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**ADOLESCENT AGENCY:  
A CONCEPTUAL MODEL, MEASUREMENT, AND CONSTRUCT VALIDITY**

A Dissertation in  
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by  
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## ABSTRACT

Agency is the ability to make decisions and take actions that shape the course and direction of one's life. Research focused on adolescent development and positive youth development has only recently begun to articulate how youth agency should be conceptualized and how it develops. This study examines the measurement characteristics of a 9-item measure constructed to tap motivation, and cognitive and behavioral strategies for agency. Youth in 6<sup>th</sup> or 7<sup>th</sup> grades, and at least one parent or caregiver completed questionnaires as part of a larger research trial. Data from a total of 390 youth (72% White) and their parent(s) were analyzed.

Results demonstrate a one-factor solution as the most parsimonious solution that is consistent for both genders. In SEM models examining construct validity, the agency measure demonstrated was positively associated with positive self-concept, life skills, , behavioral adaptation, and family processes. The measure was not associated with indicators of household resources (i.e., SES and financial strain). In hierarchical regression models examining incremental validity the measure demonstrated little value in models predicting positive youth development characteristics, and limited preliminary value in predicting risk behaviors.

This dissertation contributes to the study of agency in three important ways. Conceptually, it adds clarity to the literature on agency by grounding the construct in three developmental meta-theories. Empirically, it illustrates that a short, parsimonious measure of agency was meaningfully associated with other psychosocial and familial constructs in expected ways. Further, findings from this study provide insight into the unique role that agency may play in risk behavior. Together, the conceptual and empirical work of this dissertation can serve to expand the literature on the measurement of adolescent agency.

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## INTRODUCTION

Agency is the ability to make decisions and take actions that shape the course and direction of one's life (Emirbayer & Mische, 1998; Hitlin & Elder, 2007). Agency identifies the individual as the primary author of personal actions and decisions, which are self-generated and engaged at will (Balconi, 2010). Furthermore, agency affords individuals the ability to be actively engaged in their own personal development, to increase their well-being, to take new directions in life, and achieve self-actualization (Seligman, 2002; Sumerlin, 1997).

The development of agency is particularly important during the adolescent years. Adolescence represents an opportune time for youth to develop and solidify a sense of agency. As youth mature from childhood through adolescence social roles and expectations of youth begin to change. Schools and parents begin to transfer more responsibility to youth for making important decisions about their lives. Adolescents are expected to take a central role in making education and career choices, navigate decisions about engaging in risk behaviors, and select peers and romantic partners. In essence, they are expected to become more agentic in many aspects of their lives. Therefore, understanding youth agency is an important research question and its measurement is the focus of this dissertation.

Agency is a broad developmental concept that is both multidimensional and abstract. Literature on agency is disparate and diffuse and the majority of it is conceptual. The term "agency" is used differently across articles, (Hitlin & Elder, 2007), and most studies on agency are theory-building or qualitative in nature (Larson & Angus, 2011; Menning, 2008). Agency has been conceptualized as a combination of cognitive, evaluative processes such as self-efficacy and planning (Bandura, 2001), as cognitive conceptualizations of goals, beliefs, and expectancies

(Little, Snyder, & Wehmeyer, 2006), as a process of social engagement, informed by the past, oriented toward the present and future (Emirbayer & Mische, 1998), and as combination of self-direction, an internal compass, and the ability to redirect efforts as needed (Schwartz, Pantin, Coatsworth, & Szapocznik, 2007).

Very few empirical studies of agency exist, but findings from them demonstrate that people who operate from a place of empowerment, efficacy, self-direction, or intentionality (among other synonymous descriptors) experience better developmental outcomes relative to those with less agentic orientations. In a longitudinal cohort study adolescents who demonstrated higher levels of agentic competencies, such as dependability, effective use of intelligence, and self-confidence, experienced better adulthood outcomes relative to those who were less agentic in adolescence (Clausen, 1991). Better outcomes included greater educational and occupational attainment, fewer marriages, and greater likelihood of personality and role stability across the.

Agency also enables people to create and capitalize on “turning points” in their lives (Masten, et al., 2004). For example, a group of seven individuals who transitioned from being maladaptive (i.e., low competence across multiple life domains) in emerging adulthood to resilient in young adulthood transitioned in part due to improvements in personal autonomy, an agentic characteristic (Masten et al., 2004). Similarly, adolescents who had actively made personal decisions about their destinies (i.e., agentic planning) after discharge from a psychiatric hospital later demonstrated resilience in adulthood and parenthood relative to peers with similar psychiatric backgrounds (Hauser & Allen, 2006).

The conceptual and theoretical work on agency indicates that it is an important and complex developmental process. However, the few empirical studies that exist on agency show that it is a challenging construct to define and operationalize (Hitlin & Elder, 2006; 2007). The

challenges and limitations of agency research extend into research on the development of agency in adolescence. Research focused on adolescent development and positive youth development has only recently begun to develop theories around how youth agency should be conceptualized and how it develops (c.f. Bandura, 2005; Larson & Angus, 2011; Lerner, Theokas, & Jellic, 2005). Likewise, research that empirically tests models of adolescent agency are also just beginning to emerge in the literature (Hitlin & Elder, 2006).

The most notable empirically-tested model published comes from life course researchers. Hitlin and Elder (2006) used cross-sectional data from The National Longitudinal Study of Adolescent Health (Add Health; Bearman, Jones, & Udry, 1997) to evaluate agency in a structural equation model framework. In that study they identified a second-order latent factor model of agency, where agency emerged from the latent factors of self-efficacy and optimism, and is predicted by planful competence. In turn, agency, as hypothesized, significantly predicted self-esteem, connection to school, and negatively predicted school problems, criminal activity, and violence. Additionally, four indicators of social support significantly predicted agency, with family social support being the strongest predictor of agency (Hitlin & Elder, 2006). This model is novel because it includes more than one component of agency (i.e., both self-efficacy and optimism), and also evaluates predictors and outcomes across multiple domains.

Typically measures of adolescent agency focus on only one aspect of it. In particular, the most common construct used to operationalize agency is self-efficacy (Bandura, 2001). Self-efficacy is defined as one's belief in personal ability to bring about a certain outcome. This belief is self-evaluative, and informed by personal mastery experiences, vicarious observation of others, verbal persuasion by others, and physiological arousal (Bandura 1982, 1989). Although one's belief in personal ability is certainly relevant to agency it alone is not a sufficient depiction

of agency. Simply believing that one is capable of achieving a certain outcome does not account for their motivation to do so, nor does it represent actions taken to achieve that end. Self-efficacy is an important belief connected to motivation, affect, choice-making, and goal-directed behavior (Bandura, 1989). However, operationalizing agency as self-efficacy does not adequately capture the multi-dimensional nature of agency and consequently lacks sufficient content validity (Cronbach & Meehl, 1955).

Other empirical reports of adolescent agency are limited by the extent to which the agency measures are burdensome in length and represent a compilation of multiple previously established constructs such as self-esteem, internal locus of control, or purpose in life, (e.g., Multimeasure Agentic Personality Scale; Côté, 1997). Although a multi-measure approach more adequately addresses the multi-dimensional nature of agency, using many lengthy measures may not be appropriate for some populations of youth, and also introduces some question of what agency is not, given the array of dimensions included in measurement. Therefore, in order to understand the extent to which youth experience and capitalize on personal agency we need to validly yet efficiently measure adolescent agency.

This study aims to contribute to the measurement literature on adolescent agency by evaluating a 9-item measure constructed to tap intrinsic motivation for personal goals, and cognitive and behavioral strategies for achieving them. The focus of this study is to explore the construct validity of this measure by examining its factor structure and its association with other variables. The factor structure is examined to establish its correspondence to the conceptual model presented in this study. Construct validity is evaluated using positive youth development constructs, and family and household context variables (e.g., SES). Finally, the incremental

validity of the adolescent agency measure is evaluated in models predicting positive and problem behaviors.

### **Conceptualizing Agency through Motivation, Cognition, and Behavior: Dimensions for Measurement**

Although a singular definition or operationalization of adolescent agency does not exist, three hallmarks of youth agency have been forwarded: self-direction, an internal compass, and redirecting efforts in the face of barriers (Schwartz et al., 2007). These hallmarks suggest that youth agency is made up of a combination of motivation, and cognitive and behavioral strategies. Each of these dimensions is an equally important aspect of agency. The motivation dimension accounts for a person's striving to meet and fulfill personal needs and goals. The cognitive dimension represents thought processes and intentions toward reaching those goals – how the mind is engaged and utilized as a resource. The behavioral dimension is the manifestation of agency as youth taking action toward achieving the desired goal. Agency as conceptualized here is characterized by youth coordinating across these three dimensions. Consequently, incorporating motivation, cognition, and behavior in a measurement model of agency captures the multiple dimensions necessary for exercising agency.

The relevance of each of these domains in their contribution to youth agency is supported by theoretical and empirical work on Self-determination Theory (i.e., motivation; Ryan & Deci, 2000), social cognitive theory (i.e., cognition; Bandura, 2001), and Selection, Optimization, Compensation theory (i.e., behavior; Gestsdottir & Lerner, 2007). Empirical research on each of these theories provides sound evidence that these dimensions are associated with youth ability to

achieve important outcomes. Following are some examples of research on these dimensions of agency.

### **Motivation**

Motivation is a key dimension of agency. It is motivation that provides the impetus for taking initiative in one's activities and day-to-day life (Larson, 2000; Watts & Caldwell, 2008) and motivation has been directly connected to experiencing a sense of personal expressiveness (Waterman et al., 2003). Self-determination theory (SDT; Ryan & Deci, 2000) identifies motivation styles that lie on a continuum of internally regulated motivation (e.g., intrinsic motivation) to externally regulated motivation (e.g., extrinsic motivation); SDT also includes the absence of motivation (i.e., amotivation). This continuum represents the extent to which the source of motivation is regulated internally (e.g., activity is naturally rewarding) or externally (e.g., activity is done to avoid punishment). A youth's motivational orientation (i.e., internally or externally regulated) towards goals will influence how engaged that youth is in achieving them (Walls & Little, 2005). Many examples of the influence of motivational style on outcomes can be found in literature on adolescent academic achievement and career planning, and risk behaviors.

Research by Marcoulides and colleagues, for instance, has demonstrated that youth with greater academic intrinsic motivation demonstrate lower academic anxiety, perform better in school, and have higher perceptions of academic competence than less intrinsically motivated peers (Marcoulides, Gottfried, Gottfried, & Oliver, 2008). Similarly, youth whose intrinsic motivation increases over time demonstrate greater increases in career preparation development

compared to youth whose motivation does not increase and compared to extrinsically motivated peers (Hirschi, 2010). Others have found that adolescents with more autonomous motivation for after-school activities set more goals for themselves than youth with less autonomous motivation (Beiswenger & Grolnick, 2009). In contrast, when youth engage in extrinsically motivated activities and behaviors, outcomes tend to be poorer for them than for youth engaging in intrinsically motivated activities. For example, early adolescents with friendships selected for extrinsically motivated reasons have demonstrated poorer relationship quality 6 months later compared to those who chose friendships for intrinsic reasons (Ojanen, Sijtsema, Hawley, & Little, 2010). Young people who endorse extrinsic values (e.g., fame) have been shown to be more likely to smoke cigarettes, chew tobacco, consume alcohol, and engage in sexual activity relative to adolescents who endorse intrinsic values (Williams, Cox, Hedberg, & Deci, 2000).

Taken together, research on youth motivation styles suggests that an intrinsic motivation orientation is integral to agency. Intrinsic motivation provides impetus and direction that lead to healthy and fulfilling outcomes for youth. As such it is essential to include this dimension when measuring agency.

## **Cognition**

The cognitive dimension of agency includes multiple types of cognitive evaluations, such as planning and self-efficacy (Bandura, 2001; Schwartz et al., 2007). Cognitive faculties are harnessed in order to assess what resources are required to achieve a certain outcome, to determine what resources are actually available, and to coordinate them toward goal achievement (Balconi, 2010). In addition, an important element of the cognitive dimension is to extend

understanding of one's actions beyond the literal activity into terms of higher-order goals (Vallacher & Wegner, 1989). For example, paying one's rent is not only the act of writing a check, but also represents how one maintains a place to live. Self-efficacy, belief in one's ability to bring about a certain outcome, is also a key cognitive process that supports agency (Bandura, 2001). Decades of research on self-efficacy have demonstrated that higher levels of self-efficacy are associated with thinking optimistically, persisting longer, capitalizing on opportunity, expecting favorable outcomes, and experiencing enhanced quality of emotional life (Bandura, 2005).

Planning and efficacy can promote positive outcomes for adolescents. For example, adolescent career planning and career self-efficacy are strongly correlated with career-related goal setting (Rogers, Creed, & Glendon, 2008). Further, youth with high career decision-making self-efficacy show higher career planning and career exploration at two-year follow-up (Creed, Patton, & Prideaux, 2007). Greater planning ability in high-risk adolescents is associated with their greater academic competence (Martel et al., 2007), and planfulness in emerging adulthood is strongly predictive of academic attainment in young adulthood (Masten et al., 2004).

Cognitive processes such as planning have also been shown to be integral to creating "turning points" (Hauser & Allen, 2006; Rutter, 2012). Adolescents who had been institutionalized but actively planned for their post-institutionalization have demonstrated resilient adulthood and parenting outcomes across several psychosocial measures (Hauser & Allen, 2006). Similarly, girls who had grown up in a residential treatment home were more likely to demonstrate positive adult outcomes (e.g., absence of criminality or marital problems) when they had some positive school experiences (hypothesized to lead to self-efficacy) and when they were planful about mate selection and marriage (Rutter & Quinton, 1984).



Cognitive processes like planning and self-efficacy play a key role in exercising agency to reach one's goals. Therefore, it is necessary to incorporate measurement of such processes in order to adequately measure agency.

## **Behavior**

The third proposed dimension of agency is behavior. Being agentic requires taking action in order to intentionally shape the course of one's life. Selection, optimization, and compensation (SOC) theory describes developmental processes and activities that support goal attainment. This theory is based in the premise that individuals are primary, active contributors to their own development, and the processes of selection, optimization, and compensation describe active self-development strategies (Baltes, 1997).

Selection refers to goal-selection and commitment (e.g., play the piano). Optimization encompasses the efforts put forward to improve one's ability or likelihood of success (e.g., take piano lessons). Compensation entails the use of supports when resources decline or are unavailable (e.g., buy an affordable electronic keyboard instead of a piano). Although SOC does not strictly measure only behavior, it captures agentic behavior through items such as "I always pursue one goal after another" (S), "I do everything I can to realize my plans" (O), and "When I am afraid of losing something that I have achieved, then I invest more time and effort in it" (C).

Measurement studies of SOC have demonstrated developmental change in SOC measurement across time. Confirmatory factor analysis identified SOC as one unified factor with data from 5<sup>th</sup> and 6<sup>th</sup> grade youth (Gestsdottir & Lerner, 2007), suggesting that early adolescent youth may not have clearly differentiated goal pursuit strategies. As the youth in this study aged

into 8<sup>th</sup> through 10<sup>th</sup> grades, the SOC strategies began to differentiate into multiple factors that map onto the three SOC components (Gestsdottir, Bowers, von Eye, Napolitano, & Lerner, 2010; Gestsdottir, Lewin-Bizan, von Eye, Lerner, & Lerner, 2009). These findings suggest that as youth progress from early to middle adolescence their agentic strategies for goal attainment begin to diversify. Additionally, in these studies SOC was demonstrated to be negatively related to substance use, delinquency, and depression, and positively associated with positive youth development through 10<sup>th</sup> grade (Gestsdottir & Lerner, 2007; Gestsdottir et al., 2009; 2010).

Research on SOC trajectories from 5<sup>th</sup> to 11<sup>th</sup> grade identified four trajectories of SOC development that followed linear and non-linear patterns (Bowers et al., 2011). Two patterns declined over time characterized by whether the decline was steady or rapid over time. The other two patterns demonstrated an increase over time with one group stably high on SOC and increasing, and a late-onset group that started low and increased over time. A majority of the youth were in the steady decline group (82%), with 5-8% of the youth in each of the other three trajectories (Bowers et al., 2011).

Membership in these SOC trajectories was not related to household income, household structure (i.e., single parent), youth gender, or youth engagement in problem behaviors<sup>1</sup> (Bowers et al., 2011), but membership was related to positive youth development and community contribution. The lack of association between income and household structure variables and SOC trajectory membership highlights that the development of successful developmental strategies like SOC or agency may not be dependent on the availability of certain resources (e.g., family income, two parent household).

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<sup>1</sup> The study authors noted the lack of association between problem behaviors and trajectory membership as an unexpected finding, and attributed it to multifinality and equifinality. An alternative explanation may be that only problem behavior report from 11<sup>th</sup> grade was used. Previous studies evaluating SOC and problem behaviors have used measures of these no more than 2 years apart.

The growing body of research on adolescent use of SOC strategies demonstrates consistent associations with positive youth development indicators. As adolescents identify and commit to goals, engage in ways to reach those goals, they are more fully engaged in their lives, and begin to establish positive pathways for present and future opportunities. Given the necessity of taking action to reach one's goals, a measure of agency should include behavioral strategies used for goal attainment.

The preceding sections highlight three broad aspects of development that underpin agency. Motivation provides the drive to reach personal goals, cognition organizes thoughts and plans, and behavior is the action taken to reach those goals. Agency is characterized by regularly and actively harnessing and focusing motivational, cognitive, and behavioral resources and strategies. Conceptually, agency may be comprised of at least these three dimensions, each of which is a necessary component for individuals to behave agentially and for agency to have positive developmental consequences.

### **Construct Validity of a Brief Measure of Adolescent Agency**

A brief measure of adolescent agency was developed that was informed by the above three dimensions. The measure is comprised of nine items with three items each per dimension. Evaluating the construct validity of this measure is the focus of this study. Construct validity in this study is focused on evaluating the extent to which the instrument adequately operationalizes the conceptual theory of agency presented above, and examining if the agency measure is associated with other measures in ways expected by theory and prior empirical evidence. The constructs used for exploring validity in this study (described in following sections) were

selected based on research from the fields of positive youth development and developmental psychology more broadly.

### **Factor Structure of Agency**

The first aim of this study is to evaluate construct validity by examining the factor structure of the agency construct. This step includes testing a single-factor, a two- and three-factor model, and a second-order factor model, and examining how items load onto the factor(s). The factor pattern will demonstrate if the three dimensions organize as a unified structure, or if they are differentiated functions. Examining item loadings will reveal relations among items and the extent to which the items hang together as indicators of agency or dimensions of agency. Taken together the factor pattern and item loadings will indicate how well the measure as a whole operationalizes the conceptual model.

### **Assessing Equivalence Across Gender**

One common and mistakenly held assumption in psychosocial research is that instruments function similarly across different groups (Byrne, 2008). However, this assumption is rarely verified through statistical analysis. To understand the proper usage of this agency measure it is necessary to establish whether its measurement differs by gender. Therefore, the present study will examine whether the instrument operates in the same manner for female and male youth, and if the latent agency construct has the same structure and associations with the proposed validity variables.

According to Byrne (2008) measurement equivalence is concerned with observed variables, their links to unobserved variables, and observed variables' errors. Structural equivalence focuses on unobserved variables, and evaluates relations among the factors and regression paths in structural models (Byrne, 2008). In this study, the key parameters of interest in terms of invariance are the factor pattern of the agency measure, the factor loadings of the agency measure (i.e., weak factorial invariance), the error variance of observed variables, and agency correlations with validity constructs.

Invariance in these parameters would indicate that the instrument is (1) measuring the same latent variable for both males and females, (2) that the factor structure is the same for both groups, (3) unexplained variance in the items is not systematically different between genders, and (4) agency is associated with other constructs in the same ways for both boys and girls.

In order to establish support for the construct validity of the agency measure, the second aim of this study will be to examine the measure's associations with constructs described in the preceding sections and whether they vary by gender. Agency is hypothesized to be positively associated with self-concept, life skills, family processes, negatively associated with poor adaptation, and unassociated with household resources.

### **Agency and Self-Concept: Self-Esteem, and Future Perspective**

Agency, as proposed in this study, is a global orientation that a youth has toward the opportunities and obstacles that arise over the course of development. Youth can experience and exercise agency by directing life choices and outcomes. As a result of this empowered orientation a youth is likely to develop a positive sense of self-esteem. Preliminary research has

demonstrated that agency and self-esteem are associated. For instance, Hitlin and Elder (2006) demonstrated agency to very strongly predict self-esteem ( $\beta = .86$ ). Although the measure of self-esteem used in their study was a combination of proxy items available in the Add Health (1997) dataset, their finding supports the hypothesis that these constructs should be positively associated.

In their modeling of agency, Hitlin and Elder (2006) argued that a future-oriented, temporal orientation is an essential aspect of agency. In their study this future orientation was operationalized as optimism, using Add Health (1997) data. Optimism refers to one's outlook on life wherein generally positive outcomes are expected by the optimist in the future and across the life course (Peterson, 2000). Optimism, according to their model, reflects a long-term view of one's life chances (Hitlin & Elder, 2006, 2007).

In contrast to the Hitlin & Elder (2006) model, the model hypothesized in this study proposes that such a perspective would be associated with, or a result of, higher levels of agency but is not necessarily a factor that makes up agency. Rather, I suggest that a future-focused construct that reflects both optimism and clarity of future goals is likely to be a consequence of experiencing and exercising agency. The dimensions in the conceptual model of agency are intended to represent fundamental aspects that are necessary for agency to be exercised. Conceptually, optimistic, future-oriented constructs are most closely related to self-efficacy but differ in that they include anticipation of a positive outcome in particular. Where self-efficacy is focused on one's belief about one's ability to bring about a specific outcome (Bandura, 1989) optimism emphasizes the belief that things will generally go well. Agency does not require an optimistic perspective in order to be exercised, any more so than a realistic perspective would be

necessary. However, exercising agency may then lead to an optimistic perspective. Therefore agency and future perspective are hypothesized to be positively associated.

### **Agency and Life Skills: Problem-Solving, and Assertiveness**

Agency is likely to be manifested in specific behavioral strategies like problem-solving and assertiveness. Theoretical and empirical research on social competence has indicated that problem-solving and assertiveness are essential for youth competence (Durlak et al., 2007). Social skills training for youth often includes an emphasis on problem-solving and assertiveness, which impact important aspects of development (e.g., stress coping, aggressive behavior) and can be maintained for at least a year or longer (Weissberg, Caplan, & Harwood, 1991). Problem-solving is negatively related to delinquent behavior, whereas problem-avoiding is related to higher levels of adolescent depression (Kort-Butler, 2009). Assertiveness has been operationalized in a general form (e.g., asking for directions) and in problem-specific form (e.g., ATOD refusal assertiveness). At some point, agency requires taking action, and action can be manifested in behavioral skills such as problem-solving and assertiveness. As such, significant positive associations between agency and these skills are hypothesized.

### **Agency and Poor Adaptation: Internalizing/Externalizing**

Agentic youth may be less likely to exhibit adaptation problems, like internalizing and externalizing. Internalizing and externalizing are maladaptive behaviors used for dealing with stressors and solving conflicts. Externalizing appears in toddlerhood and declines as children

develop additional capacities for communication and self-control (Coie, Dodge, & Damon, 1998). In contrast, internalizing increases over development, and may be due to increases in cognitive capacities that enable anticipation of negative or depressive events (Fanti & Henrich, 2012).

If a youth is agentic and therefore has the ability to make decisions and take actions to shape his or her life, it follows that the youth is less likely to need to resort to delinquency or aggression, or to withdraw and become isolate. To this end, intervention programming designed to address internalizing and externalizing in children focuses on social skills and problem-solving training (life skills hypothesized to be associated with agency). A school-based program that emphasized life skills training was delivered to children with internalizing and externalizing symptoms and their parents. Children in the program demonstrated reductions in both areas at one-year follow-up (Weiss, Harris, Catron, & Han, 2003). These findings provide preliminary but extrapolated support for the hypothesis that agency and internalizing/externalizing may be associated. Of interest to this study is to examine whether an association exists between agency and internalizing/externalizing, and to what extent, with the understanding that other processes may intervene between agency and these behaviors. As a preliminary exploration in this study, agency is hypothesized to be inversely associated with these measures of maladaptive behaviors.

### **Agency and Family Processes: Family Adaptability, and Family Cohesion**

Research on the family context and youth development suggests that some family processes may support the development of agency. Family cohesion and adaptability research findings have demonstrated that these processes are associated with more adaptive youth



functioning, and may support the development of youth agency (Dishion, Nelson, & Bullock, 2004). Family cohesion enables youth to feel connected to the family. Connectedness, in turn, is central to the development of intrinsic motivation (Deci & Ryan, 1985), which is an essential dimension of the agency model proposed.

Adaptability within the family enables youth to have a sense of personal autonomy and influence within the family system (McElhaney, Allen, Stephenson, & Hare, 2009). Research on child self-efficacy in the parent-child relationship has demonstrated that parental adaptive communication significantly predicted child efficacy in the relationship (Caprara, Pastorelli, Regalia, Scabini, & Bandura, 2005). Adaptability within the family system lead to increased self-efficacy, which is a core element of the cognitive dimension of the proposed model of agency.

Preliminary support for an association between family context and agency comes from the Hitlin & Elder (2006) study which demonstrated that family social support was the strongest predictor of agency relative to support from adults, teachers, and friends. Therefore, this study hypothesizes that family characteristics that enable youth to feel a sense of cohesion with family members and a sense of flexibility likely support or promote agency in adolescents (Leffert et al., 1998). In this study agency is expected to be significantly and positively associated with family adaptability and cohesion.

### **Agency and Household Resources: Socioeconomic Status, and Financial Stress**

Although research suggests that some family processes support agency development, research on household characteristics suggests some aspects of the household context may be unrelated to youth development of agency. Research on both SOC and growth-conductive

experiences has demonstrated that neither depends on higher social class or household income (Bowers et al., 2011; Hektner, 2001).

For example, four trajectories of SOC development were identified from 5<sup>th</sup> to 11<sup>th</sup> grade (Bowers et al., 2011). The findings identified that membership in the SOC trajectories was not related household structure (i.e., single parent) or household income (Bowers et al., 2011). However, in a different study on growth-conducive experiences (measured by intrinsic motivation, goal-directedness, and concentration), youth with lower community social class experienced significantly higher levels of growth conducive experiences (Hektner, 2001) relative to their higher social class peers. That is, youth from homes and communities with fewer resources were more frequently involved in productive activities and active leisure.

Taken together, findings across these studies suggest that the development of agency may not depend on the availability of financial or educational resources within the household or community, or may be inversely related to available resources. Household context measures used in the present study seek to establish that the agency measure is not associated with the availability of social or financial capital (through the benefits that accrue from them). Therefore, the agency measure is expected to have a small, non-significant association with measures of social economic status (measured by income and education) and financial strain.

### **Examining Incremental Validity**

Fundamentally, a new instrument should demonstrate added value to the related field of research. This added value is called incremental validity, and is defined as the “degree to which a

new scale enhances predictions of a criterion variable beyond scores from previously available measures” (Snyder, 2005, p. 66). This added value can be determined by the significance of change in the  $R^2$  in hierarchical regression models. For example, the incremental validity of the Children’s Hope Scale (CHS; Snyder, 2005) was evaluated in a model predicting achievement scores with perceived self-worth. Step one of the analyses regressed achievement onto perceived self-worth, and step two added the CHS to the predictive model. The addition of the CHS to the model increased the  $R^2$  by .18 ( $p < .001$ ). This ability to account for additional variance in achievement scores demonstrated the incremental validity of the CHS measure.

The potential value of this measure of agency is its ability to contribute to predictions of desired and risk outcomes in adolescents above and beyond existing measures. This study will begin a preliminary exploration of the agency measure’s incremental validity with measures of lifetime alcohol and cigarette use, school and life satisfaction, antisocial behavior, and internalizing, and externalizing behaviors. The predictive models are based in risk and protection and positive youth development theories. The constructs of interest in these analyses are briefly discussed below.

### **Risk Attitudes and Agency Predicting ATOD Use**

The first model of interest draws upon the theory of planned behavior (TPB; Azjen, 2002) to predict ATOD use. This theory articulates three types of beliefs that predict intention to take action: behavioral beliefs, normative beliefs, and control beliefs. These beliefs produce an attitude toward the behavior in question, a perceived norm about the behavior, and perceived difficulty of carrying out the behavior (Azjen, 2001). These beliefs have been shown to

longitudinally predict amount of alcohol and tobacco use in college undergraduate students. Specifically, perceived behavioral control demonstrated consistent and significant ability to predict amount of alcohol and tobacco use six months after beliefs and intentions were measured (McMillan & Conner, 2003).

Following the theory of planned behavior framework, the present study will model youth beliefs in their ability to refuse offers to use substances, to refuse a friend's offer of an alcoholic drink, and their perception of the risk of harm of trying and using cigarettes, alcohol, and marijuana. The measures selected are not a true representation of the theory but were selected based on its conceptual framework.

In the first step, these beliefs will be examined as predictors of youth report of lifetime alcohol and cigarette use. At the second step agency will be added to the model to examine if the agency measure significantly adds predictive value to the model. The goal of this analysis will be to examine the role of agency, conceptualized here as global orientation that may function as a protective factor, relative to specific substance use beliefs and attitudes that have been shown to be associated with substance use. This set of analyses is intended to be an exploratory investigation into whether agency is similarly predictive of substance use as risk attitudes.

### **Positive Youth Development Indicators and Agency Predicting Life Satisfaction, School Satisfaction, Antisocial Behavior, and Internalizing/Externalizing Behaviors**

The next models of interest follow a positive youth development framework that examines youth assets in predicting positive and risk outcomes. Developmental assets have predicted thriving in youth, and agentic assets in particular (such as planning, decision-making)

have contributed to school success, physical health, and overcoming adversity (Scales, Benson, Leffert, & Blyth, 2000). For the purposes of continuing to examine the incremental validity of the agency measure, problem-solving, assertiveness, and self-esteem were selected as relevant developmental assets for inclusion in models that predict life satisfaction, school satisfaction, antisocial behavior, and internalizing and externalizing. These outcomes have been associated with developmental assets such that the more assets are present the more likely youth are to be satisfied with their lives and school, and the less likely they are to exhibit antisocial or maladaptive behaviors (Leffert et al., 1998). As described in previous sections, these assets are also hypothesized to be associated with, but distinct from, agency. Therefore, we would expect for these assets and agency to uniquely contribute to predicting the outcomes of interest.

### **The Present Study**

The present study aims to evaluate the measurement properties of a 9-item measure of adolescent agency. The measure was designed to tap intrinsic motivation, cognitive, and behavioral strategies of agency, with 3 items for each dimension. This measure of agency was included in a study focused on youth adaptation and well-being. To address possible bias arising from solely using youth self-report measures, variables included in research questions 2.2 and 2.3 include items that parents/caregivers answered.

Table 1 shows each research question, and corresponding hypotheses, variables, and analytic approach.

### **Research Questions and Hypotheses**

There are three research questions and corresponding hypotheses that guide this study.

**RQ 1:** How well do the data in this study fit a conceptual model of agency that is made up of three dimensions? What is the underlying factor structure of this measure? Does its measurement vary by gender?

*Hypothesis 1:* The three distinct dimensions of agency will be strongly correlated.

Agency will function similarly for both youth genders.

**RQ 2.1:** To what extent does the agency measure demonstrate positive associations with youth report of self-esteem, problem solving, assertiveness, future perspective? Do structural associations between constructs vary by gender?

*Hypothesis 2.1:* Agency will demonstrate significant, positive associations with these self-concept and life skills constructs. Agency will function similarly for both youth genders.

**RQ 2.2:** To what extent does the agency measure demonstrate strong, positive associations with constructs of youth adaptation and family processes? Do structural associations vary by gender?

*Hypothesis 2.2:* Agency will demonstrate significant, negative associations with internalizing and externalizing, and significant positive associations with family adaptability and cohesion. Agency will function similarly for both youth genders.

**RQ 2.3:** To what extent does the agency measure demonstrate the absence of a strong, significant association with measures of household context? Do structural associations vary by gender?

*Hypothesis 2.3:* Agency will demonstrate small, non-significant associations with SES and financial strain. Agency will function similarly for both youth genders.

**RQ 3.1:** To what extent does the agency measure significantly explain additional variance in models predicting lifetime use of alcohol and cigarettes after refusal of peers, refusal of ATOD, and perceived ATOD risk are entered into the model?

*Hypothesis 3.1:* Agency will significantly explain additional variance in the model.

**RQ 3.2:** To what extent does the agency measure explain additional variance in models predicting life satisfaction, school satisfaction, antisocial behavior, internalizing, and externalizing after problem-solving, assertiveness, and self-esteem are entered into the models?

*Hypothesis 3.2:* Agency will significantly explain additional variance in the models.

Table 1

*Summary of proposed study research questions, hypotheses, variables, and analyses.*

<b>RQ#</b>	<b>Research Question</b>	<b>Hypothesis</b>	<b>Variables</b>	<b>Analyses</b>
1	How well do the data in this study fit a conceptual model of agency that is made up of three dimensions? What is the underlying factor structure of this measure? Does measurement vary by gender?	The three distinct dimensions will be strongly correlated.	<i>Youth report</i> 9 Agency Items Gender	CFA
	<i>To what extent does agency demonstrate construct validity through:</i>		<i>Youth report:</i>	SEM
2.1	Positive associations with measures of youth problem solving, future perspective, self-esteem, assertiveness?	Agency will be positively and significantly associated with self-concept and life skills.	Gender Self-esteem Problem solving Assertiveness Future perspective	
2.2	Negative associations with internalizing/externalizing, and positive associations with family adaptability/cohesion?	Agency will be negatively associated with youth maladaptation, positively associated with family processes.	Internalizing (P, Y) Externalizing (P, Y) Family adaptability (P, Y) Family cohesion (P, Y)	
2.3	Lack of association with measures of household context?	Agency measure should not be significantly associated with household financial strain or SES.	Financial strain (P) SES (P)	
3.1	To what extent does the agency measure significantly explain additional variance in models predicting lifetime use of alcohol and cigarettes?	The agency measure will significantly explain unique variance in these models.	<i>Youth report:</i> Peer refusal ATOD refusal Perceived ATOD risk Gender	Hierarchical multiple logistic and linear regression
3.2	To what extent does the agency measure significantly explain additional variance in models predicting antisocial behavior, internalizing externalizing, life satisfaction, and school satisfaction?		Problem-solving Assertiveness Self-esteem Gender	

*Note:* (P) = parent report, (Y) = youth report, CFA = confirmatory factor analysis, SEM = structural equation model.



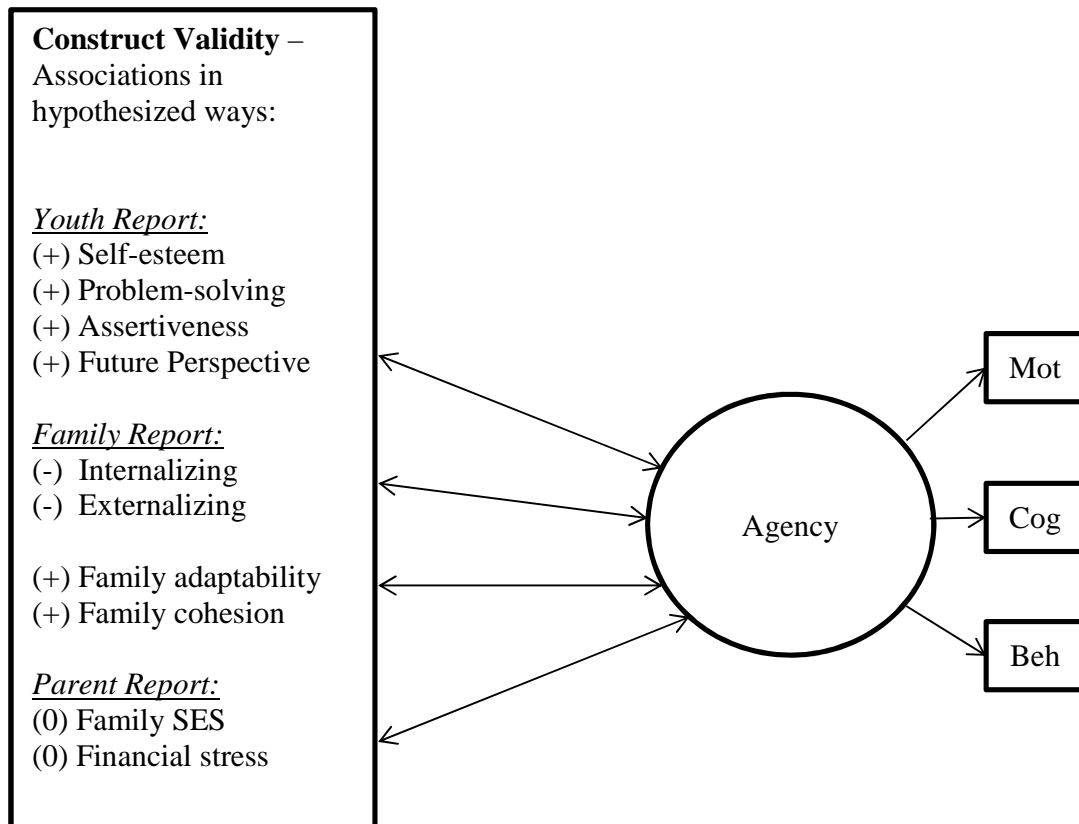


Figure 1. Conceptual summary of construct validity variables and hypothesized associations.

(+) = positive association hypothesized, (-) = negative association hypothesized, (0) = absence of association hypothesized. Beh=behavior, Mot=motivation, Cog=cognition.

## METHODS

### Research Study

Data for this study were collected as part of a larger project evaluating the effectiveness of an adaptation of the Strengthening Families Program: For Parents and Youth 10-14 (SFP 10-14; Molgaard & Spoth, 2001). Families with youth in 6<sup>th</sup> or 7<sup>th</sup> grades were recruited to participate in a research project being conducted in rural and urban communities in Pennsylvania. Participants were recruited through letters for parents sent home with the youth, information sessions held by research staff during homeroom times, on back-to-school nights, and days of school wide parent-teacher conference days. Families who agreed to participate in the research project were randomly assigned to one of three conditions, 1) control, 2) SFP 10-14, or 3) adapted SFP 10-14. The research protocol was approved by the Institutional Review Board of The Pennsylvania State University.

All families in the research project were compensated for their time through store gift cards delivered at pre-test, post-test, and 1-year follow-up. Parents were provided gift cards in the amount of \$50, \$70, and \$85 for each respective time point. Youth were provided gift cards in the amounts of \$25, \$30, and \$40.

The programs were offered once per semester in the Spring and Fall semesters beginning Spring 2010 (i.e., Cohort 1). Cohort 1 was run in a rural, university town in Pennsylvania. Beginning with Cohort 2 a rural school district nearby was included in the research study. Beginning with Cohort 3, two school districts from one urban area were included. Thus, from

Cohort 3 through the sixth and final cohort the project was conducted across four school districts (two rural, two urban) in Pennsylvania.

## **Participants**

Participants were families who had at least one youth in 6<sup>th</sup> or 7<sup>th</sup> grade in one of four school districts in rural and urban areas in Pennsylvania. Participating families agreed to be randomly assigned to one of the three conditions; original SFP, the adapted version, or a home study control. Families who were assigned to the program conditions were encouraged to have both parents/caregivers of the youth to attend the weekly sessions. Data for this study were drawn from the sample of youth and parent participants from the first five cohorts.

Data from 390 youth in 6<sup>th</sup> and 7<sup>th</sup> grade were used for the present study, along with data from 361 mother/female caregivers and 150 father/male caregivers. Of the youth 54% ( $n=212$ ) were female. Race representation of youth in this sample was as follows: 72% ( $n=281$ ) White, 13% ( $n=50$ ) Black, 4% ( $n=16$ ) Asian, 5% ( $n=19$ ) multi-racial, 5% ( $n=21$ ) other, and <1% ( $n=3$ ) Native American. Representation across races was similarly distributed for mothers and fathers. At baseline measurement, youth participants ranged in age from 10-14, with a mean age of 12.13 years. Only baseline data are used in this study.

## **Measures**

Data used in this study were collected prior to the beginning of the program sessions. Youth and parents each completed surveys mailed to the home, and surveys administered during

an in-home visit by research staff. Research staff read survey questions aloud if literacy issues were indicated. Descriptions of each measure are provided below and all alphas reported are from the present study.

### **RQ 1. Confirmatory Factor Analysis of Agency Measure**

*Adolescent agency* was measured with a shortened version of an original pilot measure (Bradley, 2010). Using factor analysis on data from the preliminary validity study, 9 of 15 items were retained for use in this study. The shortened version included 3 items each for how often youth engage motivation, cognitive, and behavioral dimensions of agency (Bradley, 2010). Responses were on a 4-point Likert scale of 1-4, and corresponded to “Never”, “Sometimes”, “Usually,” and “Always”. This measure is used in all research questions. Table 2 shows all items in the measure and their intended dimensions. Assessing the structure and psychometric properties of the measure is the focus of the study and is therefore presented in the results section.

### **RQ 2. Agency Associations with Validity Constructs**

*Self-esteem* was measured using the 9-item Rosenberg Self-Esteem Scale (Rosenberg, 1965). An example item is “I feel that I have a number of good qualities”. All items had a 5-point Likert scale from 0 – 4, ranging from “Strongly Disagree” to “Strongly Agree”. Alpha reliability on this instrument was  $\alpha = .83$ .

*Future perspective* was measured with an 8-item instrument designed to tap clarity of future goals and optimism towards the future (Sharp & Coatsworth, 2012). An example clarity item is “I really know what I have to do to reach my future goals”, and an example optimism item is “I think that my plans for the future will progress in the best possible way”. Response options were on a 5-point Likert scale from 0 – 4, ranging from “Completely Disagree” to “Completely Agree”. Alpha reliability on this instrument was  $\alpha = .92$ .

*Problem solving* was measured with a 5-item instrument (Redmond et al., 2009) to assess the extent to which youth use decision-making skills. The questions were preceded by the stem “When you have a problem, how often do you do the following things?” Example items include “Think about which of the choices is best” and “Think about the possible consequences of each choice”. The response scale was a 5-point Likert scale of 0-4 ranging from “Never” to “Always”. Alpha reliability on this instrument was  $\alpha = .88$ .

*Assertiveness* was measured with a 6-item instrument designed to measure aspects of social confidence and assertiveness (Griffin et al., 2006; Trudeau et al., 2003; Wills et al., 1989). An example social confidence item asks how likely the youth would be to “ask a teacher to explain something that you don’t understand”. An example assertiveness question asks how likely the youth would be to “ask for directions if you don’t know where you are”. The response scale was a 5-point Likert scale from 0 – 4, ranging from “Definitely would not” to “Definitely would”. Alpha reliability on this instrument was  $\alpha = .73$ .

*Internalizing and externalizing behaviors* were measured using the Child Behavior Checklist (CBCL) using both parent and youth report (YSR) versions (Achenbach, 1991). This instrument contains items designed to measure four types of internalizing or externalizing behaviors. Two subscales of externalizing were measured (CBCL alphas listed as female

caregiver/male caregiver): aggressive behavior (YSR: 17 items,  $\alpha = .86$ , CBCL: 17 items,  $\alpha = .67/.70$ ) and rule-breaking behavior (YSR: 15 items,  $\alpha = .88$ ; CBCL 19 items  $\alpha = .89/.89$ ). Two subscales of internalizing were measured, anxious/depressed (YSR: 13 items,  $\alpha = .85$ ; CBCL 13 items  $\alpha = .82/.80$ ), and withdrawn/depressed (YSR: 8 items,  $\alpha = .77$ ; CBCL: 8 items,  $\alpha = .83/.85$ ). The response scale for all items was 0-2, ranging from “Not true” to “Very true or often true”. Example YSR items include “I argue a lot” (aggressive behavior), “I drink alcohol without my parents’ approval” (rule-breaking behavior), “I cry a lot” (anxious/depressed), and “I am too shy or timid” (withdrawn/depressed). Items on the CBCL included the same content areas, asked with the stem “How true is each of these for your child in the study now or within the past 6 months?”

*Family adaptability and cohesion* was measured using youth, mother, and father report on the Family Adaptability and Cohesion Evaluation Scales II (FACES II; Olson, Portner, & Bell, 1982). The cohesion subscale of FACES II consisted of 15 items (alphas listed as youth/female caregiver/male caregiver) ( $\alpha = .85/.89/.86$ ). An example cohesion item is “Family members know each other’s friends”. The adaptability subscale consisted of 14 items ( $\alpha = .82/.79/.77$ ). An example adaptability item is “Our family tries new ways of dealing with problems”. Response options for all items were on a 5-point Likert scale of 0 to 4, ranging from “almost never” to “almost always”.

Socioeconomic status (SES) was measured as a composite of household income and parental education. *Household income* was measured based on responses to a question outlining the many types of income a household may have (e.g., alimony, disability, investment income, etc.). Mothers and fathers were asked to report total household income before taxes either by year, by month, or by week. If both parents responded then an average of their answers was used.

For SEM analysis the responses were recoded to a 7-point Likert scale representing annual household income: 1 = < \$10,000 and 7 > \$90,000. Median household income was \$26,000, captured in the Likert scale as a 3.

*Caregiver education* was measured by asking mothers and fathers one item with a response scale from 1 to 7, ranging from “Less than 7<sup>th</sup> grade” to “Graduate training”. This item was recoded to a 1 to 5 scale that consolidated three categories that reflected lower than high school level education, where 1 was less than high school and 5 was graduate training.

*Income and financial stress* was measured with the Conger & Elder (1994) instrument measuring three aspects of financial strain within the family described below. Mothers and fathers responded to these items. *Perceived material need* was measured with 4 items (alphas listed as female caregiver/male caregiver) ( $\alpha = .92/.91$ ), on a 5-point Likert scale of 0 to 4, ranging from “Strongly Disagree” to “Strongly Agree”. An example item is “We have enough money to afford the kind of clothing we should have”. *Felt financial constraint* was measured with 3 items ( $\alpha = .91/.86$ ). An example item is “During the last 12 months, how much difficulty have you had paying your utility bills?” Response options were on a 5-point Likert scale of 0 to 4, ranging from “No difficulty at all” to “A great deal of difficulty”. *Financial concerns* were measured with 3 items ( $\alpha = .85/.82$ ). An example item is “My financial situation is much worse than it was in the previous 12 months”. Response options were on a Likert scale of 0 to 4, ranging from “Strongly Disagree” to “Strongly Agree”.

### **RQ 3. Incremental Validity**

*Peer refusal* was measured with 6 items about youths' ability to refuse a friend's offer of an alcoholic drink by using different strategies. Response options were on a 4-point Likert scale of 0 to 3, ranging from "Very unlikely" to "Very likely". The question stem was "If you were with a group of your friends and one of them offered you an alcoholic drink, how likely would you be able to do each of these things...", and an example strategy is "just refuse it and walk away". Alpha reliability on this instrument was  $\alpha = .75$ .

*ATOD Refusal* was measured with 5 items, 1 each for cigarettes, alcohol, marijuana, hard drugs, and inhalants. Response options were on a 4-point Likert scale of 1-4 ranging from "Definitely would not say no" to "Definitely would say no". The question stem was "How likely are you to say "no" when someone tries to get you to..." and an example item is "smoke marijuana or hash". Alpha reliability on this instrument was  $\alpha = .98$ .

*Perceived ATOD risk* was measured with 6 items about the perceived risks of trying and regularly using substances. These items were adaptations of items in the Add Health survey. Response options were on a 3-point Likert scale of 1-3 ranging from "No risk" to "Great risk". The question stem was "How much do you think people risk harming themselves (physically or in other ways) if they...", and example items are "try cigarettes once or twice" and "smoke cigarettes almost every day". Alpha reliability on this instrument was  $\alpha = .94$ .

*Lifetime alcohol and cigarette use* was measured with 1 item for each substance: "Have you ever drunk more than just a few sips of beer, wine, wine coolers, whiskey, gin or other liquor without your parents' permission?", and "Have you ever smoked a cigarette?". Response options were binary, "Yes" or "No".



*Adolescent agency, adolescent assertiveness, problem—solving, self-esteem, and internalizing, and externalizing* were measured with instruments described for RQ2 section above.

*Life satisfaction* was measured using 7 items that assess overall life satisfaction for children and adolescents (Huebner, 1991). Response options were on a 5-point Likert scale of 0-4 ranging from “Strongly disagree” to “Strongly agree”. An example item is “I have what I want in my life”. Alpha reliability on this instrument was  $\alpha = .86$ .

*School satisfaction* was measured with 7 items. Response options were on a 5-point Likert scale of 0-4 ranging from “Not at all true” to “Really true”. An example item is “I like being in my school”. Alpha reliability on this instrument was  $\alpha = .74$ .

*Antisocial behavior* was measured with 17 items that tap frequency of physical and non-physical aggression, and delinquency behaviors (Farrell, Kung, White, & Valois, 2000). Response options were on a 5-point Likert scale of 0-4 ranging from “Never” to “More than five times”. The question stem was “During the past 12 months, how many times have you...” Example items are “Put down someone to their face”, “Thrown objects such as rocks or bottles at people to hurt or scare them”, and “Shoplifted something from a store”. Alpha reliability on this instrument was  $\alpha = .82$ .

### **Analytic Plan**

The aim of the first research question was to identify the best fitting measurement model of agency and its underlying factor structure. Two-group confirmatory factor analysis (CFA) was used to address this research question and to test for structural invariance between males and females. This analysis tested whether the data supported a three dimensional model of agency.

The dimensions of agency are hypothesized to be integrated; therefore, high correlations among them were anticipated. Given the potential for high correlations, alternative models were tested, including a higher-order model and a one-factor model. The models were run in a two-group analysis to test for invariance between female and male youth.

For research question 2, structural equation modeling (SEM) was used. RQ2 addressed convergent validity by evaluating the extent to which positive associations existed between the agency construct and other constructs hypothesized to converge with this measure (e.g., problem-solving, assertiveness). Construct validity was examined using measures of youth adaptation, family processes, and household resources to determine the extent to which the agency measure is associated with these factors in ways predicted by theory.. For RQ 2 measures that included both youth and parent report were used to mitigate reporter bias in analyses. Analyses tested for model invariance by gender.

For SEM analyses, due to the large number of total items for self-esteem, future perspective, assertiveness, and problem-solving, parcels were created so that each latent construct had three manifest indicators which represented the mean of the items included in that parcel. This approach was taken because the nature of the study was focused specifically on the agency construct and its associations with other constructs and study goals did not include examining the structure of non-agency constructs' items (Little, Cunningham, Shahar, & Widaman, 2002). Items were parceled according to construct dimensions. For example, the assertiveness instrument includes assertiveness and social confidence subscales with 3 items each, so each parcel included an item from each dimension. Self-esteem parceled according to items of worth/respect. Parcels included equal distribution of reverse worded items. Future perspective parcels each included clarity and optimism subscale items.

The third research question asked if there was any added value in using the agency measure to understand positive and risk outcomes of adolescents. These analyses used hierarchical multiple regression and logistic regression to predict outcomes of interest. Variables selected based on theory were entered into the models at Step 1. In Step 2, the agency measure was added. The  $R^2$  change was examined in Step 2 to identify if the addition of agency accounted for a significant amount of additional variance in the outcomes. The first set of models had lifetime alcohol use and lifetime cigarette use as outcome variables, predicted by ATOD refusal, peer refusal, and perceived risk of ATOD experimentation/use. The second set of models had life satisfaction, school satisfaction, antisocial, internalizing, and externalizing behavior as outcomes. In Step 1 these were predicted by problem-solving, assertiveness, and self-esteem.

Table 2

*Agency instrument items*

	Dimension/ Item #	Item
A.	Beh1	I try to find ways to do things that are really important to me
B.	Mot1	I feel inspired to do things that interest me
C.	Cog1	I think about the steps I will need to take to get or accomplish the things I want
D.	Beh2	I take action to do the things I want to do
E.	Cog2	I am confident I can reach my goals
F.	Mot2	I like having a sense of purpose when I do things
G.	Mot3	I do things that I know will bring me satisfaction
H.	Cog3	I think of different ways to reach my goals
I.	Beh3	If I need it, I ask for help in order to reach my goals

*Beh=behavior. Mot=motivation. Cog=cognition.*

## RESULTS

The aim of this study was to empirically evaluate a theoretical model of agency that is made of the three dimensions of motivation, cognition, and behavior. First, this study examined the measurement model of a 9-item measure of agency, and tested several models of factor structures using confirmatory factor analysis. Next, construct validity was examined in a series of structural equation models that included measures of adaptation, self-concept, life skills, family processes, and household resources. Finally, hierarchical regressions were run to determine the incremental validity of using the agency measure in theoretically informed predictive models of ATOD use, life satisfaction, school satisfaction, and antisocial, internalizing, and externalizing behavior.

Table 3 provides a correlation matrix of all variables used in the analyses and Table 4 provides means, standard deviations, and N's for each variable.

### **Missing Data**

Missing data patterns were primarily associated with how data were collected. Due to the large number of survey items in this research trial two surveys were administered to each participant at each time point. For each participant, one survey containing half of the survey items was mailed to the family home for completion. Once completed, this survey was either mailed to the research office, collected by research staff during an in-home assessment, or in some cases returned to staff at SFP 10-14 sessions. The second survey containing the other half of the survey items was usually completed during an in-home assessment. Typically if a survey was filled out, it was filled out in its entirety. If data were missing it was most often because the

entire survey had not been collected or returned to research staff, or an in-home assessment was not done.

Constructs of interest for this study were present in both surveys. Because the agency instrument is the focus of the present study, cases were removed from the sample if data for the agency measure were missing completely. Of the 432 family data cases 42 (10%) had no data from the agency instrument. This resulted in 390 cases (212 female, 178 male) of data for the analyses in this study.

The confirmatory factor analysis, convergent, and divergent validity analyses were all conducted in LISREL 8.80 which employs full-information maximum likelihood (FIML) to determine parameter estimates in the case of missing data. Due to a large percentage of missing data of father report (62%) on family adaptability and cohesion, and father report on youth internalizing and externalizing, one dataset was imputed using NORM to impute missing data for these variables. Results did not differ in patterns or interpretation based on the FIML-only analyses compared to analyses using FIML with the NORM imputed dataset.

### **SEM Fit Indices**

It is well known that  $\chi^2$  is influenced by sample size wherein large sample sizes can produce a significant p-value for this statistic. Therefore, three additional fit indices were examined to evaluate model fit to the data: NNFI (Bentler & Bonnett, 1980), CFI (Bentler, 1990), and RMSEA (Browne & Cudek, 1993). Each of these additional indices is in the class of comparative fit indices where the fit of the proposed model is considered against the fit of an independence model, or against the fit of a perfect model.

The NNFI and CFI indices examine the model fit relative to the independence model. The independence model is the least constrained model that assumes no associations among the modeled variables (Tabachnick & Fidell, 2007). Nested models are a subset of this least constrained independence model, and represent increasing levels of constraints in the model. NNFI and CFI fit indices indicate improved model fit to the data relative to less constrained models. The minimum acceptable value of model fit for NNFI is .90, with values greater than .95 considered good fit (Bentler & Bonnett, 1980), and for CFI the lowest acceptable value is .92, with values greater than .96 considered good fit (Bentler, 1990).

In contrast, RMSEA examines lack of model fit relative to a perfect model. The perfect model represents a fully saturated model with zero degrees of freedom, and accounts for all possible effects within the model (Vogt, 2005). With RMSEA the lowest acceptable value is .08 (Browne & Cudek, 1993), and values of .06 or less indicate a good fitting model (Tabachnick & Fidell, 2007).

As additional constraints were added to the models the above fit indices were examined for acceptability. In order to identify if measurement invariance constraints were acceptable the significance of change in  $\chi^2$  was examined. A significant change in  $\chi^2$  would indicate that the proposed model was a poorer fit to the data and should not be accepted. A non-significant change in the  $\chi^2$  would indicate that the more constrained model did not represent a worse fit to the data than the less constrained model.

### **Results for RQ1 Confirmatory Factor Analysis**

Five models were to be examined to identify the best fitting factor solution: a one-factor, two-factor, three-factor, four-factor, and a second-order factor model. Analyses for the three-factor, four-factor, and second-order factor model yielded warnings of a non-positive definite (NPD) psi matrix, suggesting an especially poor-fitting model.

The problem of a NPD matrix is well-known for being difficult to resolve and typically occurs due to item collinearity, measure inconsistency, inadequate start values, or model misspecification (Ping, 2009). Multiple strategies were employed to resolve NPD status before determining this problem was arising due to a misspecified model. Based on trouble-shooting guidelines (Graham, 2002), the first steps taken were to run principal components analysis and multiple regression. Principal components analysis was used to determine if a negative eigenvalue was present; none was found. Multiple regression analysis was used to determine if parameter estimates were reasonable and non-zero, which they were. The data file and input variables were re-examined for collinearity issues (such as including the three motivation items and the motivation subscale) and none were found. Errors were allowed to correlate, which did not resolve NPD. Sample size was increased by using data from both genders combined which also did not resolve NPD psi matrix. Because the NPD warning was not present in the one-factor and two-factor models, and multiple strategies were attempted to resolve the warning, NPD was determined to be an issue of model misspecification for the three-factor, four-factor, and second-order models.

The one factor model was selected as the best model due to model fit indices  $\chi^2 = 70.32$  (63),  $p=0.25$ , RMSEA .02, NNFI=.99, CFI=.99, and parsimony. In this model, measurement invariance across gender was supported as demonstrated by a non-significant chi-square difference between the constrained and non-constrained models ( $\Delta\chi^2 = 7.44$  (9),  $p=.59$ ). All factor



loadings were positive and strong, ranging from .49 to .65. These loadings suggest that items are consistently tapping related concepts but are not highly redundant with other items in the measure (as would be indicated by higher factor loadings for all of the items). The one-factor solution aligns with prior exploratory factor analysis on this agency measure in a different sample of slightly older youth in 7<sup>th</sup> and 8<sup>th</sup> grades. Those findings also indicated a one-factor solution (Bradley, 2010). Alpha reliability on this instrument was  $\alpha = .82$ . Figure 2 shows the final CFA model.

The two-factor model demonstrated good fit to the data  $\chi^2 = 56.74 (52), p=0.23, RMSEA .02, NNFI=.99, CFI=.99$ , but varied by gender and represented a less parsimonious model. The two-factor model resulted in two latent factors: a motivation-type factor and a cognitive-behavior type factor. For female youth, the motivation-type factor consisted of the three motivation items and one cognitive and one behavioral item. For male youth, the motivation factor consisted of the three motivation items, and the remaining items comprised the cognitive-behavioral factor. The motivation and cognitive-behavior factors were highly correlated at .92 and .89 for girls and boys respectively. These two models are included in the Appendices A and B. The high inter-factor correlation and varying two-factor structure indicated the one-factor model as the more parsimonious solution.

Identifying a one-factor structure of agency supports the hypothesis that motivation, cognition, and behavior are salient aspects of agency, although they were not found to be discrete factors. This finding indicates that these aspects are so highly related that they can be considered a unified structure.

## **RQ2 Construct Validity Analyses**

Three main sets of analyses were run to examine construct validity of the agency measure through analysis of the agency measure's concurrent associations with other constructs. The first set examined convergent validity with positive youth development constructs based on youth report only. Constructs of interest were problem-solving, self-esteem, assertiveness, and future perspective (RQ 2.1). The second set of analyses examined agency's association with youth adaptation and family processes, using data from youth, mother, and father report. These analyses were designed to examine validity while reducing potential reporter bias. Constructs of interest included family adaptability and cohesion, and youth internalizing and externalizing behaviors (RQ 2.2). The last set of analyses examined agency's associations with indicators of household resources based on mother and father report only. The constructs of interest were socioeconomic status (SES) and financial strain (RQ 2.3). Following are details about each set of analyses and their results.

Findings are presented in Tables 5, 6, and 7. Figure 3 shows a validity continuum that ranges from fully divergent to fully convergent according to correlation size ( $r$ ), corresponding variance shared ( $r^2$ ) and unique variance ( $1-r^2$ ) (Bryant, King, & Smart, 2006), and effect size (Cohen, 1988). All variables used for analyses examining construct validity are mapped on this continuum for an overview of RQ 2 results.

### **Results for RQ 2.1 Agency, Self-Concept, and Life Skills**

The model for RQ 2.1 examined the latent agency construct's correlations with self-esteem, problem-solving, assertiveness, and future perspective latent factors in an SEM

framework. The correlations between agency and each construct were positive, and significant, ranging from .43 to .55, all  $p < .0001$  (see Table 5 and Figure 4). Correlations with agency were: self-esteem ( $r = .51$ ), problem-solving ( $r = .55$ ), assertiveness ( $r = .43$ ), and future perspective ( $r = .45$ ). Correlations of  $r > .50$  indicate a large effect size (Cohen, 1988). The constructs in this analysis share 18 to 30 percent of variance with the agency measure. Factor loadings were all strong and positive for each construct, ranging from .49 to .92. Invariance of observed variable errors was not supported as indicated by a significant chi-square difference ( $\Delta\chi^2 = 32.42$  (21),  $p = .05$ ). The final model demonstrated invariance of factor loadings and correlation coefficients, and demonstrated acceptable fit to the data,  $\chi^2 = 550.11$  (389),  $p = 0.00$ , RMSEA = .05, NNFI = .95, CFI = .95.

These results demonstrate that agency is associated with, but distinct from, other positive self-concept and life skills. The findings also indicate that these associations do not differ by youth gender. Although reporter bias towards positive self-appraisal may be attributed to the high correlations between agency and the other constructs, the absence of correlated errors across constructs suggests bias may not be interfering with the results (Byrne & Shavelson, 1996; see the next section for further discussion of correlated errors). Due to the strong, positive, and statistically significant correlations, findings for this research question demonstrated the agency measure's convergent validity with self-concept and life skills constructs.

### **Results for RQ 2.2 Agency, Youth Adaptation, and Family Processes**

This model examined the concurrent associations between agency and two broad dimensions of behavioral functioning and two family processes of family adaptability and

cohesion. For each reporter, a manifest variable was created that represented the mean of that reporter's answers on the construct of interest. Then each manifest variable, one each for youth, mother, and father were used as 3 indicators of the latent construct. For example, the mean of each reporter's responses was calculated for the CBCL internalizing scale. This resulted in three manifest items: mean of youth report about own internalizing, mean of mother report about youth internalizing, and mean of father report about youth internalizing. These items were then used as indicators of the latent internalizing construct.

Based on modification indices, errors across each reporter's manifest variables were allowed to covary between internalizing and externalizing factors, and adaptability and cohesion factors. For example, the error of youth report of internalizing was allowed to correlate with the error of youth report for externalizing, and error of mother report of adaptability was allowed to correlate with error of mother report of cohesion. Correlated errors are not uncommon in psychosocial research, and represent error that occurs in systematic rather than random ways (Byrne & Shavelson, 1996). Such errors can result from bias in responding (e.g., response patterns, social desirability, nay-saying, etc.). The correlated errors in these data may be due to differences in reporter biases to each construct.

Invariance of factor loadings and error variances was supported by the model as represented by the non-significant change in  $\chi^2$  for both model constraints ( $\Delta\chi^2=8.2$  (16),  $p=.94$ ;  $\Delta\chi^2=37.4$  (28),  $p=.11$ ) respectively. Figures 5 and 6 show the full models for female and male youth respectively. The factor loadings for the internalizing (INT) and externalizing (EXT) factors were all positive. Item loadings for the youth report variables were the lowest at .27 and .37, mother report for both factors had the highest factor loadings of all reporters, with loadings of .78 and .91 respectively.

Constraining factor correlations to be invariant produced a p-value of the chi-square difference that approached significance ( $\Delta\chi^2=18.41$  (11),  $p=.07$ ). Therefore, the factor correlations were allowed to vary by gender. Correlation coefficients from the SEM solution are shown in Table 6 organized by female and male youth. The strength and significance of correlations between agency, internalizing, and externalizing were stronger for male youth than for female youth. Results for female internalizing and externalizing respectively were  $r = -.15$ , ns, and  $r = -.17$ ,  $p < .05$ . These correlations reflect a small effect size and indicate 2 and 3 percent of shared variance with agency. Results for male internalizing and externalizing were  $r = -.41$ ,  $p < .001$ , and  $r = -.26$ ,  $p < .001$ . These correlations represent a medium effect size, and the constructs account for 17 and 7 percent of shared variance with the agency instrument respectively. Overall correlation strengths were lower than anticipated; however these results provide support for the construct validity of the agency measure due to the three significant correlations in the hypothesized direction.

Family adaptability and cohesion were significantly correlated with agency for both genders. Correlations between male agency and family adaptability was  $r = .21$ ,  $p < .05$ , between agency and family cohesion was  $r = .23$ ,  $p < .05$ . These correlations accounted for 4 and 5 percent of shared variance and represent a small to medium effect size. The correlation between female agency and family adaptability was  $r = .19$ ,  $p < .05$ , indicating 4 percent shared variance and a small to medium effect size. The strongest and most significant correlation was with female agency and family cohesion,  $r = .38$ ,  $p < .001$ , indicating 14 percent shared variance and a medium effect size. Although most correlations were lower than anticipated, these results provide some support for the construct validity of the agency measure due to the statistically significant correlations in predicted directions. This model demonstrated acceptable fit to the

data  $\chi^2=720.37$  (396),  $p=0.00$ , RMSEA .07, NNFI=.93, CFI=.93. Full results are shown in Table 6. Figure 5 shows the model for female youth and Figure 6 shows the model for male youth.

The use of youth, mother, and father report in this research question mitigated some potential of reporter bias inherent to using data from a single reporter. Findings from this research question provided preliminary support for the agency measure's construct validity as it relates to youth adaptation and family process constructs.

### **Results for RQ 2.3 Agency and Household Resources**

This model examined SES and financial strain correlations with agency. These factors were hypothesized to show weak and statistically non-significant associations with the agency measure. The data supported this hypothesis. The correlations between SES, financial strain, and agency were small and not significant (SES:  $r = .10$ ,  $p=.20$ ; financial strain,  $r = -.09$ ,  $p=.14$ ). These correlations share about 1 percent of variance with agency and indicate a small effect size. Invariance of errors was not supported as indicated by a significant p-value in the chi square change ( $\Delta\chi^2 = 40.86$  (26),  $p = .03$ ), however data supported invariance of factor loadings and correlations across gender. This model demonstrated acceptable fit to the data  $\chi^2=413.38$  (269),  $p=0.00$ , RMSEA .05, NNFI=.97, CFI=.97. Table 7 and Figure 7 show results for the final model.

### **Incremental Validity Indices**

Incremental validity can be established by examining if the addition of the measure of interest into a model that already includes meaningful predictors significantly accounts for additional variance in the dependent variable. In linear regression, the statistic most suited for

examining incremental validity is the  $R^2$  (Neter, Kutner, Nachtsheim, & Wasserman, 1996). The  $R^2$  statistic reflects the proportion of total variance in the dependent variable that is accounted for by the model's independent variables. For the incremental validity analyses using continuous outcome variables, the p-value of the item, the item's  $R^2$ , and significance in  $R^2$  change was used to examine the incremental validity of the agency measure. Each of these values were output in SAS 9.1.

Methodologists have noted that there is no direct analog of the  $R^2$  statistic in the case of logistic regression because technically there is no "variance" to be explained in a dichotomous outcome (Karp, 2009; Menard, 2000). Therefore other indicators of the model's success in predicting the outcome variable must be used. One method that examines goodness of fit uses the log-likelihood statistics. The log-likelihood is based on summing probabilities for the predicted and actual outcomes. Differences in log-likelihoods between models can be distributed as  $\chi^2$ , using degrees-of-freedom equal to the number of additional variables in the bigger model (Tabachnick & Fidell, 2007). A statistically significant result indicates the candidate model is a better fitting model. This statistic should converge with finding significant predictors in the model. (Tabachnick & Fidell, 2007). SAS produces the -2 log-likelihood statistics making this index simple to calculate.

In addition to examining the above index of fit, other indicators were examined to assess incremental validity of the agency measure. The p-value of the individual items as indicated by the Wald  $\chi^2$ , the odds-ratio, and the lower and upper bounds of the confidence interval were all examined to determine incremental validity.

### **RQ 3 Incremental Validity Analyses**

The final research question addressed in this study was the extent to which the agency measure demonstrated added-value in models concurrently predicting positive youth characteristics and risk behaviors. In order to address this question, theoretically informed models were developed to predict lifetime alcohol use, lifetime cigarette use, life satisfaction, school satisfaction, antisocial, internalizing, and externalizing behavior. In these analyses, hierarchical regression was used where theoretical predictors of the dependent variable of interest were entered in Step 1. In Step 2, the agency measure was included. Parameter estimates and significance of change in  $R^2$  or in log-likelihood (for logistic regressions) were then examined to determine if the agency measure added predictive value to each model.

### **Results for RQ 3.1 Incremental Validity in Predicting Alcohol and Cigarette Use**

Logistic regression was used as a predictor of the probability of reporting no lifetime alcohol and cigarette use. The prevalence of reporting any use was low for both substances. Of all youth, 6 female and 5 male youth reported ever having drunk alcohol, which represents 3% of the sample. Similarly, 1 female and 7 male youth (4% of male sample) reported ever having used cigarettes. Due to the very low prevalence of cigarette use by female youth, the model predicting cigarette use was conducted on the boy's data only. At Step 1, each model included peer refusal, ATOD refusal, and perceived ATOD risk. The model predicting alcohol use also included gender.

At Step 1 in both models, none of these variables were significant predictors of never using alcohol or cigarettes, although perceived ATOD risk emerged at a trend-level for lifetime alcohol ( $\beta = .24, p=.07$ ). At Step 2, agency was a significant predictor of never having drank



alcohol  $\beta = .46, p=.01, OR=5.55$ , and for never having tried cigarettes  $\beta = .69, p=.01, OR=13.55$ . The goodness of fit  $\chi^2$  index also indicated that the Step 2 model was a significantly better model in both cases: alcohol  $\Delta\chi^2= 6.71 (1), p<.01$ , cigarettes  $\Delta\chi^2= 7.32 (1), p<.01$ . These findings indicate that youth who report higher levels of agency are more likely to report never having drunk alcohol or smoked cigarettes (male youth data only). Tables 8 and 9 provide logistic regression results for alcohol use and cigarette use respectively.

### **Results for RQ 3.2 Incremental Validity in Predicting Life Satisfaction, School Satisfaction, Antisocial, Internalizing, and Externalizing Behavior**

The next five models used multiple linear regressions to predict life satisfaction, school satisfaction, antisocial, internalizing, and externalizing behavior. In Step 1 for each of these models, problem-solving, assertiveness, self-esteem, and gender were entered into the model. In Step 2 the agency measure was added. Tables 10, 11, 12, 13, and 14 provide regression results for life satisfaction, school satisfaction, antisocial, internalizing, and externalizing behavior respectively.

At Step 2, the addition of the agency measure significantly contributed to the predictive models for life satisfaction, school satisfaction, and antisocial behavior, as indicated by a significant change in the  $R^2$  in all three models. In the model predicting internalizing, agency approached significance for contributing to the model. It did not significantly increase the variance accounted for in the externalizing model. Although agency accounted for significant additional variance in the first three models, the additional variance represented a small proportion of the variance accounted for by all indicators in the models. In the models predicting

life and school satisfaction, self-esteem accounted for the largest proportion of variance of all indicators. In the model predicting antisocial behavior, agency was the only significant predictor in Step 2,  $\beta = -.17$ ,  $p = .006$ , however agency accounted for only 3% of the variance

Table 3

*Correlation Table of Manifest Variables*

<u>Variable</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>
1 Agency	1															
2 Gender	-0.03															
3SlfEst	0.44	-0.01														
4 ProbSolv	0.49	-0.12	0.37													
5 Assrt	0.32	-0.14	0.32	0.36												
6 FutPrs	0.37	-0.11	0.29	0.45	0.36											
7 Intrn (Y)	-0.19	-0.12	-0.33	-0.15	-0.21	-0.10										
8 Intrn (M)	-0.23	0.00	-0.32	-0.19	-0.14	-0.17	0.21									
9 Intrn (F)	-0.25	-0.05	-0.21	-0.20	-0.14	-0.16	0.21	0.58								
10 Extrn (Y)	-0.19	0.06	-0.20	-0.25	-0.17	-0.08	0.67	0.11	0.16							
11 Extrn (M)	-0.24	0.11	-0.30	-0.29	-0.11	-0.06	0.18	0.48	0.45	0.36						
12 Extrn (F)	-0.15	0.17	-0.20	-0.27	-0.13	-0.07	0.18	0.34	0.63	0.37	0.66					
13 Adapt (Y)	0.38	-0.02	0.43	0.51	0.23	0.26	-0.15	-0.11	-0.05	-0.18	-0.22	-0.13				
14 Adapt (M)	0.16	-0.07	0.31	0.25	0.09	0.11	-0.04	-0.24	-0.24	-0.09	-0.32	-0.39	0.38			
15 Adapt (F)	0.22	-0.14	0.09	0.22	0.08	0.08	0.02	-0.14	-0.29	-0.14	-0.24	-0.38	0.26	0.47		
16 Cohes (Y)	0.37	-0.02	0.52	0.45	0.29	0.31	-0.31	-0.11	-0.11	-0.29	-0.26	-0.19	0.69	0.40	0.24	

SelfEst = self-esteem, ProbSolv = problem-solving, Assrt = assertiveness, FutPrs = future perspective, Intrn =internalizing, Extrn = externalizing, Adapt = family adaptability, Cohes = family cohesion, Y = youth report, M = mother report, F = father report.

Table 3

*Correlation Table of Manifest Variables, continued*

	<u>Variable</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>
17	Cohes (M)	0.18	-0.05	0.30	0.23	0.10	0.16	-0.03	-0.27	-0.20	-0.11	-0.30	-0.28	0.30	0.65	0.32	0.39
18	Cohes (F)	0.28	-0.15	0.07	0.23	0.15	0.23	-0.01	-0.10	-0.29	-0.16	-0.16	-0.33	0.29	0.49	0.71	0.39
19	Fin Need (M)	-0.13	-0.02	-0.21	-0.13	-0.05	0.00	0.10	0.12	0.15	0.11	0.22	0.28	-0.19	-0.29	-0.19	-0.25
20	Fin Need (F)	0.05	0.09	-0.01	0.01	0.07	0.11	0.15	0.12	0.23	0.14	0.16	0.34	-0.01	-0.32	-0.26	-0.14
21	Fin Concern (M)	-0.08	-0.01	-0.22	-0.12	-0.06	-0.07	0.13	0.19	0.25	0.06	0.22	0.23	-0.16	-0.28	-0.17	-0.24
22	Fin Concern (F)	-0.07	0.03	-0.03	-0.14	-0.10	-0.12	0.08	0.12	0.33	0.08	0.15	0.35	-0.06	-0.28	-0.30	-0.21
23	Fin Strain (M)	-0.12	-0.02	-0.21	-0.14	-0.07	-0.07	0.13	0.15	0.19	0.11	0.22	0.29	-0.17	-0.22	-0.31	-0.28
24	Fin Strain (F)	-0.06	0.08	-0.05	-0.09	0.01	-0.02	0.18	0.13	0.22	0.21	0.19	0.30	0.00	-0.25	-0.26	-0.23
25	Income (M)	-0.03	0.00	0.07	0.04	0.03	0.00	-0.06	-0.10	-0.03	-0.05	-0.11	-0.05	-0.02	0.03	0.02	-0.01
26	Income (F)	-0.08	0.09	-0.09	-0.07	-0.04	-0.14	-0.01	0.08	0.11	0.10	0.27	0.26	-0.15	-0.10	-0.04	-0.07
27	Mother Educ	0.06	0.00	0.13	0.13	0.04	0.00	0.00	-0.04	-0.13	-0.06	-0.12	-0.21	0.15	0.22	0.22	0.22
28	Father Educ	-0.05	-0.08	0.04	0.09	0.02	-0.05	-0.08	-0.04	-0.10	-0.17	-0.19	-0.27	0.15	0.28	0.14	0.19
29	Peer Refusal	0.13	-0.13	0.14	0.34	0.26	0.19	-0.06	0.02	0.10	-0.17	-0.10	-0.05	0.14	0.07	0.14	0.23
30	ATOD Refusal	-0.07	-0.02	0.07	0.05	0.12	0.10	-0.13	-0.04	0.07	-0.17	-0.07	-0.01	-0.02	0.00	-0.05	0.13
31	ATOD Risk	0.08	0.00	0.14	0.20	0.13	0.13	-0.08	-0.09	-0.06	-0.16	-0.05	-0.03	0.09	-0.01	-0.03	0.12
32	Ever Alc	-0.14	0.00	-0.17	-0.12	-0.15	-0.08	0.11	0.07	0.10	0.10	0.04	0.01	-0.01	-0.02	0.08	-0.12
33	Ever Cig	-0.09	0.13	-0.10	-0.13	-0.04	-0.08	0.03	-0.02	-0.01	0.10	0.11	0.14	0.02	0.01	0.06	-0.07
34	Life Sat	0.41	0.06	0.53	0.31	0.15	0.13	-0.24	-0.20	-0.25	-0.24	-0.33	-0.28	0.43	0.29	0.12	0.51
35	School Sat	0.41	-0.21	0.48	0.40	0.37	0.25	-0.26	-0.19	-0.10	-0.26	-0.27	-0.18	0.37	0.25	0.11	0.41
36	AntiSoc	-0.22	0.09	-0.12	-0.18	-0.10	-0.10	0.31	0.06	0.11	0.52	0.21	0.24	-0.16	-0.04	-0.02	-0.20

Cohes = family cohesion, Y = youth report, M = mother report, F = father report, Fin = financial, Educ = education, Alc = alcohol  
Cig = cigarettes, Sat= satisfaction, AntiSoc=antisocial.

Table 3

*Correlation Table of Manifest Variables, continued*

<u>Variable</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>
18 Cohes (F)	0.43															
19 Fin Need (M)	-0.39	-0.27														
20 Fin Need (F)	-0.28	-0.36	0.59													
21 Fin Concern (M)	-0.34	-0.23	0.69	0.52												
22 Fin Concern (F)	-0.27	-0.39	0.48	0.72	0.52											
23 Fin Strain (M)	-0.28	-0.31	0.72	0.53	0.74	0.50										
24 Fin Strain (F)	-0.27	-0.34	0.56	0.66	0.58	0.68	0.72									
25 Income (M)	0.06	-0.06	-0.09	0.00	-0.11	-0.05	-0.12	-0.08								
26 Income (F)	-0.08	0.00	0.07	-0.03	0.07	0.01	0.14	0.08	-0.02							
27 Mother Educ	0.16	0.23	-0.34	-0.36	-0.34	-0.34	-0.33	-0.41	-0.02	-0.13						
28 Father Educ	0.16	0.18	-0.42	-0.37	-0.35	-0.29	-0.31	-0.34	0.00	-0.13	0.64					
29 Peer Refusal	0.08	0.23	0.01	-0.02	-0.01	-0.09	-0.10	-0.09	0.02	0.07	0.00	0.01				
30 ATOD Refusal	-0.03	0.07	-0.04	-0.09	-0.05	-0.02	-0.02	-0.07	0.04	0.03	0.02	0.06	0.20			
31 ATOD Risk	0.10	0.05	-0.15	-0.10	-0.08	-0.11	-0.10	-0.09	-0.08	-0.02	0.10	0.08	0.15	0.02		
32 Ever Alc	-0.07	-0.02	0.01	-0.05	0.06	-0.04	-0.02	0.01	0.23	-0.01	0.00	-0.01	-0.08	-0.06	-0.11	
33 Ever Cig	-0.02	0.06	0.07	0.03	0.09	-0.06	0.06	0.04	-0.04	0.55	-0.08	-0.19	0.00	-0.09	-0.05	0.30
34 Life Sat	0.25	0.12	-0.20	-0.08	-0.22	-0.09	-0.24	-0.15	0.01	-0.10	0.10	0.14	0.12	0.01	0.05	-0.12
35 School Sat	0.26	0.11	-0.13	-0.01	-0.19	-0.10	-0.17	-0.05	-0.07	-0.08	0.14	0.05	0.16	0.02	0.09	-0.10
36 AntiSoc	-0.07	-0.13	0.03	0.04	0.00	-0.05	0.04	0.07	-0.04	0.00	0.00	-0.07	-0.21	-0.08	-0.05	0.07

Cohes = family cohesion, Y = youth report, M = mother report, F = father report, Fin = financial, Educ = education, Alc = alcohol, Cig = cigarettes, Sat= satisfaction, AntiSoc=antisocial.

Table 3

*Correlation Table of Manifest Variables, continued*

	<u>Variable</u>	<u>33</u>	<u>34</u>	<u>35</u>
34	Life Sat	-0.10		
35	School Sat	-0.08	0.26	
36	AntiSoc	0.15	-0.20	-0.17

Sat= satisfaction, AntiSoc=antisocial.

Table 4 *Manifest Variable Means, Standard Deviations, and N's.*

Variable	Mean	SD	N
Agency	3.06	0.49	390
Gender	0.46	0.50	390
SlfEst	2.89	0.70	390
ProbSolv*	2.67	0.86	386
Assrt*	3.13	0.62	386
FutPers*	2.90	0.76	388
Intrn (Y)	6.42	6.06	379
Intrn (M)	6.89	5.40	360
Intrn (F)	6.77	5.93	149
Extrn (Y)	6.65	6.87	379
Extrn (M)	9.68	7.83	360
Extrn (F)	9.22	7.41	149
Adapt (Y)	2.09	0.59	389
Adapt (M)	2.36	0.49	361
Adapt (F)	2.32	0.46	148
Cohes (Y)	2.64	0.66	389
Cohes (M)	2.87	0.59	361
Cohes (F)	2.79	0.54	148
Fin Need (M)	1.35	1.03	360
Fin Need (F)	1.08	0.95	149
Fin Concern (M)	1.82	1.12	358
Fin Concern (F)	1.65	1.03	147
Fin Strain (M)	1.57	1.13	359
Fin Strain (F)	1.22	0.96	149
Income (M)	46447.68	142214.46	308
Income (F)	58114.56	173885.55	132
Mother Educ	3.34	1.09	377
Father Educ	3.36	1.21	179
Peer Refusal*	2.77	0.94	379
ATOD Refusal	3.54	1.19	378
ATOD Risk	2.30	0.88	378
Ever Alc	0.03	0.17	376
Ever Cig*	0.02	0.15	375
Life Sat	2.97	0.77	390
School Sat*	2.86	0.63	389
AntiSoc	0.21	0.30	378

SelfEst = self-esteem, ProbSolv = problem-solving, Assrt = assertiveness, FutPrs = future perspective, Intrn =internalizing, Extrn = externalizing, Adapt = family adaptability, Cohes = family cohesion, Y = youth report, M = mother report, F = father report, Fin = financial, Educ = education, Alc = alcohol, Cig = cigarettes, Sat= satisfaction, AntiSoc=antisocial. \* = Significant differences between gender.

Table 5

*RQ 2.1*

*Agency Correlations with Positive Self-Concept and Life Skills from SEM Analysis*

Construct	<i>r</i>
Self-esteem	.51****
Problem-solving	.55****
Assertiveness	.43****
Future perspective	.45****

$\chi^2=611.25 (395), p=0.00, RMSEA .05, NNFI=.93, CFI=.93$

\*\*\*\* $p < .0001$ .



Table 6

RQ 2.2

*Agency Correlations with Internalizing/Externalizing and Family Processes from SEM Analysis*

Construct	Female	Male
Internalizing	-.15	-.41**
Externalizing	-.17*	-.26**
Family Adaptability	.19*	.21*
Family Cohesion	.38***	.23*

$\chi^2=720.37$  (396),  $p=0.00$ , RMSEA .07, NNFI=.93, CFI=.93

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

Table 7

*RQ 2.3*

*Agency Correlations with Household Resources from SEM Analysis*

<u>Construct</u>	<u><i>r</i></u>
SES	0.10
Financial Strain	-0.09

$\chi^2=413.38$  (269),  $p=0.00$ , *RMSEA* .05, *NNFI*=.97, *CFI*=.97

Table 8

*RQ 3: Incremental Validity Analyses Results for Alcohol Use.*

<b>Independent Variable</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>p-value (Wald <math>\chi^2</math>)</b>	<b>Odds Ratio</b>	<b>Lower Bound</b>	<b>Upper Bound</b>
<b>Lifetime Alcohol Use (Modeling probability of never use)</b>						
<b>Step 1</b>						
Peer refusal	0.17	0.30	0.27	1.38	0.78	2.47
ATOD refusal	0.10	0.21	0.45	1.18	0.78	1.78
Perc'd ATOD risk	0.24	0.28	0.07	1.64	0.95	2.83
Gender	0.04	0.64	0.81	1.17	0.33	4.10
<b>Step 2</b>						
Peer refusal	0.11	0.31	0.48	1.24	0.68	2.26
ATOD refusal	0.17	0.22	0.23	1.30	0.84	2.02
Perc'd ATOD risk	0.24	0.29	0.08	1.65	0.94	2.90
Gender	0.00	0.65	0.98	1.02	0.29	3.60
Agency	0.46**	0.70	0.01	5.55	1.40	21.97

$\Delta\chi^2 = 6.71 (1), p < .01$

Table 9

*RQ 3: Incremental Validity Analyses Results for Cigarette Use, Male Youth Only.*

<b>Independent Variable</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>p-value (Wald <math>\chi^2</math>)</b>	<b>Odds Ratio</b>	<b>Lower Bound</b>	<b>Upper Bound</b>
<b>Lifetime Cigarette Use (Modeling probability of never use, male youth only)</b>						
<b>Step 1</b>						
Peer refusal	-0.35	0.47	0.20	0.55	0.22	1.38
ATOD refusal	0.17	0.27	0.35	1.29	0.76	2.20
Perc'd ATOD risk	0.19	0.36	0.29	1.46	0.72	2.93
<b>Step 2</b>						
Peer refusal	-0.52	0.53	0.09	0.41	0.15	1.15
ATOD refusal	0.31	0.30	0.12	1.59	0.88	2.89
Perc'd ATOD risk	0.21	0.39	0.28	1.52	0.71	3.26
Agency	0.69**	1.06	0.01	13.55	1.69	108.70
$\Delta\chi^2 = 7.32 (1), p < .01$						

Table 10

*RQ 3: Incremental Validity Analyses Results for Life Satisfaction.*

<b>Validity Construct</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>T-value</b>	<b>p=</b>	<b>Cumulative R<sup>2</sup></b>	<b><math>\Delta R^2</math> p=</b>
<b>Life Satisfaction</b>						
<b>Step 1</b>						
ProbSolv	0.16**	0.04	3.42	0.00		<.0001
Assrt	-0.06	0.06	-1.34	0.18		0.51
Esteem	0.49****	0.05	10.35	<.0001		<.0001
Gender	0.08	0.07	1.82	0.07	0.31	0.07
<b>Step 2</b>						
ProbSolv	0.08	0.04	1.62	0.11		<.0001
Assrt	-0.09*	0.06	-1.96	0.05		0.51
Esteem	0.43****	0.05	9.02	<.0001		<.0001
Gender	0.07	0.07	1.71	0.09		0.07
Agency	0.22****	0.08	4.29	<.0001	0.34	<.0001

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . \*\*\*\*  $p < .0001$ .

Table 11

*RQ 3: Incremental Validity Analyses Results for School Satisfaction.*

<b>Validity Construct</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>T-value</b>	<b>p=</b>	<b>Cumulative R<sup>2</sup></b>	<b><math>\Delta R^2</math> p=</b>
<b>School Satisfaction</b>						
<b>Step 1</b>						
ProbSolv	0.19****	0.03	3.99	<.0001		<.0001
Assrt	0.17***	0.05	3.65	0.0003		<.0001
Esteem	0.36****	0.04	7.82	<.0001		<.0001
Gender	-0.17****	0.05	-3.93	<.0001	0.34	<.0001
<b>Step 2</b>						
ProbSolv	0.13**	0.04	2.61	0.010		<.0001
Assrt	0.15***	0.05	3.26	0.001		<.0001
Esteem	0.32****	0.04	6.71	<.0001		<.0001
Gender	-0.17****	0.05	-4.08	<.0001		<.0001
Agency	0.15**	0.06	3.07	0.002	0.36	0.002

\*\*  $p < .01$ . \*\*\*  $p < .001$ . \*\*\*\*  $p < .0001$ .

Table 12

*RQ 3: Incremental Validity Analyses Results for Antisocial Behavior.*

<b>Validity Construct</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>T-value</b>	<b>p=</b>	<b>Cumulative R<sup>2</sup></b>	<b><math>\Delta R^2</math> p=</b>
<b>Antisocial Behavior</b>						
<b>Step 1</b>						
ProbSolv	-0.15**	0.02	-2.55	0.01		0.00
Assrt	-0.01	0.03	-0.22	0.83		0.53
Esteem	-0.07	0.02	-1.18	0.24		0.28
Gender	0.07	0.03	1.39	0.17	0.04	0.17
<b>Step 2</b>						
ProbSolv	-0.09	0.02	-1.41	0.16		0.00
Assrt	0.01	0.03	0.09	0.92		0.53
Esteem	-0.02	0.02	-0.34	0.73		0.28
Gender	0.08	0.03	1.50	0.13		0.17
Agency	-0.17**	0.04	-2.79	0.01	0.06	0.01

\*\*  $p < .01$ .

Table 13

*RQ 3: Incremental Validity Analyses Results for Internalizing Behavior.*

<b>Validity Construct</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>t-value</b>	<b>p=</b>	<b>Cumulative R<sup>2</sup></b>	<b>F-value</b>	<b><math>\Delta R^2</math> p=</b>
<b>Internalizing</b>							
<b>Step 1</b>							
ProbSolv	-0.07	0.27	-1.34	0.18		19.84	<.0001
Assrt	-0.11*	0.37	-2.07	0.04		11.02	0.001
Esteem	-0.34*****	0.33	-6.67	<.0001		45.96	<.0001
Gender	-0.10*	0.42	-2.07	0.04	0.19	4.27	0.04
<b>Step 2</b>							
ProbSolv	-0.04	0.29	-0.63	0.53		19.84	<.0001
Assrt	-0.10	0.38	-1.87	0.06		11.02	0.001
Esteem	-0.32*****	0.34	-5.92	<.0001		45.96	<.0001
Gender	-0.10*	0.42	-2.02	0.04		4.27	0.04
Agency	-0.10 <sup>†</sup>	0.51	-1.68	0.09	0.19	2.83	0.09

<sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*\*\*  $p < .0001$ .



Table 14

*RQ 3: Incremental Validity Analyses Results for Externalizing Behavior.*

<b>Validity Construct</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>t-value</b>	<b>p=</b>	<b>Cumulative R<sup>2</sup></b>	<b>F-value</b>	<b><math>\Delta R^2</math> p=</b>
<b>Externalizing</b>							
<b>Step 1</b>							
ProbSolv	-0.23****	0.38	-4.38	<.0001		45.51	<.0001
Assrt	-0.02	0.53	-0.38	0.71		2.20	0.1391
Esteem	-0.21****	0.46	-4.00	<.0001		15.09	0.0001
Gender	0.09 <sup>†</sup>	0.59	1.81	0.07	0.15	3.29	0.0706
<b>Step 2</b>							
ProbSolv	-0.21***	0.41	-3.70	0.00		45.51	<.0001
Assrt	-0.01	0.53	-0.26	0.80		2.20	0.14
Esteem	-0.19***	0.48	-3.55	0.00		15.09	0.00
Gender	0.09 <sup>†</sup>	0.59	1.84	0.07		3.29	0.07
Agency	-0.06	0.72	-1.01	0.31	0.16	1.02	0.31

<sup>†</sup>  $p < .10$ . \*\*\* $p < .001$ . \*\*\*\*  $p < .0001$ .

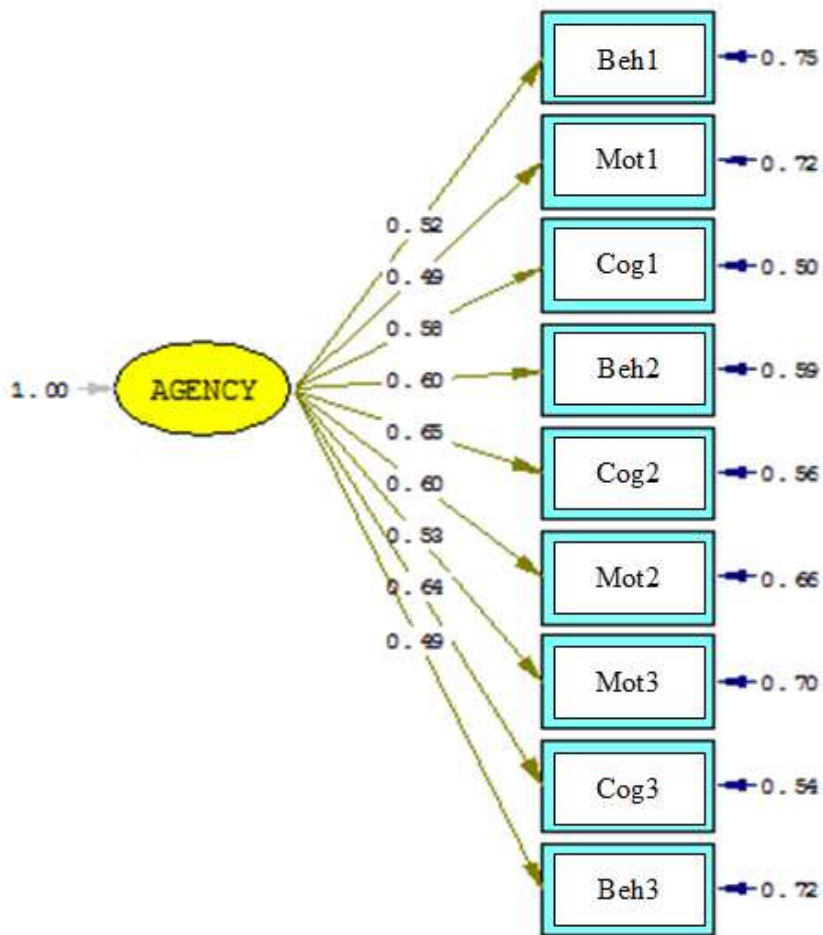
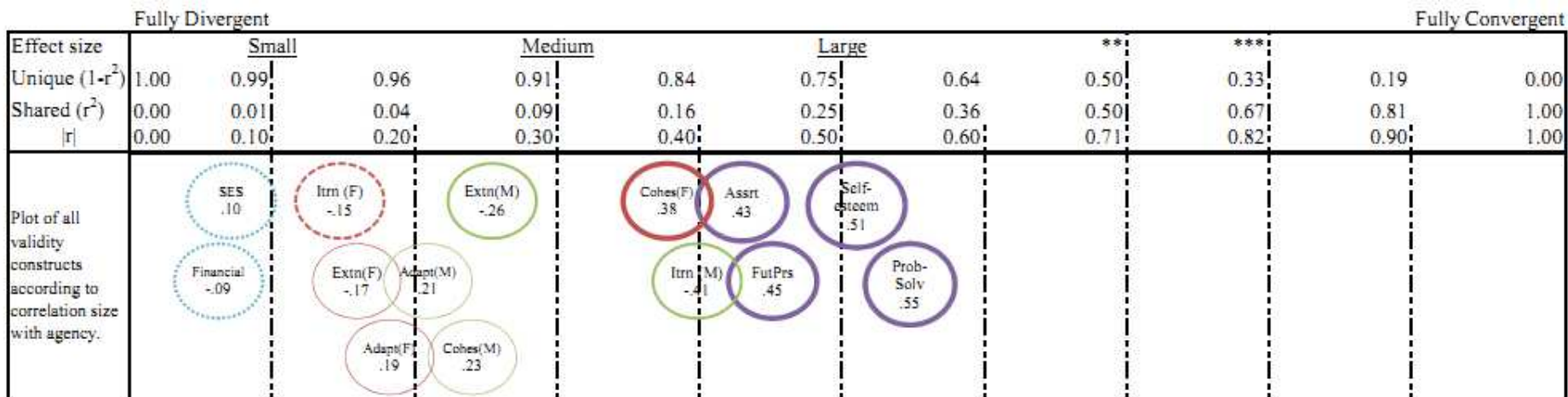


Figure 2. RQ 1: Confirmatory factor analysis of 9-item agency measure, final model. Invariance of factor loadings by youth gender.  $\chi^2 = 70.32 (63)$ ,  $p=0.25$ , RMSEA .02, NNFI=.99, CFI=.99.



Legend

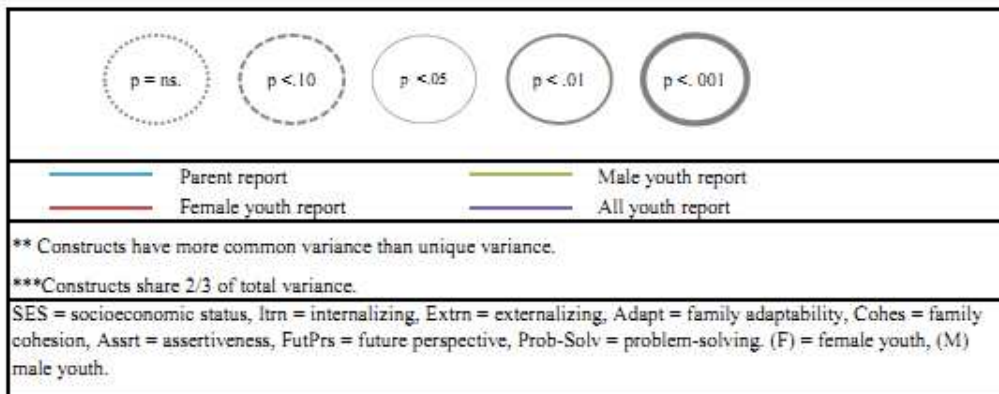


Figure 3. Validity continuum with RQ2 correlations plotted by constructs' correlation with agency.

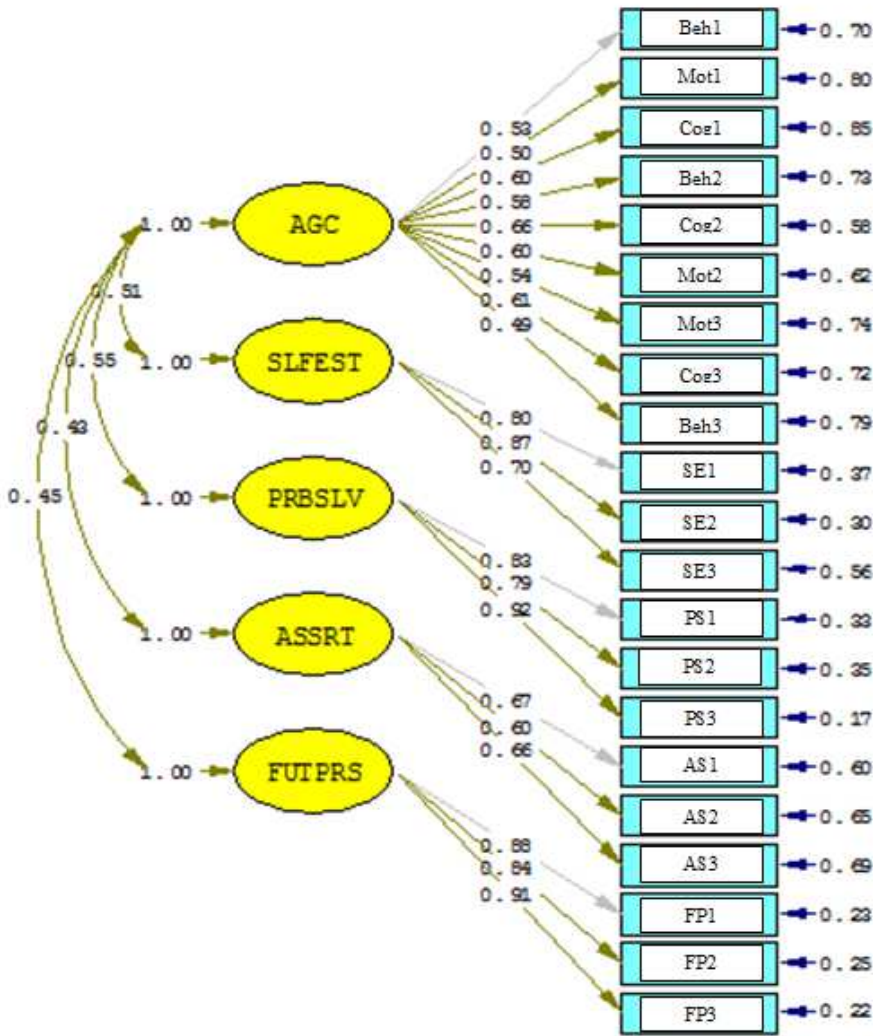


Figure 4. RQ 2.1: Agency correlations with positive self-concept and life skills. Invariant correlations between agency (AGC) and self-esteem (SLFEST), problem-solving (PRBSLV), assertiveness (ASSRT), and future perspective (FUTPRS), invariant by youth gender.  $\chi^2 = 550.11 (389), p=0.00, RMSEA = .05, NNFI=.95, CFI=.95.$

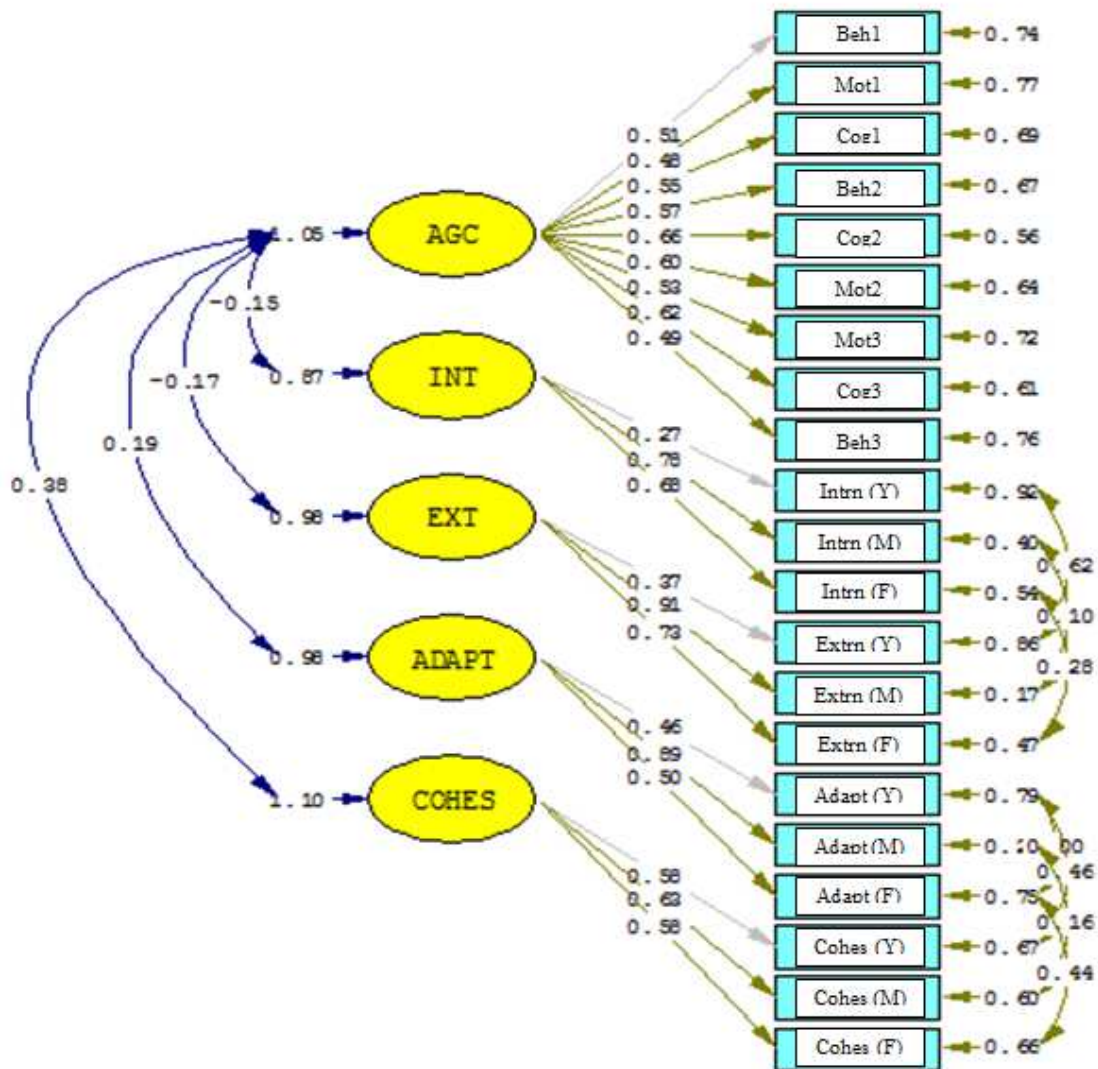


Figure 5. RQ 2.2: Female youth, agency (AGC) correlations with internalizing (INT), externalizing (EXT), family adaptability (ADAPT), and family cohesion (COHES). Invariant factor loadings and error by youth gender. Variant correlations by gender.  $\chi^2=720.37$  (396),  $p=0.00$ , RMSEA .07, NNFI=.93, CFI=.93.

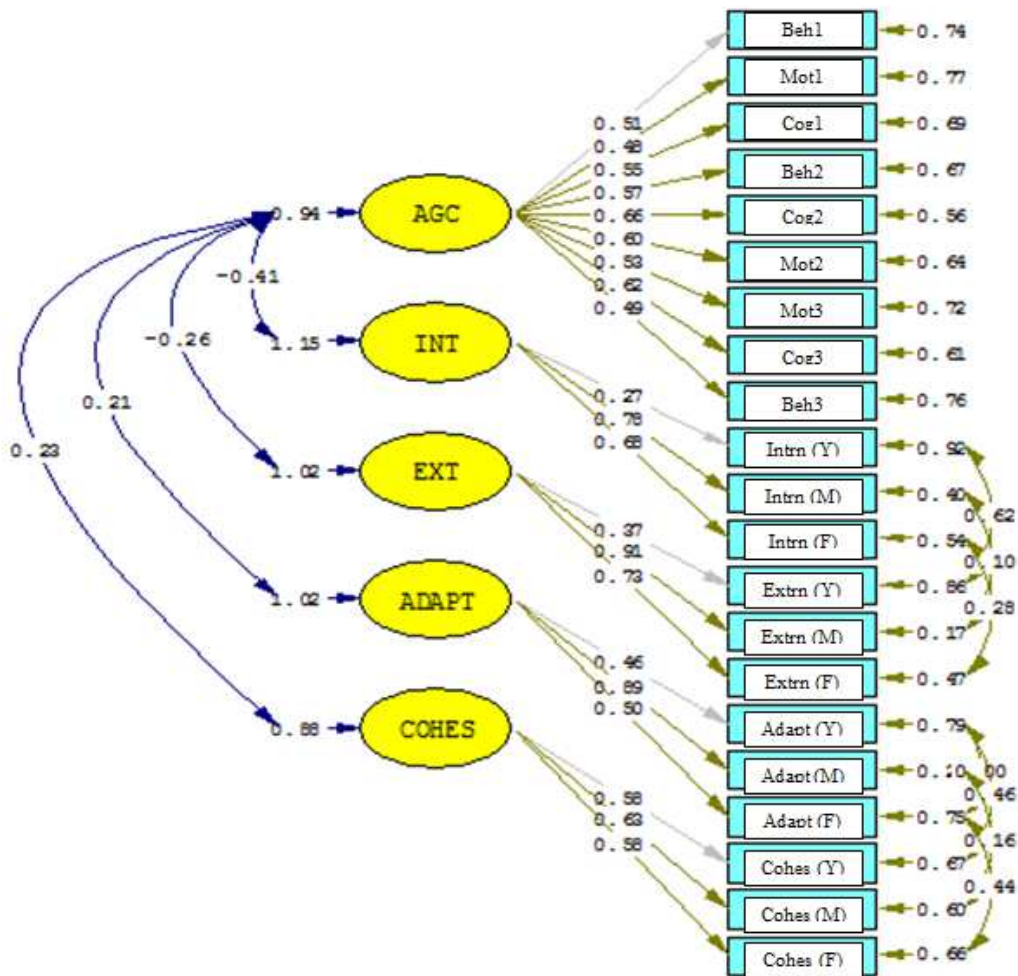


Figure 6. RQ 2.2: Male youth, agency (AGC) correlations with internalizing (INT)/externalizing (EXT), family adaptability (ADAPT), and family cohesion (COHES). Invariant factor loadings and error by youth gender. Variant correlations by gender.

$\chi^2=720.37$  (396),  $p=0.00$ , RMSEA .07, NNFI=.93, CFI=.93.



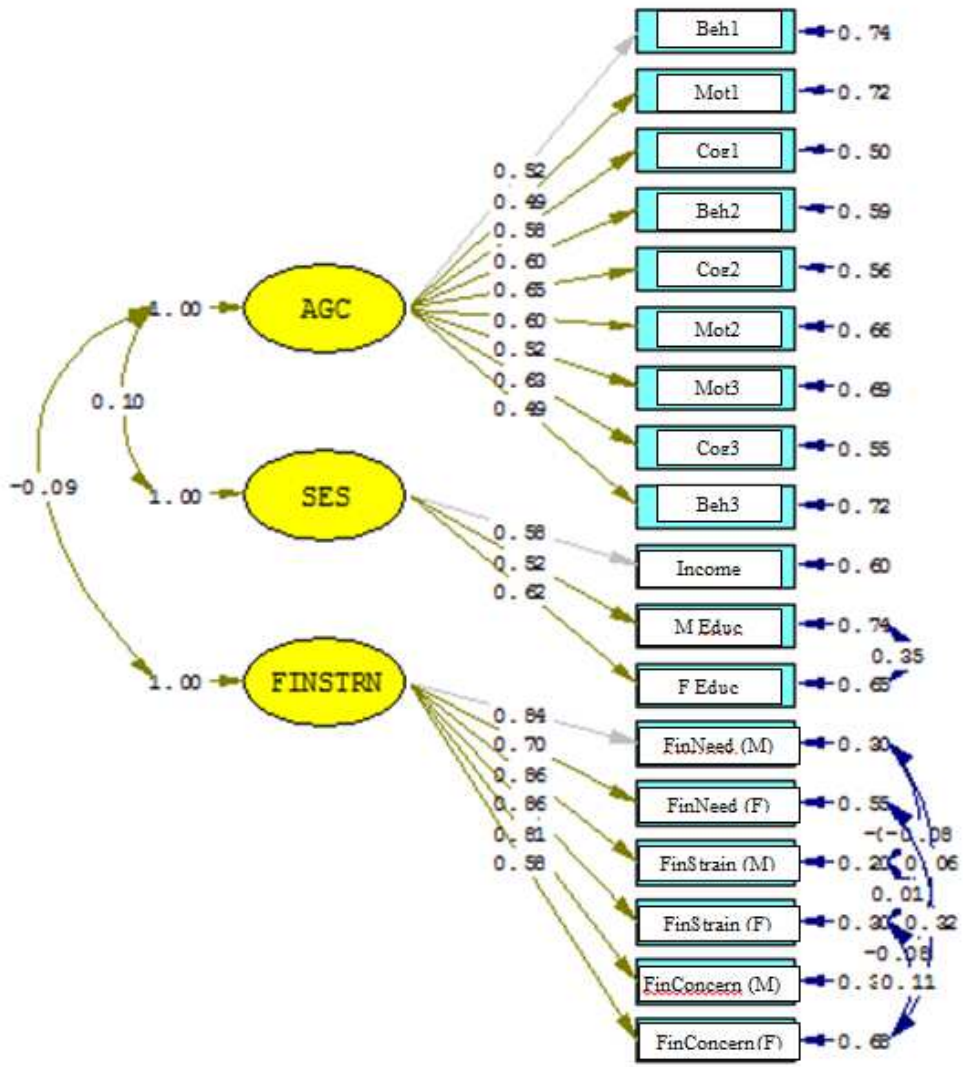


Figure 7. RQ 2.3 Agency (AGC) correlations with socioeconomic status (SES), and financial strain (FINSTRN). Invariant correlations by youth gender.  
 $\chi^2=413.38$  (269),  $p=0.00$ , RMSEA .05, NNFI=.97, CFI=.97

## DISCUSSION

This study demonstrates that agency can be validly operationalized as a combination of intrinsic motivation, and cognitive and behavioral strategies. A one-factor solution was identified for both genders. Construct validity of this operationalization was supported through a series of analyses that sought to identify if the agency measure was associated with youth, family, and household constructs as hypothesized. Limited support was found for the incremental validity of the measure in models predicting problem behaviors and positive youth characteristics.

### **Factor Structure of Agency**

The first research question asked how well the data collected with the agency measure fit a three-dimensional conceptual model of agency. A one-factor solution was selected as the best fitting due to interpretive and theoretical parsimony. This solution suggests that agency is a unified structure comprised of intrinsic motivation, cognitive and behavioral strategies that are not differentiated. The absence of differentiation may be due to developmental level of youth in this study who were in 6<sup>th</sup> and 7<sup>th</sup> grades. In early to middle adolescence youth may not have fully developed or distinguished different strategies for agency yet. A similar finding was demonstrated with the SOC measure in the 4-H Study of Positive Youth Development where a single SOC factor differentiated into three factors as youth progressed from 5<sup>th</sup> to 10<sup>th</sup> grade (Gestsdottir & Lerner, 2007; Gestsdottir et al., 2010; Gestsdottir et al., 2009).

Although it is plausible that the absence of differentiation in factor structure was not found due to developmental level of youth in the study there are other possible explanations. It may be



that the items in the agency instrument are not worded well enough to elicit differentiated responses. The original instrument consisted of 15 items, 5 for each dimension. In the present study each dimension is represented by 3 items, which may not be enough to adequately tap into the agency dimensions.

A two-factor solution was also identified as a possible solution. Although fit indices demonstrated good fit, the two identified factors were very highly correlated which suggested a lack of practical differentiation between them. The plausibility of a two-factor solution combined with implications from SOC research suggest that over time the one unified agency factor may differentiate into two or more practically distinct factors (Gestsdottir, Lewin-Bizan, von Eye, Lerner, & Lerner, 2009).

Identifying a one-factor solution has a few implications. First, this finding supports the assertion that motivation, cognitive and behavioral strategies are all salient dimensions in the measurement of agency. Agency is not just self-efficacy but also includes features of intrinsic motivation, other cognitive aspects like planning, and integrates action strategies. A one-factor structure suggests that these aspects may be very tightly interwoven processes (also evidenced by the high correlations in the two-factor model). Or it may be that how youth think about and evaluate these processes may not be clearly differentiated.

As one factor, these three processes may carry equal weight (in how they are experienced, or in how they are evaluated). The factor loadings in this study show equality across processes as evidenced by comparable loadings that range between .49 and .65. If the factors differentiate over time as youth develop, the factor inter-correlations might vary in strength, which would provide more information about how these processes are connected.

Similarly, in a second-order model of agency factors might vary in how strongly they load onto that second-order factor, which could indicate differential significance the dimensions.

Individual agency is a key principle of life course theory (Elder, Johnson, & Crosnoe, 2004). In this theory, the individual is seen as directing the life course by making decisions and taking action, within the context of opportunities and constraints, history, and social circumstance. The model proposed here and consequent one-factor solution align with life course theory by characterizing agency as making decisions and carrying out actions in the service of personal inspirations and aspirations.

### **Agency, Positive Self-Concept, and Life Skills**

Agency measurement was significantly and strongly correlated with self-concept and life skills. These findings show that the agency construct shares some features of both positive self-evaluation (self-esteem and future perspective) and personal ability (problem-solving and assertiveness). These four constructs shared 20-30% of variance with the agency construct, which indicates some noteworthy similarity. However, this leaves 70-80% of variance unshared between the self-concept and life skills constructs and agency.

The unshared variance may be due to the fact that intrinsic motivation is an aspect to the agency measure but is not a feature of the other measures. Likewise, separately they tap into cognitive and behavioral strategies and resources, but only as individual constructs. In contrast, the agency construct reflects multiple aspects, which most likely explains the source of unshared variance.

Convergence between agency and self-esteem in this study aligns with findings from the previously reviewed Hitlin & Elder (2006) study. Their study found a much stronger association between agency and self-esteem ( $\beta=.86$ ). However, this finding was limited by the fact that both constructs were post-hoc compilations of variables considered to be adequate proxies for the constructs of interest. The current study contributes to previous findings on the association between agency and self-esteem because the constructs used here were not post-hoc proxies.

The current study was also constrained by constructs available in the dataset because the larger study was not designed for a measurement study of agency. The convergent validity findings presented here represent a sound first step toward demonstrating expected associations with other similar variables. Other constructs that would be ideal for further examining convergent validity would include actual intrinsic motivation, self-efficacy, and SOC measures. In such analyses agency would be expected to share variance with these constructs but again to demonstrate a larger portion of unshared variance due to the multiple dimensions incorporated in the agency measure.

Another candidate construct would be autonomy. Ryan & Deci (2006) have articulated a very clear depiction of what characterizes autonomy. They have defined it as assent at one's highest level of reflection and have specified that autonomy can occur in individualistic or collectivistic societies provided personal assent is present. Autonomy is a key underlying psychological need that supports the development of intrinsic motivation (Ryan & Deci, 2000), which is a component of agency. Therefore, some convergence between agency and autonomy would be expected.

The findings from this research question provide some support for the Schwartz et al. (2007) integrative model that combines intrapersonal mechanisms of youth development from

both applied developmental science and developmental psychopathology. That model depicts agency, operationalized by SOC, playing a central role in positive identity and problem-solving, two characteristics shown here to be associated with agency.

### **Agency, Youth Adaptation, and Family Processes**

The agency measure demonstrated construct validity through its pattern of associations with indicators of youth adaptation and family processes, as reported by three reporters (youth, mother, father). Agency was negatively correlated with internalizing and externalizing behaviors for both genders. Correlations were stronger and more significant for boys than for girls. Male youth who reported higher levels of agency were evaluated as having lower levels of externalizing and internalizing, especially the former. The associations between agency and internalizing and externalizing behaviors were lower than anticipated. These low associations may be due to the multiple influences outside of youth agency that lead to maladaptive behavior. Nevertheless, the significant, inverse associations provide preliminary support for the agency measure's ability to predict adjustment problems.

Measures of family adaptability and cohesion were also associated with agency. These associations were also lower than hypothesized but were nevertheless significant and in the hypothesized direction. Multiple contextual factors may interfere with the potentially positive impact of family processes on agency and this may account for the lower correlation sizes. These findings contribute to confidence in agency's association with family processes hypothesized to support its development. In their empirical study, Hitlin & Elder (2006) demonstrated an association between agency and family support of similar size ( $\gamma=.22$ ).

Other variables that would be valuable to examine in predictive validity analyses include self-actualization, goal-setting, and goal attainment. Given this measure of agency incorporates intrinsic motivation, cognitive, and behavioral strategies, an agentic youth by this measure would likely be engaged in identifying and pursuing goals, and experiencing a sense of self-actualization in the process or as a consequence of these activities (Sumerlin, 1997).

### **Agency and Household Resources**

As hypothesized, the agency measure had low, non-significant associations with measures of household SES and financial strain. Prior research on agentic personality indicators demonstrated comparably low and non-significant correlations between family capital and agentic attributes (Côté, 1997). In an empirical study on identity capital in late adolescents, agentic attributes were conceptualized as intangible identity capital, and parental SES and financial resources as tangible identity capital. Correlations across these constructs were predominantly non-significant and averaged at .06 (Côté, 1997). In line with prior research, the current findings demonstrate that measures of available social and financial capital within the household has a small association with agency.

The ideal conceptualization of agency captures characteristics that enable youth to adapt and thrive, regardless of circumstance. Agency as operationalized here is intended to be global in nature and is conceptualized as a generalized orientation to life. The measure asks youth how often they experience the intrinsic motivation, cognitive, and behavioral features of agency. The household resources associated with social and financial capital should not be especially influential in how often youth experience agency. The findings here support this hypothesis, and align with the life course theory principle that individuals, as agents, construct their life course

through both opportunities and constraints (Elder, Johnson, & Crosnoe, 2004) in that agency can operate through resources or despite the lack of them.

### **Agency, PYD, and Risk**

The agency measure demonstrated limited incremental validity in regression models on risk attitudes and positive youth development (PYD). In models predicting risk outcomes of lifetime alcohol use, lifetime cigarette use (male data only), and frequency of antisocial behaviors, although agency emerged as the only significant predictor of these behaviors, these analyses had limitations. In particular, the low prevalence of alcohol and cigarette use in the sample provided little power to identify associations, so caution is warranted in interpreting these findings. It is noteworthy that of the predictors entered in these models, agency emerged as the only significant predictor and had very strong associations with no lifetime use. It may be that the global agentic orientation serves as a stronger protective factor for younger youth and the ATOD-specific beliefs and attitudes become more protective as youth age into more normative experimentation years. Again, the low prevalence of use in this sample warrants caution in interpretation.

The agency measure also accounted for significant additional variance in the PYD model predicting antisocial behavior. However, no other predictors were significant in Step 2 of the model, and the measure accounted for 3 percent of the total 6 percent variance in the model. Examining these results in concert with the findings on refraining from substance use provides a small amount of preliminary implications for the role agency might play in risk behaviors.

Examining these research questions with a higher risk sample of youth or older youth could provide more insight into whether these findings are actual phenomenon or analytic artifact.

Agency also accounted for significant additional variance in the other PYD models, although self-esteem accounted for a significantly larger proportion of variance in these models. Self-esteem accounted for 20 percent of variance in life satisfaction, 10 percent of variance in school satisfaction and internalizing, and 4 percent in externalizing whereas agency accounted for between 0 and 3 percent of variance in these models. This may be due to the fact that self-esteem is a measure of satisfaction with self and self-regard, and this general sense is likely to spill over into satisfaction and interpersonal domains. In contrast the agency instrument measures a global approach to reaching goals, and satisfaction related to agency would likely be examined in relation to actual setting of goals youth, and success in pursuing them.

Future research examining the role that agency plays in risk behaviors would benefit from studies using mediation analyses. Referring back to the Schwartz et al. (2007) model, agency is depicted to be correlated with social cognitive mechanisms (i.e., beliefs, attitudes, intentions). The model examined here included both social cognitive mechanisms and agency as predictors of substance use. This may not adequately reflect these processes and behaviors. It may be that agency predicts beliefs, attitudes, and intentions, which in turn predict later substance use. Studying mediators of agency and the role that agency plays in predicting risk behaviors would help move the field of agency and youth risk research forward.

## **Summary**

This study contributes to the study of agency in two important ways. One, it conceptualizes agency as a multi-dimensional construct, using 9-items, grounded in three

developmental meta-theories (Self-Determination Theory, Ryan & Deci, 1985; social-cognitive theory, Bandura, 1989; Selection-Optimization-Compensation, Baltes, 1997). Scholars have noted that a well-articulated model of agency should measure its multiple dimensions (Shanahan & Hood, 2008). This instrument was specifically designed to address this gap in agency operationalization and measurement. Extant research on “agency” often uses secondary data where agency is operationalized as a combination of other constructs never originally conceptualized as agency per se. The instrument examined here addresses some of these issues in agency research by providing a valid and efficient measure of the construct. Moreover, the results demonstrate that the agency measure is distinct from other measures included in this study such as self-esteem and problem-solving.

Two, this study empirically informs the nomological network of constructs associated with agency. Common critiques of research on agency are that the construct is too abstract, difficult to define, and is overly broad (see Hitlin & Elder, 2006 for a good summary of the issues). In fact, Hitlin and Elder (2006) suggested that “an empirically-sensitive measure of the concept would go a long way toward moving this discussion forward” (p.3). The findings from this study provide empirical support for the connections between agency and other psychosocial and familial constructs. Further, findings from this study provide some preliminary insight into the unique role that agency may play in risk behavior.

This study demonstrates that agency can be measured both validly and briefly with one instrument. This instrument enables researchers to study adolescent agency operationalized as a combination of intrinsic motivation, cognitive and behavioral strategies. This approach broadens the scope of agency research beyond over-reliance on the construct of self-efficacy and incorporates more developmental facets of agency. The possibility of a two-factor model



suggests that agency may differentiate into multiple factors; therefore we may be able to use this instrument to study the development of agency over time. The simplicity of this measure, its intentional grounding in developmental theory, its validity, and expansion of the nomological network can serve to expand the field of agency research, and provides possible implications for prevention work with youth.

### **Advancing Agency Research**

Given that most research on agency is conceptual or theoretical in nature, much work is left to be done to empirically study agency. Agency measurement would benefit from gathering both observational and other-reporter data on youth agency and examining that data relative to youth self-report data. Using other methods and informants would further clarify the validity of this and other measures of agency, and would help to mitigate possible issues surrounding self-report bias on this instrument. Future research on agency would also benefit from further examining its validity relative to other constructs. Evaluating convergent validity constructs such as self-efficacy and autonomy, divergent validity constructs like selfishness and independence, and predictive validity constructs like goal setting and attainment would each provide further insight into the validity of this instrument and conceptualization of agency.

Another area of inquiry surrounds whether the exercise of agency can always be considered positive. Agency as conceptualized here has intrinsic motivation as an integral aspect of it. Research on intrinsic motivation has consistently reported positive adaptation and pursuits associated with this style of motivation. Therefore, agency as described here is hypothesized to be summarily positive. However, this is an untested assumption and should be further examined.

As Larson (2006) articulated, youth may be intrinsically motivated to be a good drug dealer or internet hacker, so it is not safe to assume that youth will be prosocially oriented without the necessary supports to promote and encourage such an orientation.

## **Prevention Implications**

Youth who reported higher levels of agency were less likely to have ever used alcohol or cigarettes, and reported lower frequency of antisocial behaviors. Cohesion with family was strongly correlated with female agency, and internalizing was strongly, negatively correlated with male agency. Each of these areas, substance use, delinquency, family connectedness, and positive behavioral adaptation are foci of contemporary school- and family-based prevention programs, and prevention research agendas. The current funding climate is shifting towards increased accountability in demonstrating outcomes. Data collection needs to be as unencumbered as possible for participants while providing value to implementers and researchers. Studies into instrument validity and measurement properties enable practitioners and researchers to select measures relevant to prevention goals and demonstration of outcomes. For programs designed for early to middle adolescents that focus on preventing initiation of substance use, engagement in antisocial behaviors, and promoting positive behavioral adaptation, and family bonding, the agency measure could help determine program impact on agency which is a potential proximal indicator.

Agency as conceptualized and measured here may also be relevant to development of prevention programming. In their review of four types of agency, Hitlin and Elder (2007) articulate identity agency as being used toward achieving and maintaining “claimed identities”.

Identity agency reflects the “motivating nature of identity commitments” wherein the individual has selected certain identity goals and commitments and actively puts effort toward successful achievement of an identity. Agency as operationalized in this study may correspond with identity agency. Assent to the instrument items may reflect early identity commitment to being agentic. Given identity development is a central task of adolescence (Erikson, 1965), and agency’s role in supporting identity development (Côté, 1997; Côté & Levine, 2002; Schwartz, Côté, & Arnett, 2005; Schwartz et al. 2007), prevention programming could be developed to support these tandem developmental processes.

Programming could address identity and agency development by facilitating youth awareness and strengthening of agency by identifying different modes or methods for being agentic (e.g., planning strategies, finding inspiration, brainstorming possible actions to take). Programing could be structured as a “possible selves” type of program (Oyserman, Terry, & Bybee, 2002; Oyserman, Terry, Bybee, & Hart-Johnson, 2004), where youth identify what they want to be, or what kind of person they want to be, and develop plans for reaching those goals or exploring those possibilities. SFP 10-14 does engage youth in these steps in one program session and includes parent involvement in goal-planning, but there is no curricularized follow-up on goals or activities after that particular program session.

### **Limitations, Strengths, and Future Directions**

This study had some limitations that should be noted here. First, caution in generalizing the results is warranted for a couple of reasons. One, data were drawn from a predominantly White sample of youth, and analyses did not attempt to account for ethnicity. Two, analyses did

not take into account differences between youth located in urban and rural areas. It is possible that agency functions differently based on youths' community contexts and this was not examined here.

Second, data used in these analyses were drawn from a larger study that was not specifically designed as a measurement study of agency. The measures available for assessing validity were not specifically chosen a priori. Therefore variables included in the research questions were limited to variables available in the research trial. This presented a challenge, particularly for identifying adequate constructs for divergent validity analyses. Measures were selected from the entire measurement battery as the best candidates for demonstrating construct validity.

This study also had some strengths worth mentioning here. A key strength was the ability to use youth, mother, and father report on two validated surveys, the Family Adaptability and Cohesion Evaluation Scales II (FACES II; Olson, Portner, & Bell, 1982), and youth and parent versions of the Child Behavior Checklist (CBCL; Achenbach, 1991). The availability of these data enabled some mitigation of reporter-bias. Another strength was that multiple aspects of construct validity were addressed in this study using CFA, construct correlations through SEM, and incremental validity through hierarchical regression. Results of each of these analyses contribute to further understanding the abstract construct of agency.

Some possible future directions on this conceptualization of agency include longitudinal data analysis to examine direction of effects between agency, family processes, and substance use, and an evaluation of the role of SFP 10-14 in increasing agency in youth participants in the current research trial. Future studies will expand to include measurement and developmental

studies of agency in South African youth participating in HealthWise (Caldwell, Smith, Collins, Graham, Lai et al., 2012).

Within models related to positive youth development, adolescent agency is featured as an important element. In a theoretical model from Schwartz et al. (2007) youth agency is a central feature shown as promoting problem-solving, development of positive identity, and healthy attitudes and beliefs connected to risk behaviors. This study has provided initial insight into the role that agency plays in youth development, and future research will continue to advance our ability to explain and understand agency as a key developmental characteristic of youth.

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## Appendix A

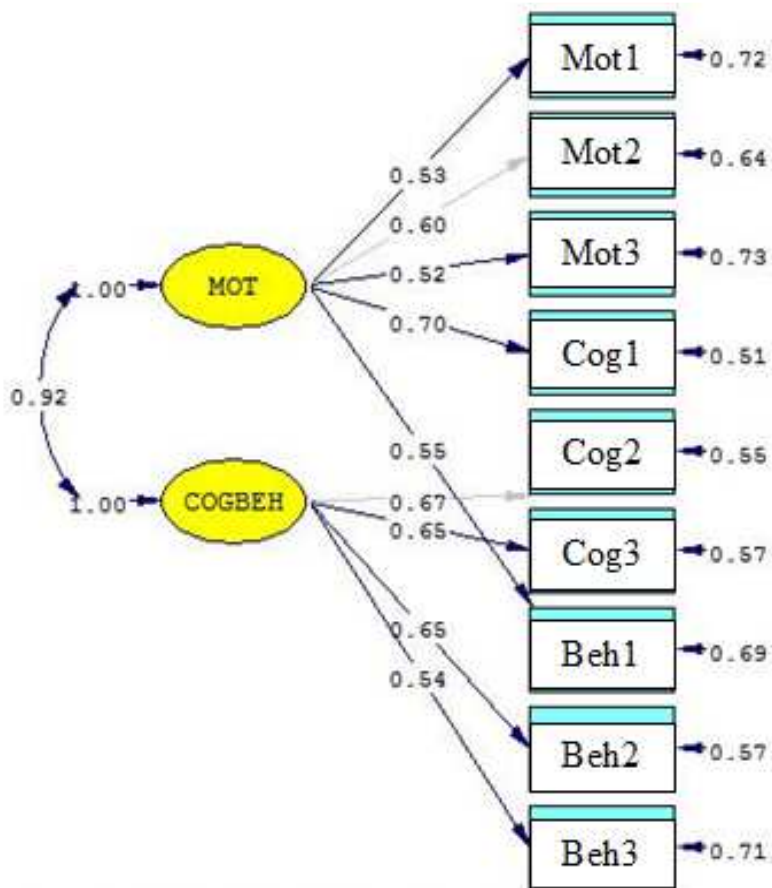
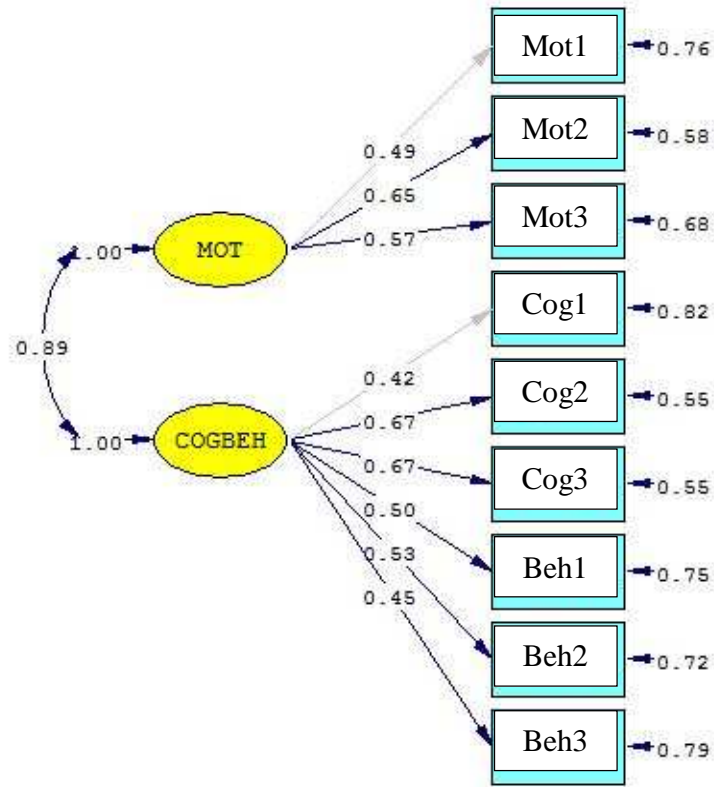


Figure A. RQ 1: Female youth, two-factor model of agency, 5-item motivation factor, 4-item cognitive-behavior factor.

## Appendix B



Chi-Square=26.36, df=26, P-value=0.44357, RMSEA=0.009

Figure B. RQ 1: Male youth, two-factor model of agency, 3-item motivation factor, 6-item cognitive-behavior factor.

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## Research Interests

My research interests surround prevention programming to promote adolescent competence and well-being. In the context of this type of program, my interests span multiple areas, including adolescent development of agency, tailoring and adapting proven effective programs to local context and need.

## Academic Experience

Graduate Research Assistant – Pennsylvania State University

2010 – 2013	<b>Strengthening Families in Pennsylvania Project</b>
2010 summer	<b>EPISCenter: Weed &amp; Seed project</b>
2009 – 2010	<b>HealthWise II</b>
2008 – 2009	<b>TimeWise-Harrisburg</b>
2007 – 2008	<b>HealthWise-South Africa</b>

## Professional Experience

2013-present	Managing Director	EPISCenter, University Park, PA
2011-2013	Evaluation Specialist	EPISCenter, University Park, PA
2001 – 2002	Compensation & Benefits Rep.	CARE USA, Atl., GA
2000 – 2001	Human Resources Coordinator	Silverpop Systems, Inc., Atl., GA

## Education

*Ph.D. Human Development & Family Studies – Dec 2013*  
The Pennsylvania State University, University Park, PA  
*Emphasis: Prevention Science & Adolescent Development*

*B.A. Psychology - May 2006*  
Georgia State University, Atlanta, GA  
*Magna Cum Laude & Departmental Distinction*

## Papers & Presentations

- Bradley, S. A.**, Caldwell, L. L., & Graham, J. W. (In preparation). Adolescent agency: A multi-dimensional perspective and parsimonious measure.
- Caldwell, L. L., **Bradley, S.**, & Coffman, D. (2009). A person-centered approach to individualizing a school-based universal preventive intervention. [Special Issue: The Ontogenetic Approach to Prevention]. *American Journal of Drug and Alcohol Abuse* (35)4, 214-219.
- Bradley, S. A.** (2011, February). Using propensity scores to reduce estimate bias. Accounting for non-randomization to condition and non-randomization to the mediator : A SAS tutorial. Prevention and Methodology Training session presentation.
- Bradley, S. A.**, Smith, E. A., Lai, M. H., Graham, J. W., & Caldwell, L. L. (2010, June). Sexual-coercion risk in South African adolescent male youth: Risk correlates and HealthWise impacts. Paper presented at the annual meeting of the Society for Prevention Research, Denver, CO.
- Bradley, S.**, Caldwell, L. L., & Graham, J. W. (2009, May). *Personal agency in high-risk, urban adolescents: Associations with physical activity, and alcohol and tobacco use.* Poster presented at the annual meeting of the Society for Prevention Research, Wash DC.