the individual. The second objective of this research was to operationalize this conceptualization of agency into a comprehensive yet brief measure of agency for adolescents and establish the measure's reliability and validity. Specific points of interest were to identify if these dimensions hang together, what kind of factor structure they result in, and what kinds of developmental outcomes are (and are not) associated with agency.

This discussion will begin with an evaluation of the instrument reliability. Next, validity results will be discussed in relation to the instrument performance and substantive interpretations will be forwarded. Some results were consistent across each of the four groups; others were not and varied by grade or gender. Although most results were as expected, a few were contrary to expectations; these agreements and divergences will be discussed. Finally, the measure and

substantive interpretations will be considered in the context of improving prevention efforts. Future directions and limitations will also be discussed.

Instrument Performance

Reliability

Internal Consistency

At the level of the full agency instrument, and at the subscale levels, the instrument performed well in each group of youth. The alpha levels for the full measure were high, and the alpha levels for the individual subscales were good. Overall, these alpha levels indicate that the full measure and its subscales reliably measure what they are intended to measure. The internal consistency coefficients (i.e., Cronbach's alphas) support the proposition that motivation, cognition, and behavior as defined here are relevant dimensions to the experience of agency.

Factor Analyses

The factor analyses further support this articulation of agency, although not as anticipated. The factor analyses did not result in a 3-factor solution for any group of youth. In only one instance, for the 7th grade males, did the factor analysis yield a completely clean solution. For the other groups of youth, the factor analyses resulted in one clear, interpretable factor, and a second complex and uninterpretable factor. This second factor is likely due to measurement "noise" as the wording of some questions may be less clear than others. Given the

structure of the second factor and the relatively low loadings, it was dropped from interpretations. Examining the factor loading patterns for each group of youth, most items have a very strong, positive loading on the retained factor. The factor loadings on this singular factor provide further support the assertion that agency is comprised of these motivation, cognition, and behavior dimensions.

Contrary to expectations, these dimensions as measured by the agency instrument do not result in a 3-factor solution. Although unexpected, the one-factor solution may be the most developmentally realistic outcome because 7th and 8th grade youth have not yet experienced enough differentiation between the motivation, cognition, and behavioral processes. It may be that as adolescents move into high school and begin experiencing increased levels of decision-making and autonomous action that these agency dimensions begin to differentiate. Indeed, Fischer's (1980) research on identity in early adolescence indicates that youth only have the ability to think of themselves in "single abstractions." These abstractions are general descriptions of self, and early adolescents are unable to generate and compare multiple abstractions of self (Harter, Bresnick, Bouchey, & Whitesell, 1997). Thus, youth in this sample may be experiencing greater agency but are not yet fully aware of their multiple internal resources or how to synchronize those with external resources. Therefore, it may well be that the distinctions between inspiration, thinking strategies, and behavioral styles have not yet crystallized for adolescents in this sample. Similar non-differentiation results were found by Gestsdottir & Lerner (2007) in their study on SOC in 5th and 6th graders. As mentioned earlier, their study demonstrated that the SOC strategies in their sample of youth were undifferentiated, but that as a whole, these behaviors did demonstrate positive associations with the 5 C's of positive youth development and negative associations with substance use, delinquency, and depression.

However, lack of differentiation in youth on the agency processes is not necessarily the only possible reason for the lack of a 3-factor structure. In Gestdottir & Lerner's (2007) study,

they used the Freund & Baltes (2002) measure which had already demonstrated a 3-factor structure in adults. In contrast, the present study is not using a measure that has previously demonstrated such a structure. Therefore, it is possible that the agency measure is not worded such that a 3-factor structure would emerge. It may be that the subscale items need to be further refined in order to result in a 3-factor solution. Alternatively, these processes may be *so* interrelated that a 3-factor solution is not possible. However, at this stage of measure development, a clean one-factor structure with strong positive loadings across each dimension is sufficient support for this conceptualization of agency.

Instrument Validity

A significant focus of this research endeavor has been to determine how the adolescent agency instrument relates to other adolescent development measures. Although many of the results were consistent with preliminary expectations, several results were contrary to expectations. This section is structured such that for each construct of interest (e.g., physical activity) results that were consistent across all 4 groups are discussed first and are followed by results that vary across groups. Contradictions to preliminary expectations are also discussed where relevant.

Convergent Validity

Agency Subscales

The correlation analyses between the motivation, cognition, and behavior subscales of the agency measure all demonstrated positive and strong correlations. This suggests that there are real

relationships between the three proposed dimensions of agency. Intrinsic motivation, cognitive strategies (e.g., planning and belief in personal ability to achieve one's goals), and taking action to reach goals relate to each other in a powerful and meaningful way. The correlations across these dimensions demonstrate that these kinds of functioning travel together and represent an agentic orientation. Prior research has suggested such a constellation of agentic domains (Kuczynski & Parkin, 2007; Little & Wanner, 1997; Schwartz et al., 2007), and this outcome supports those assertions.

Comparing the agency subscale correlations with subscale correlations within the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1993) reveals significantly stronger correlations between agency subscales on comparable domains. The MSLQ has subscales for Intrinsic Goal Orientation ($\alpha=.74$, 4 items), Self-Efficacy for Learning and Performance ($\alpha=.93$, 8 items), Metacognitive Self-Regulation ($\alpha=.79$, 12 items), and Effort Regulation ($\alpha=.69$, 4 items), among others. These subscales are most comparable to the motivation, cognition, and behavior subscales in the agency instrument, where the intrinsic goal orientation represents the motivation domain, the efficacy and metacognitive MSLQ subscales represent the cognitive domain, and the effort MSLQ subscale represents the behavior domain. Correlations across these subscales range from $r = .43 - .61$ in the MSLQ instrument, whereas the agency subscale correlations are higher and range from $r = .74 - .83$. Differences in strengths of correlations between these groups of subscales may suggest that agency is a general orientation towards life and the variation in the strength of the associations (i.e., agency vs. MSLQ subscales) reflects differential agentic functioning according to context (e.g., learning). A caveat to this interpretation should be considered: the MSLQ subscale internal consistency coefficients are somewhat less robust than those for the agency subscales, and this may be a source of the lower correlations among the MSLQ subscales. Therefore, it is also plausible that given more robust

internal consistency that the MSLQ would show similar subscale correlations to those demonstrated by the agency subscales.

Self-Efficacy and Free-Time Affect

As anticipated the agency measure was strongly, positively correlated with the self-efficacy for restructuring (SERE), self-efficacy for physical activity (SEPA), and free-time affect (FTA) scales. These relationships were consistent across all groups. The moderate to strong correlations between these constructs and agency establish the agency measure's convergent validity. There is a good degree of conceptual and practical overlap between these constructs. If one is likely to exercise agentic capacity, one is also likely to feel efficacious in physical activity pursuits and to generally feel positively about their free-time life. There is not full overlap between agency and these constructs because agency as used here is global, whereas the self-efficacy and free-time affect measures are domain-specific (i.e., physical activity). One might expect a "baseline" level of agency to exist, similar to constructs like intrinsic motivation, and that its level fluctuates according to context (Gottfried, Fleming, & Gottfried, 2001). The associations between agency and the SERE, SEPA, and FTA constructs reflect such a possibility.

Concurrent Validity

Results for the concurrent validity analyses revealed a variety of patterns of associations across grades, genders, constructs, and agency subscales. Overall, the agency instrument demonstrated significant associations with important developmental domains for adolescents.

Physical Activity

Associations between physical activity outcomes and agency were in line with research that demonstrates the relevance of intrinsic motivation, efficacy, and behavioral strategies to physical activity for youth (Gillison, et al., 2006; McCarthy, Jones, & Clark-Carter, 2008; Ryan, 2005). As expected, agency positively correlated with intrinsic reasons for engaging in physical activity for male and female youth in both grades. In this sample, youth who are likely to engage in agentic processes are also likely to report that often the reason they are physically active is because it is fun, and because it is healthy. These reasons are intrinsic in nature and as such were correlated with the motivation subscale. It is important to note that these items also correlated significantly and positively with the cognition and behavior subscales. It is likely that each dimension of agentic functioning facilitates fulfilling engagement in physical activity and that engaging in physical activity facilitates the development of agency in these dimensions over time (individual ↔ context; Lerner et al., 2005).

For males in both grades and females in 8th grade, agency was associated with number of hours of physical activity over the weekend. Here, including each scale facilitated identifying what dimension of agency is salient to time spent being active over the weekend. For 7th grade males, all dimensions were associated with time spent active. However, for 8th grade males, cognition most strongly related to physical activity and there was no relationship with motivation. In contrast, for 8th grade females, the only significant relationship was with motivation. Here it is important to note that the associations between agency (subscales) demonstrate more variation when the measure is of actual behavior (i.e., time spent physically active). These differential associations across subscales and between groups highlight that the salience of any domain of agency shifts according to characteristics of the individual (i.e., 8th grade male) and the individual's context (i.e., weekend activity). Moreover, the salience of measuring these domains

of agency increases as the research focus shifts from measuring cognitive beliefs and strategies to measuring reports of actual behavior.

Peer Influence

The relationship between agency and positive and negative peer influence was as expected based on existing research (Caldwell, et al., 2009; Dubow, et al. 2001; Pakaslahti, et al., 2002). Agency and its subscales had strong, consistent associations with positive and negative peer influence across groups. The moderate and positive correlation between agency and positive peer influence (correlation range: .307 - .464) suggests that agentic youth are likely to have a greater number of physically active peers relative to less agentic youth. This is especially true for 7th grade males in this sample ($r = .464$). It is likely that engaging in physical activity in middle school involves other youth and those other youth are probably agentic too. Bandura (2001) indicated that social structure and personal agency are reciprocal and interdependent. As such, youth persistence in physical activities with similar peers likely has a reciprocal effect whereby agentic youth provide challenge to each other and act as scaffolding partners for the development of agency among each other.

Agency negatively correlated with negative peer influence. Agentic youth are not likely to engage in physical activity simply to “keep up with” their peers. (Again, this is most true for 7th grade males: $r = -.357$). The more agentic youth are, the less likely they are to report this as a reason for being physically active. Thus, agentic youth also demonstrate that despite being physically active over the weekend, and having higher numbers of physically active peers, they do not report social pressure to “keep up with” their peers.

A significant negative association was found only for 7th grade males for the second negative peer influence item (e.g., will only be active if friends are too). For each of the other

groups, there was no significant association between agency, its subscales, and this item. For seventh grade males, there was no significant relationship between this item and motivation, but there were significant negative correlations with the cognition and behavior subscales, and the overall measure. It may be that this group of males is especially agentic as it relates to physical activity. Associations between agency and PA measures are generally the strongest for this group in particular (recall also that the 7th grade males had the only true one-factor solution). Therefore, whereas for the other three groups, agentic youth may or may feel like the only way to be active is with their friends, the 7th grade males are more definitively agentic about their physical activity. This result may align with descriptions of agency that suggest it is an individualistic or self-centered orientation (vs. communal or conventional; Stein & Newcomb, 1999) because these males do not need their friends in order to be physically active themselves. Moreover, the cognitive and behavioral drives appear to supersede the motivational component of agency.

These results for the 7th grade males and second peer item highlight the utility of measuring all three domains of agency. Here, measuring only the relationship between intrinsic motivation and negative peer influence could potentially lead to the wrong inference because no result would be found. However, when measuring all domains of agency, researchers gain valuable insight into what is working and for which adolescents.

Grades

The relationships between agency and grades were the most varied of any of the constructs considered in this paper. This variation may well be because intrinsic motivation is a primary focus of this paper, and youth vary in their level and motivation style for good grades (Gottfried, et al, 2001). The results provide interesting patterns for consideration. For seventh grade females, all aspects of agency were positively associated with higher grades. In direct

contrast, there was no relationship between any aspect of agency and grades for 8th grade females. For 7th grade males, the only agency dimension significantly associated with higher grades was behavior. And exactly the opposite was true for 8th grade males, behavior was the only subscale not significantly associated with higher grades, and cognitive agency demonstrates the strongest association. No clear or consistent pattern emerged across the groups for the relationship between agency (subscales) and grades.

The strength and direction of these correlations are similar to those found in a study evaluating agency and academics in 6th to 9th grade students employing the Multi-CAM (Walls & Little, 2005). The two agency scales in the Multi-CAM (i.e., ability and effort) would be conceptualized here as measures of cognitive agency because they are framed as *beliefs*. Correlations between their agency scales and combined math and science grades were $r = .19$ and $.27$ for ability and effort respectively. In this study, the cognition subscale and grades show similar correlations ranging from $.12$ to $.25$. Similarly, their scale of intrinsic motivation correlated with achievement at $r = .09$. In the present study the motivation subscale demonstrated comparable or better correlations with grades in a range of $r = .089$ to $.27$. Thus, there is existing support for the strength and patterns of relationships found here as evidenced by others research on the relationship between agency and grades.

One interpretation of the varying patterns of association is that incorporating all three dimensions is useful for better understanding the association between agency and grades. For 7th grade males, agentic behavior is most relevant. For 8th grade males, agentic motivation and thinking matter more. For 7th grade females, any strategy works. And for 8th grade females, we need to reconsider how to approach them altogether. Based on similarities between the present research and prior research (as noted above), this may well be an appropriate interpretation.

However, a couple of issues suggest caution from interpreting these patterns as developmental truth for these adolescents. First, these results may be due to how the item

measures grades (e.g., grades typically gotten...mostly A's and B's, etc.). This item may cause cognitive dissonance for youth who typically earn very good grades in some subjects and very poor grades in others. Furthermore, some youth do not have to try in order to achieve good grades whereas other youth may struggle mightily to simply pass. Considering both of these issues may help explain the varied associations between agency and grades. Assessing agency with other academic, learning goals, and effort indicators may demonstrate more intuitive or consistent patterns of association.

Knowledge

Contrary to expectations, there was a positive, moderate correlation between agency and knowledge of number of nearby places to be active. This analysis was expected to demonstrate discriminant validity, but instead demonstrates another construct with which agency is concurrently valid. Youth who are more agentic are more likely to know greater numbers of nearby places to be active. If youth are motivated, planning, and taking action, then these processes are likely to result in increased knowledge either by intention or simply by exposure. Indeed, as adolescents develop self-regulation and self-determination abilities they also become more able to synthesize their knowledge fully (Larson, 2006), and this result reflects that.

Preference

The only significant associations between agency and preference of having an adult leader present were for 7th grade youth. Agentic 7th graders were less likely to report preferring programs with adult leaders or instructors present (again, especially true for 7th grade males). This significance may reflect a developmental process, where younger youth who are agentic are

experiencing and exerting agentic efforts in non-supervised conditions and experimenting with their own sense of autonomy. Whereas, youth in 8th grade may be more connected with a sense of agency regardless of adult presence and so may be indifferent to whether an adult is necessary or desirable.

Discriminant Validity

Two relationships that were expected to demonstrate concurrent validity that did not were between agency and delinquency, and agency and perceived constraints. Across each group of youth, there was consistently no relationship between these constructs. The relationship between agency and these constructs illuminates what is not related to agency.

Delinquency

The absence of association between agency and delinquency across all groups is likely the result of the agency measure being “value-free”. The measure was specifically designed to not incorporate values or motives based on the indication from Larson that “youth can be intrinsically motivated by the challenge of learning to be a good drug dealer, scam artist, or Internet hacker (Csikszentmihalyi & Larson, 1978)” (Larson, 2006, p.681). The key point is that agency, much like intrinsic motivation, is conceptually distinct from its point of focus. The relationship expected to emerge was a negative correlation between agency and property damage delinquency, given that agentic youth have the skills and tools available to them to expand their range of possibilities (Kort-Butler, 2009; Palen & Coatsworth, 2007; Scheier & Botvin, 1996). The absence of relationship suggests that agentic youth may or may not engage in property damage. Whether or not they do is likely related to other factors within themselves (e.g., aggressive

orientation) and in their developmental context (e.g., relationships, school, neighborhood). Such realities refer researchers to Larson's well-founded statement that implies delinquency may well be another possibility that agentic youth may create for themselves.

Perceived Constraints

Across all groups, the full agency measure had no significant association with the perceived constraints for physical activity scale. This was contrary to expectations built on the same logic for delinquency: youth who are more agentic have the skills to open up more opportunities in their lives – the ability to overcome constraints. The four items used to measure constraints were chosen to reflect two internally oriented constraints (i.e., embarrassed, don't have skills), and two external constraints (difficulty getting to activity location, school and chore responsibilities take too much time). The relationship between agency and the perceived constraints scale suggests that an agentic youth may or may not perceive constraints and that may or may not be related to how a youth functions (i.e., it may be prohibitive or it may be irrelevant).

As a 4-item scale, perceived constraints was not significantly associated with the full agency scale for any group. However, the cognitive subscale demonstrated a significant negative association for 8th grade males. Post-hoc analyses revealed that for 8th grade males, higher agency was associated with less likelihood of indicating a lack of skills as a constraint to physical activity (recall that lack of skills was one of the 4 items comprising the scale). For 7th grade males, the behavior subscale also had a significant negative association with perceiving lack of skills as a constraint causing the overall agency scale to approach significance ($p=.071$). These associations have a couple of possible interpretations. One, it may be that more agentic males are more likely to actually have the skills to be physically active. Alternatively, more agentic males are less likely to perceive that an absence of skills is a good reason to not be physically active, i.e., they may

play regardless of their own skill level or they have the agency skills to get the physical activity skills.

Instrument Performance Summary

In summary, the measure worked well and in many ways, as anticipated. Across all groups, the agency measure and subscales demonstrated good internal consistency. Although a 3-factor solution did not emerge from the factor analyses, most of the items loaded strongly and positively on one factor. The within-agency subscale correlations indicate that the motivation, cognition, and behavior domains are convergent with one another. Further, the full scale (and subscales) strongly and positively correlate with other constructs hypothesized to be similar to agency, namely, self-efficacy for restructuring events, efficacy for physical activity, and free-time affect. This measure also demonstrates preliminary evidence for predictive validity. Likelihood of engaging in physical activity for intrinsic reasons, number of physically active friends, resistance to engaging in physical activity simply to keep up with peers, and knowledge of more places to be physically active nearby are each positively and significantly associated with agency. Contrary to expectations, this measure did not relate to property-damage delinquency or perceived constraints to physical activity. Combined, these results support the validity of a theory and a measure of agency that incorporates motivation, cognition, and behavior dimensions and demonstrate preliminary usefulness for doing so.

Agency, Adolescents, and Prevention Efforts

Adolescent Agency

In general, the youth in this sample report moderately good levels of agentic functioning. The mean proportion of the full possible agency points ranged from 74-77% across the groups. It seems reasonable to expect that few youth in middle school are operating at maximum levels of agency, and mean scores in the mid-to-high 70's reflect that. During this period, youth have already survived the transition from elementary school to middle school, and have likely mastered some of the tasks inherent to this transition. Despite that, there are likely some enduring challenges (social pressure, new more complex school topics, shifting social groups) that require competence on a daily basis, or some looming challenges that are present in the social milieu but not immediately relevant to some of these youth (romantic relationships, transitioning to high school, changing pubertal status). Each of these issues, mastered or not, likely influence adolescent experience and exercise of agency. Considering all this, the overall mean scores reflect positive and encouraging levels of agency in these adolescents.

Another noteworthy finding is that the youth in this sample report comparable levels of agentic functioning across grade level and gender. Although males report slightly higher levels on each subscale, the proportion of total possible subscale points reflects and supports the overall comparability in levels of agency expression across grade and gender. This result is, again, in line with Gestdottir & Lerner's (2008) research on SOC in early adolescents. Youth in their sample across grades 5, 6, and 7 reported comparable levels of SOC behaviors. These results may be because, as mentioned earlier, biologically and conceptually, agency is a capacity inherent to all human beings which may explain why youth in this sample report comparable levels of agentic functioning across groups.

Agentic Functioning and Prevention Programming

As mentioned at the outset of this paper, the effectiveness of prevention programming for adolescents is rooted in adolescent ability to connect with personal volition and join that volition with a greater range of (positive) possibilities. Implicit to such programming is that agency is an available resource and that its successful development and expression requires support. Therefore, increasing adolescent awareness of this capacity should be an explicit goal of prevention program curricula (Alexander, 2005). The prefrontal cortex gives rise to this capacity for volitional action, and biological research indicates that development in the prefrontal cortex (PFC) can be influenced by targeted interventions. Recent research has recommended prevention programs that promote skill acquisition related to PFC functioning in areas such as planning and executive functioning (Beauchaine, Neuhaus, Brenner, & Gatzke-Kopp, 2008). Thus, incorporating agentic functioning into the realm of prevention work responds to calls from recent research and suggestions. Further, Bond and Hauf (2004) indicate that successful programs not only address risk but also incorporate the development of resources for use beyond the program and beyond immediate contextual risk and basic needs. Here I propose that agency is just such a resource.

The conceptualization presented in this paper is a first step toward providing the means to incorporate agency into prevention programming. The measure presented here provides a theoretically sound and interesting variable. It also provides a start-point for adaptive-prevention programming (Collins, et al, 2004). As already demonstrated, agentic functioning is associated with desired adolescent outcomes most notably actual time spent being physically active, which is a substantial public health interest currently. By evaluating agentic functioning by dimension, program implementers can tailor program delivery to the profiles and needs of each group of youth. For 8th grade females, a program would likely be most effective if instructors and curricula

emphasized inspiration and a sense of purpose because for this group because the only significant association between physical activity and agency was on the motivation subscale. In contrast, this motivation-oriented approach would likely not be effective for 8th grade males given the lack of relationship between motivation and time spent active. For these males, the most effective approach would likely be enhancing their cognitive strategies for achieving goals. For 7th grade males, lessons focusing on all aspects of agency would likely be effective because each subscale was significantly associated with time spent active. For 7th grade females, it is somewhat less clear what might work for them given no significant association with agency subscales. There is a small non-significant association between physical activity and the motivation subscale, which is similar to the 8th grade females albeit a weaker association. These varying relationships between the three domains of agency and actual time spent being physically active argues for the salience of each domain and the relevance of incorporating each into the construction, delivery, and adaptation of prevention programs for adolescent physical activity.

Agentic functioning as measured here an apt variable to use for such program adaptation for three reasons. One, agency is relevant to all individuals (vs. measures of depression or substance use) and therefore can be incorporated into universal programs as well as targeted programs. Two, agency is likely a relatively malleable characteristic as compared to age or gender. This malleability allows for interindividual differences and intraindividual change. As such, participants will vary in their rank order and their reported levels of agentic functioning could change over time. Three, this measure demonstrates good reliability and validity, which would ensure that adaptation based on this measure would have minimal error associated with its delivery (Collins, et al., 2004). Incorporating this construct and measure into adaptive programming conceivably enables program delivery to engage with participants according to where they are at agenticity. Tailoring program efforts accordingly can facilitate participant awareness and harnessing of their own volitional capacity for development and change.

Limitations and Future Directions

Limitations

Some limitations in this study bear mentioning. Foremost, the agentic functioning measure was the last measure to be developed and included in the PPALTY survey instrument. As such, the validity analyses here primarily relate to physical activity, which is one, specific context for youth. Space limitations on the survey and time limitations for participants did not allow for scales related to other dimensions of well-being and risk to be included. As such, the validity analyses may not be as generalizable as would be desired. Nevertheless, the predictive validity analyses provide some useful insights into the relationships between agency and outcomes associated with physical activity.

Second, the agentic functioning instrument was included at the post-test only. As such, the data analyzed were cross-sectional and do not allow for developmental inferences regarding agentic functioning stability and continuity over time. A related issue is that by-condition analyses were not conducted. The small comparison-condition sample size did not allow for by-grade and by-gender analyses to also be conducted. Although it is quite possible that youth in the intervention condition may respond differently to the survey items than youth in the comparison condition, concessions were made in order to ensure adequate cell sizes for by-gender and by-grade analyses. Therefore, analyses of differences between conditions or change across time were not possible. Nevertheless, the findings here are robust and interesting enough to warrant future research into changes over time or that result from intervention efforts.

Future Directions

This study is a good first step towards the development of a measure of adolescent agentic functioning. Future steps include further investment in establishing the validity and reliability of this instrument. Such efforts should include convergent and response validity analyses using scales that tap constructs related to well-being, hope, self-esteem, and social desirability bias. Doing so will further elaborate on the validity of this measure and in a more global manner. Evaluating its performance in other populations of older adolescents, young adults, and potentially very high achieving representatives of those groups would help identify how sensitive this measure is to population variation. Additionally, conducting factor analyses on data gathered from adults may lead to insight into the feasibility of identifying a 3-factor solution.

As it relates to outcomes, using this measure in conjunction with event-level analyses would facilitate an understanding of whether agentic functioning is relatively stable within persons or if it is a reactive, context-dependent phenomenon. Further, identifying if and how agentic functioning changes according to the positive or negative valence of events could also provide useful insights. Another domain of interest is researching the extent to which changes in one dimension of agency relate to changes in other dimensions. That is, if an intervention influences intrinsic motivation, does agentic cognition or behavior change? The strong positive correlations between these dimensions suggest that they would. If so, to what extent and what is the time-lag between change in one dimension and change in another? Further, is there a superordinate dimension of agency that directs change for the other two dimensions (i.e., is change unidirectional or bidirectional)? These are interesting empirical questions into the nature of agency and its relationship to context. Exploring answers to them will help us gain better insight into psychological and contextual processes of adolescent ownership over their lives and development.

Appendix A

Adolescent Agency Items

Motivation

Most of what I do during the day is important to me.
I like having a sense of purpose when I do things.
I do things that I know will bring me satisfaction.
During the day, most of what I do has no purpose.
I feel inspired to do things that interest me.

Cognition

I think about the steps I will need to take to get or accomplish the things I want.
When I am doing something, I think about why I am doing it.
I think about what is really important to me.
I believe that I can reach my goals.
I think of different ways to reach my goals.

Behavior

I take action to do the things I want to do.
If I need it, I ask for help to reach my goals.
When I find something I am interested in, I take action to explore it.
If I am doing something the wrong way, I try to figure out the right way to do it.
I try to find ways to do things that are really important to me.

Scale: 1=never, almost never; 2=sometimes; 3=quite often; 4=always, almost always

Appendix B

Student Assent Letter

Informed Consent Form for Biomedical Research Student Assent

The Pennsylvania State University

Title of Project: PHYSICAL EDUCATION, RECREATION AND COMMUNITY PARTNERS: PROMOTING PHYSICAL ACTIVITY

Principal Investigator: Linda Caldwell, Ph.D., Professor of Recreation, Park & Tourism Management

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University Park, PA 16802
(814) 863-8983; lindac@psu.edu

Other Investigators: Drs. John Graham, Andrew Mowen, Mark Ivy, Mallika Bose, & Edward Smith and Jennifer Glenn

Would you like to volunteer for our study? We want to find a way to help students your age learn to develop healthy activities in their free time. Here is some information about the study. If you agree to participate, please check the appropriate boxes at the end of this letter and sign it, then give it to the Penn State staff person. If you do not want to participate, please do not sign or return the form. If your parent or guardian has indicated that he or she does not want you to participate, you cannot agree to be part of the study.

WHAT IS THE STUDY ABOUT?

You will be participating in the TimeWise: Taking Charge of Leisure Time program as part of your school activities. You will participate in this program during school in physical education class. A group from Penn State wants to know your thoughts about the program to make sure it is as good as it can be.

WHAT WILL I BE ASKED TO DO?

Students who receive permission. . .

- . . .Will be asked to fill out a survey before and after the TimeWise program in (ENTER DATE), which will take about 30 minutes each time.
- . . .Will be asked to complete a “Previous Days Physical Activity Recall” form three times: before and after the program, and one time during the TimeWise program. These forms will take about five minutes to do each time.
- . . .May be selected (by chance) to wear a pedometer during waking hours for five to seven days. These very small devices have been used in many other studies and provide information about movement. They are worn on the waistband and cause no

discomfort at all. IF you are selected to be one of the volunteers to wear an activity monitor, you would wear it for five to seven days and then meet with Penn State research staff so that they could put the activity monitor information into a computer. Volunteers, who will be chosen by chance, will be loaned an activity monitor to wear starting some time between the beginning of October 2008 and the third week of October, 2008. Activity monitors would need to be returned within 2 weeks, or approximately mid-October through the 3rd week of October. If you return the activity monitor loaned to you, you will receive \$10 cash as long as the monitor is intact and working. You will not receive \$10 cash if you do not return the activity monitor, or if it is returned broken or unusable.

- ...May be selected (by chance) as one of 20 students to have a short interview with one of our research team members for about ten to fifteen minutes. This interview will be audio recorded.
- ...May be observed during the program activities by research personnel.

WHO WILL KNOW I DID THE STUDY?

Your participation in this research is private. A government oversight agency, Penn State University's Biomedical Institutional Review Board, and Penn State University's Office for Research Protections may also review study information.

WHAT IF I HAVE QUESTIONS?

Please contact Dr. Caldwell (see information above) with questions, complaints or concerns about the research. You can also call this number if you feel this study has harmed you. If you have questions about your rights as a research participant, or you have concerns or general questions about the research, contact Penn State University's Office for Research Protections at (814) 865-1775.

DO I HAVE TO DO THIS?

NO. Your decision to be in this research is your choice. You can stop at any time. You do not have to answer any questions you do not want to answer. Your grade will not be affected by your decision to talk part or not take part in the research activities. You may feel a little embarrassed when answering some of the questions.

WHAT SHOULD I DO IF I WANT TO TAKE PART IN THIS STUDY?

- ← Please check this box if you **VOLUNTEER** to take part in the SURVEY.
- ← Please check this box if you **VOLUNTEER** to WEAR THE PEDOMETERS AND PROVIDE THAT DATA. YOU AGREE TO RETURN THE ACTIVITY MONITOR INTACT BY OCTOBER 31ST IN EXCHANGE FOR \$10 CASH.
- ← Please check this box if you **VOLUNTEER** to HAVE AN INTERVIEW WITH ONE OF THE PENN STATE STAFF.

Student's Signature

Print Name

Date

THANK YOU FOR HELPING US! You will receive a copy of this form.

Person Obtaining Consent

Date

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