

**Family Socioeconomic Hardship and Adolescent Academic and Substance Use  
Outcomes: The Mediating Roles of Parental Monitoring and Self-Regulation**

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## **ABSTRACT**

As supported by ecological systems theory and the family stress model of economic hardship, socioeconomic status can directly be related to adolescent adjustment outcomes including self-regulation, academic performance, and substance use as well as be indirectly related to these outcomes through the mediator of parental monitoring. Data obtained from 220 adolescent (male = 55%, female = 45%, mean age = 15.12 years) and primary caregiver dyads participated in the study to examine the relationship between these variables. Analyses were conducted using Structural Equation Modeling, and the results of the study demonstrate that economic hardship is directly related to adolescent academic performance and also indirectly related to this outcome through maternal monitoring. Parental monitoring was also positively related to adolescent self-regulation. Therefore, this study highlights the importance of high levels of parental monitoring for beneficial adolescent self-regulation, academic, and substance use outcomes.

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## 1.0 - Introduction

The effect of self-regulation on academic outcomes and substance use is well-established in child/adolescent development literature (Dembo & Eaton, 2000; Senécal, Koestner, & Vallerand, 1995; Wills, Walker, Mendoza, & AINETTE, 2006). A family context variable of socioeconomic status (SES) and economic hardship is also known to be associated with these individual outcomes (Duncan, Duncan, Alpert, Hops, Stoolmiller, & Muthén, 1997; Walker, Greenwood, Hart, & Carta, 1994; Zwick & Green, 2007). However, little research has been conducted simultaneously considering all of these variables and involving a possibly crucial mechanism – parenting behaviors – in the relationship between socioeconomic status and adolescents’ ability to self-regulate. A more sophisticated model of the interactions among family socioeconomic status, parenting behaviors, adolescent self-regulation, and academic and substance use outcomes is vital to enhancing our understanding of the processes by which adolescents’ adjustment outcomes are influenced by family economic status and hardship. Therefore, the present study attempts to expand on the findings from previous research by examining a more comprehensive model of adolescents’ academic and substance use outcomes. This model tests the mediational effects of parent monitoring between family socioeconomic hardship and adolescent self-regulation, which in turn might be related to adolescent academic and substance use outcomes.

The effects of economic hardship on development are wide-sweeping and affect both mental and physical health outcomes. Those living in low socioeconomic status neighborhoods have more physical and mental health problems (Chappel & Funk, 2010; Flouri, Tzacidis, & Kallis, 2010) and are also less likely to exercise (Cleland, Ball, Hume, Timperio, King, & Crawford, 2010) possibly leading to higher levels of obesity than those in higher SES neighborhoods. Even growing up as a child in poverty has long-term life consequences as an adult, such as a higher rate of suicide (Rojas & Stenberg, 2010), poorer adult health outcomes due to poor environmental conditions during key developmental periods in life (Conroy, Sandel, & Zuckerman, 2010), and also a lower life expectancy than those who grew up in a higher SES group (Clarke, Miller, Chang, Yin, Cockburn, & Gomez, 2010). Because of these numerous effects, studying how economic hardship influences development is a key research area to

understand. In addition, the vital relationship of SES and economic hardship to multiple outcomes necessitates the use of economic hardship as a main predictor variable in models studying development.

Ecological systems theory provides a basis for this model and describes a variety of levels and pathways through which the environment can change parent and adolescent behaviors (Bronfenbrenner, 1986). For example, socioeconomic status can affect adolescents' well-being at both family – the mesosystem level of the theory – and the individual level of adolescent self-regulation – the microsystem level of the theory. Low levels of SES can also lead to parent stress, which can in turn influence poorer adolescent outcomes. In addition, low levels of SES are associated with higher probability of adolescents growing up in a neighborhood filled with violence and few beneficial role models, making parental monitoring especially critical to these adolescents. Thus, adolescents' and family characteristics, as well as external support systems, may moderate the effects of low SES (Bradley & Corwyn, 2002), so that the levels of ecological systems theory seem to interact rather than being independent and stagnant, with one level influencing, and also being influenced by, another level.

A theoretical approach that is more proximal to the family and the adolescent is the family stress model of economic hardship (Conger & Conger, 2002). This theoretical model takes the broad ideas of ecological systems theory and applies them to a focused concept of how economic difficulties can influence adolescent outcomes. The family stress model of economic hardship describes a process through which economic hardship can lead to higher levels of stress or economic pressure within a family. Because of economic pressure, parents experience higher levels of emotional distress and negativity in their interactions, both with each other and with their adolescents. The family stress model of economic hardship emphasizes that it is these disrupted parenting behaviors resulting from high levels of parental distress, negativity, and withdrawal that are related to high levels of negative adolescent adjustment outcomes. Therefore, ecological systems theory provides an explanation for a direct pathway for economic difficulties to influence adolescent outcomes – largely through neighborhood and family contexts – while the family stress model of economic hardship provides a theoretical link for parenting behaviors as a mediator between economic strain and adolescent outcomes. Both ecological systems theory and the family stress model of economic hardship provide a foundation for the model



used in the present study as these theories describe not only how socioeconomic hardship can influence adolescents' behavior directly but also indirectly through parental monitoring and parenting behaviors.

### **1.1 - Economic Hardship, Self-Regulation, and Adjustment Outcomes**

The numerous effects of socioeconomic status and economic hardship on adolescent adjustment outcomes are well documented in extant literature. The negative effects of socioeconomic hardship are especially noticeable when the poverty is extreme, persistent or occurs early in a person's life as these types of poverty are more likely to be related to negative developmental outcomes compared to transient poverty (McLeod & Shanahan, 1996). In particular, Evans and Rosenbaum (2008) found in their longitudinal study that as parents' income decreased so did their children's self-regulatory skills. This relationship between parental income and children's self-regulation persisted even after accounting for parental investments – such as books – in their children's outcomes, indicating that the reduction of parental income was related to children's self-regulation independently of parents' ability to provide resources for their children. For that reason, there appear to be significant effects of poverty on adolescent's ability to self-regulate that may be related to some environmental characteristics beyond the availability of resources. It could be argued that these higher levels of impulsivity or seeking an immediate reward might be adaptive for the children/adolescents from low income families. However, seeking an immediate small reward at the cost of discounting a greater future reward may not be adaptive for long-term planning or benefit them in the long run (Kirby, Winston, & Santiesteban, 2005; Krishnan-Sarin, et al., 2007). In accordance with ecological systems theory, the stressors related to low adolescents' ability to self-regulate may come from additional strain placed on the family by the neighborhood context of poverty or may come from high parent stress due to a low income.

Additionally, as demonstrated by ecological systems theory, adolescents are not the only members of a family to suffer under the pressure of economic hardship. In other words, adolescent's ability to self-regulate may not be the only thing to suffer because of the stress associated with a low-income. Parents' ability to monitor their adolescents may also be negatively affected by the stressors associated with living in a low-income environment. Belle (1982) proposed that low-income parents may have less time and fewer skills needed to effectively monitor their adolescents than do middle or high income parents due to the higher

amounts of stressors associated with having a low-income. Indeed, researchers have found that parents who experience economic hardship consequently are more likely to experience depression or demoralization and become less skillful at parenting. This less skillful parenting can be associated with negative effects on adolescent development (e.g. Conger, Conger, Elder, Lorenz, Simons, & Whitbeck, 1992/1993; Solantaus, Leinonen, & Punamäki, 2004).

Furthermore, parents who are in a low socioeconomic status may have to work more than one job to support their family and are more likely to have lower average levels of education (Brooks-Gunn & Duncan, 1997). Therefore, those parents who are experiencing economic hardship or the negative effects of a low socioeconomic status may have less time to monitor their adolescents or may have had fewer opportunities to learn good monitoring skills. Indeed, prior research indicates that adolescents from economically disadvantaged families felt that their parents monitored them less and had more negative perceptions of parents' attempts to control them than did adolescents from families living in better economic conditions (Shek, 2005). Furthermore, increased poverty is associated with decreases in parental warmth (Pinderhughes, Nix, Foster, Jones, & The Conduct Problems Prevention Research Group, 2001). Thus, stress associated with economic hardship and constraints seem to place parents at a greater risk for impaired ability to monitor and support their adolescents as the family stress model of economic hardship would predict.

In addition to the indirect effects of economic strain on adolescent outcomes through parenting, there is evidence that socioeconomic status directly influences adolescents' academic outcomes and cognitive abilities. For example, adolescents from lower income families, compared to adolescents from higher income families are likely to have fewer total years of schooling, have lower test scores and lower verbal ability, and are less likely to complete high school (Brooks-Gunn & Duncan, 1997). Such discrepancies between high and low-income students may be in part because adolescents in lower income families are less likely to have age appropriate cognitively stimulating materials readily available to them (Miller & Davis, 1997). In fact, Miller and Davis (1997) demonstrated that the longer a child was in poverty the more extreme these deficits were.

Additionally, children in low-income conditions are more likely to have health problems than are children in a high-income environment due to the stresses and poor living conditions associated with living in low-income neighborhoods (Brooks-Gunn & Duncan, 1997).

Therefore, it is expected that adolescents in low-income families are more likely to become sick and miss days of school or feel unwell at school and become less able to focus on their studies. Collectively, these previous findings on adolescent resources and health suggest that adolescents with a low family socioeconomic status are placed at a greater risk for having difficulties in academic achievement when compared to adolescents with a high family socioeconomic status.

Furthermore, adolescents who grow up in at-risk families are more likely to demonstrate health risk behaviors such as smoking, drinking, drug use, and sexual activity (e.g. Repetti, Taylor & Seeman, 2002; Wills, McNamara, & Vaccaro, 1995). Not only are adolescents in low socioeconomic conditions more likely to use substances, they are also more likely to increase their use of substances. For example, Brown, Catalano, Fleming, Haggerty and Abbott (2005) studied adolescents in grades 6 to 10 and found that adolescents in low SES families increased their substance use faster than did adolescents in higher income families. Many studies seem to point to low socioeconomic status as a clear risk factor for higher levels of substance use than those in high SES groups. However, it should be noted that some studies find a bell-shaped distribution of substance use in adolescents indicating that those in both low-income and high-income families are most likely to be substance users with the lowest occurrences of substance use in middle-income families (Diala, Muntaner, & Walrath, 2004; Luthar & Latendresse, 2005). Therefore, dividing adolescents into “low-risk” and “high-risk” groups based solely on low and high socioeconomic status may be misleading. Rather, it may be necessary to consider the unique stresses placed on adolescents by their environment in addition to family economic status or hardship.

## **1.2 - Parental Monitoring and Adolescent Self-Regulation**

Prior studies suggest that parental monitoring is an important factor to consider when examining youths’ ability to self-regulate and that higher levels of parental monitoring are positively correlated with adolescent ability to self-regulate (Otto & Atkinson, 1997). More specifically, adolescents in low-income families may be at higher risk for developing poor self-regulation skills due to the additional stressors associated with living in a low-socioeconomic status group. For these adolescents, parental monitoring behaviors may be particularly important for their healthy adjustment. Therefore, the present study seeks to further the results of previous

research through examining a meditational model to determine whether the harmful effect of family economic hardship on adolescent ability to self-regulate may be mediated through parental monitoring behaviors.

Although parental monitoring may be particularly important for adolescents in low-income families, optimal parental monitoring may be particularly difficult to attain because these families reside in neighborhoods often prone to higher incidences of violence and other factors which may contribute to poor self-regulatory skills (Belle, 1982). Nevertheless, parental monitoring seems to serve as a protective buffer between community violence and adolescents' psychological well-being even though the protective benefits of parental monitoring might be lower once violence becomes extreme (Ceballo, Ramirez, Hearn & Maltese, 2003). Thus, examining the role of parental monitoring among at-risk adolescents – in particular due to low socioeconomic status or economic hardship – is critical to understanding the complex relationship that family socioeconomic status and hardship have on adolescent's ability to self-regulate and adjustment outcomes.

### **1.3 - Adolescent Self-Regulation and Academic Performance**

Self-regulation is an important skill for adolescents to possess because of its direct and positive relationship to academic performance. Adolescents who have fewer self-regulatory skills have lower levels of academic achievement (Diamond, Barnett, Thomas, & Munro, 2007; Evans & Rosenbaum, 2008; Tangney, Baumeister, & Boone, 2004). This relationship may occur because adolescents with fewer self-regulatory skills are unable to delay the immediate reward of a fun activity such as watching television or playing outside for the delayed reward of a good academic performance. The findings of Duckworth and Seligman (2005) support this idea as these researchers found that self-discipline was a better predictor of academic performance than was IQ. That is, adolescent's ability to self-regulate, including goal setting and deferring gratification, predicted academic performance better than some standardized measures of intelligence. Those adolescents' who were better able to academically motivate themselves and use appropriate motivational regulation strategies in academic activities also had higher levels of academic achievement (Wolters, 1999). Other researchers (Miller & Byrnes, 2001) argue that those adolescents who have good self-regulatory skills are more competent decision makers and that this skill is correlated with making better academic decisions. Therefore, ability to self-regulate directly influences adolescent academic outcomes.

Self-regulatory capabilities are also important to possess because of their indirect academic benefits. Adolescents who are better self-regulators have more positive social interactions (Lopes, Salovey, Côté, & Beers, 2005). Therefore, these adolescents may be more likely to ask for help because they have fewer fears of being rejected and may be more likely to receive help when needed. Overall, prior research findings suggest that adolescents' ability to self-regulate is an important factor to consider when examining predictors of their academic outcomes.

#### **1.4 - Adolescent Self-Regulation and Substance Use**

Extant research has also indicated benefits of self-regulation for lower substance use and abuse as well as higher adherence to socially acceptable behaviors. Bandura, Caprara, Barbaranelli, Pastorelli, and Regalia (2001) found that increases in self-regulatory efficacy, both concurrently and longitudinally, were directly related to reductions in substance use by decreasing transgressive behaviors. These researchers also found that increases in self-regulatory efficacy were indirectly related to decreases in substance use through increases in prosocialness and adherence to moral self-sanctions. In addition, those with fewer self-regulatory skills or who were more impulsive were more likely to be drug users than were those with better self-regulatory skills (Conner, Stein, & Longshore, 2009; Kirby, Petry, & Bickel, 1999). Not only are adolescents with fewer self-regulatory skills more likely to use substances; they are also more likely to suffer negative consequences such as loss of friends from their substance use (Wills, Sandy, & Yaeger, 2002). Therefore, it appears that higher self-regulatory capabilities not only directly influence lower drug use in adolescents but are also indirectly associated with lower levels of substance use through higher levels of prosocial morals and behaviors.

#### **1.5 - Gender Differences**

While effects are not always clear and consistent, gender differences have emerged in extant literature. For example, Wills, Resko, Ainette and Mendoza (2004) found that boys were at greater risk for being poor self-regulators which was directly related to higher levels of substance use. However, they also noted that the effects of parental support were similar across genders. Therefore, the present study will examine gender differences in the structural relations linking family economic hardship and adolescent outcomes, and also the direct effects of gender on the mediating processes as well as outcomes.

## 1.6 - The Present Study

To better understand the process mechanisms that may link adolescents' ability to self-regulate and their academic and substance use outcomes, the following questions were examined: First, does self-regulation mediate the effect of family socioeconomic hardship on adolescents' academic and substance use outcomes? In addition, is the relationship between family socioeconomic hardship and adolescents' ability to self-regulate mediated by parental monitoring?

Specifically, family economic hardship is expected to be negatively correlated with self-regulation such that higher family economic hardship would be associated with lower self-regulatory abilities. In addition, family economic hardship is predicted to be negatively related to parental monitoring such that parents in a higher family economic hardship would show poor monitoring behaviors for their adolescents. Poor parental monitoring is in turn expected to be associated with lower levels of adolescents' ability to self-regulate, suggesting that it partially mediates the relationship between family economic hardship and adolescents' ability to self-regulate. Lastly, adolescents' ability to self-regulate is predicted to be positively related to academic outcomes and negatively related to substance use. Therefore, adolescents who show poor ability to self-regulate will have lower levels of academic achievement and more instances of substance use. Adolescents who experienced decreases in family income (from Wave 1 to Wave 2) are expected to show lower levels of self-regulation, academic performance, and higher levels of substance use than those adolescents from families that maintained a constant level of income or increased income. In addition, adolescents with families that were on government financial assistance at both Wave 1 and Wave 2 or who were not on government financial assistance at Wave 1 but were at Wave 2 are expected to have more negative self-regulation, substance use, and academic outcomes than those from families that were never on government financial assistance or that were on assistance at Wave 1 but not at Wave 2. For a graphic model of the hypotheses see Figure 1. To the author's knowledge, no previous study has examined the mediating processes of self-regulation between family economic hardship and adolescent adjustment and the mediating effects of parental monitoring for self-regulation accounting for the effects of economic hardship. In particular, understanding how the relationship between family

economic hardship and self-regulation is mediated by parental monitoring is the first step towards being able to influence this relationship for the purposes of intervention and prevention among adolescents at-risk for the detrimental effects of poverty.

## **2.0 - Method**

### **2.1 - Participants**

Participants were part of a longitudinal study conducting research on youth's healthy development. Participants were gathered based on a convenience sampling method. At the first time of testing (Wave 1), adolescents were between the ages of 10 to 17 years of age. At the completion of the first round of testing, there were a total of 365 participants. Adolescents were later tested approximately two years after their first time of testing (Wave 2). Therefore, at the second time of testing, adolescents were between the ages of 11.82 to 18.86 years of age ( $M = 15.12$ ,  $SD = 1.56$ ). Adolescents in the sample were 88.6% White with the other 11.4% reporting themselves as African-American, Hispanic, or other races. Those who had already attended their first year of college were considered to be aged out of the study and were not asked to complete the study a second time. Due to ageing out and other forms of attrition, there were 220 adolescent participants in the second wave of the study (male = 55%, female = 45%). Participants who did not age out of the study but voluntarily chose not to participate in Wave 2 had a lower income and were more likely to be on financial aid from the government than those participants who did not attrite out of the study. Primary caregivers were also asked to participate in the study at both waves. At Wave 2, primary caregiver respondents were 81.3% mothers, 14.2% fathers, and 4.6% other caregivers including grandparents and foster parents. Primary caregiver ages ranged from 28.38 to 71.80 years ( $M = 45.92$ ,  $SD = 6.47$ ). Primary caregivers reported their race as 90.9% White with the remaining 9.1% reporting their race as African-American, Hispanic, or other races. Family income ranged from no source of income to earning more than 200,000 dollars a year and mean family income was between \$35,000 and \$49,000 a year. Of the sample, 10% ( $n=22$ ) received financial assistance from the government at Wave 2. Participants were recruited from small cities, towns, and rural areas in a Southeastern State.

### **2.2 - Procedures**

For the first wave of the study, participants were contacted via phone lists purchased from contact companies, snowball sampling (word-of-mouth), by responding to flyers placed around Southwestern Virginia area or by responding to notices placed on the internet. For the second wave of this study, participants were contacted via letters in the mail and/or by phone using previous contact information gathered during the first wave of the study. Participants were



asked to come to University labs to be interviewed. Adolescents and their primary caregivers were interviewed privately and simultaneously. Interviews took approximately 2 hours and after being interviewed, all participants were debriefed, and parents and adolescents received monetary compensation.

### **2.3 - Measures**

**Demographic and socioeconomic variables.** Demographic information such as primary caregiver age, race, marital status (answers range from never married, divorced, separated, married) and number of persons living in the household was gathered. The primary caregiver was also asked to report the household income as well as information about any financial assistance or food stamp programs from which they received aid. Income was reported in monthly or yearly income, whichever method was easiest for the participant to report. Financial assistance from the government was based on a yes or no answer about whether the participant receives financial assistance or does not receive government financial assistance. Finally, participants answered how well-off they felt their family was (1=Very Poor, 5=Upper Middle Class), how satisfied they were with their current financial situation, income, and material possessions (1=Very Satisfied, 4=Very Unsatisfied), and how often they worried about their family's financial situation (1=Very Often, 4=Never) (see Appendix A). Difference scores in income (Wave 2 minus Wave 1) were examined as well as changes in the status for receiving government assistance between the two waves. Primary caregivers also reported feelings of financial strain using the Economic Strain Questionnaire (Pearlin, Menaghan, Lieberman, & Mullan, 1981). This questionnaire asks parents if they feel they can afford appropriate clothes, furniture, and other necessities for their family using a five-point Likert Scale (1=Strongly Agree, 5=Strongly Disagree). Using a similar scale, Schieman and Pearlin (2006) found alpha reliability levels of .79 (see Appendix B). In the current sample, reliability, computed using Cronbach's Alpha, was .90. Both an objective and a subjective measure of socioeconomic status were utilized in this study because each provides unique information for analysis. While subjective measures of socioeconomic status allow comparison of how participants feel about their socioeconomic position in society, objective measures allow comparison to standardized measures of poverty.

**Parental monitoring.** In addition, parents and adolescents were asked about parental monitoring habits using the 13-item Child Monitoring Scale (Hetherington & Clingempeel,

1992). This scale asks how much the parent knows about his/her adolescents' decisions about various aspects of the adolescent's life such as performance in school, where the adolescent is when not at home, and dating behaviors (see Appendix C). Answers on this scale range from 1 (Always Knows) to 5 (Never Knows). This well-validated scale has also been used in previous studies to measure constructs similar to those of interest to the present study (e.g. Kim, Hetherington, & Reiss, 1999). Kim, Hetherington and Reiss (1999) found alphas of .89 and .90 for mother's monitoring scales and father's monitoring scales respectively. In the current sample, reliability was found to be .89 for adolescents' reports of mother's monitoring, .92 for adolescents' reports of father's monitoring, and .88 for primary caregiver's report of parental monitoring.

**Self-regulation.** Adolescents were asked to report their ability to self-regulate using the Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004). This scale is 13-items and asks how typical each statement is of the adolescent using a Likert scale ranging from 1 (Not at all) to 5 (Very much). Examples of questions are "I am good at resisting temptation" and "I wish I had more self-discipline" (see Appendix D). Tangney, Baumeister and Boone (2004) reported alpha levels of .83 and .85 for this scale. In the current sample, reliability was found to be .83. Adolescents also filled out the 27-item Kirby Monetary Choice Questionnaire (Kirby, Petry, & Bickel, 1999). On the Kirby Monetary Choice Questionnaire, adolescents must choose between a smaller, immediate reward and a delayed, but larger reward (see Appendix E). From their choices on the Kirby Monetary Choice Questionnaire, a discount rate for each adolescent (a measure of impulsivity) was calculated. Evidence has been found for a magnitude effect on discount rates (Kirby & Maraković, 1996). As reward amount increases, discount rates decrease. Because discount rates can be thought of as a measure of impulsiveness (higher discount rates being equivalent to higher levels of impulsivity), people generally tend to become less impulsive as reward amounts increase. Therefore, the Kirby Monetary Choice Questionnaire was scored by grouping rewards into three sizes: small (\$25-\$35), medium (\$50-\$60), and large (\$75-\$85). Test-retest reliability for this measure has been found to be .77 (5 weeks) and .71 (1 year) (Kirby, 2009).

**Academic performance.** Adolescents were also asked to report their performance in academic subjects and their overall grade point average (see Appendix F). Answers were reported in the form on a letter grade ranging from A (excellent) to F (failing).

**Substance use.** Adolescents filled out the Youth Behaviors substance use measure (Chassin, Rogosch, & Barrera, 1991). This questionnaire asks adolescents about their current and previous drug use of cigarettes, alcohol, marijuana, and other drugs such as inhalants. Substance use in the past thirty days was the primary question of interest (see Appendix G).

## 3.0 - Results

### 3.1 - Data Analysis Strategy

Bivariate correlations were calculated in order to determine the relationship between study variables, including family socioeconomic status (i.e. income level and government financial assistance), economic hardship (i.e., the Economic Strain Questionnaire), self-regulation measures (The Child Monitoring Scale and the Kirby Monetary Choice Questionnaire), parental monitoring measures, substance use, academic achievement as well as demographic variables such as age, gender, and ethnicity. It was found that age was significantly correlated with adolescents' perceptions of maternal monitoring, primary caregiver's report of monitoring, academic performance, and substance use. Adolescent race was significantly correlated with adolescents' perceptions of father monitoring (See Table 1). Therefore, these demographic variables were included in the analyses as control variables.

The SEM analyses to test the hypotheses were then conducted using the Mplus Version 5.21 statistical software package (Muthén & Muthén, 2010). Overall model fit indices were examined using the following measures: (1)  $\chi^2$  value, (2) degrees of freedom, (3) corresponding p-value, (4) Root Mean Square Error of Approximation (RMSEA), and (5) Confirmatory Fit Index (CFI). An RMSEA value less than .05 and a CFI value equal to or greater than .95 indicated a good fit (Hu & Bentler, 1999). The significance of mediation effects were tested using product-of-coefficients tests using Delta method standard errors for the two-path (single-mediator) or three-path (two mediators in series) mediated effects (Taylor, MacKinnon, & Tein, 2008). The first two-path test determined if parental monitoring was a significant mediator of the relationship between economic strain and adolescent self-regulation. The second two-path test determined if adolescent self-regulation was a significant mediator of the relationship between parental monitoring and adolescent academic outcomes. The third two-path test determined if adolescent self-regulation mediated the relationship between parental monitoring and adolescent substance use. Finally, the three-path mediation tests determined the significance of the effects of economic hardship on adolescent outcomes through the two mediators of parental monitoring and adolescent self-regulation. A two-group SEM was conducted to examine gender differences in the structural relations among the variables focusing on the differential affect of perceptions of maternal and paternal monitoring on cigarette use in the past thirty days and discounting rates on the Kirby Monetary Choice Questionnaire respectively.

Equality constraints were imposed across the two gender groups and the significance of the model fit changes were examined. Nested model comparisons were calculated by chi-square difference and its significance. If the equality constraints did not degrade the model fit significantly ( $p < .05$ ), then it was concluded that there were no gender differences regarding the effects of mediation.

With the number of participants expected to be in the second wave of the study ( $N = 220$ ), the power of the study for a small effect size  $f^2 = .02$  is .286. The power for a medium effect size  $f^2 = .15$  is .996. The power for a large effect size  $f^2 = .35$  is 1.00. Power was calculated using G\*Power 3 program (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007).

### **3.2 - Intercorrelations among Variables**

Summary statistics and bivariate correlations of study variables are presented in Table 1 and Table 2 respectively. Income, government aid, as well as the Economic Strain Questionnaire at Wave 2 are all significantly correlated in the expected directions suggesting that these three variables measure similar constructs. In addition, the parental monitoring variables are significantly correlated demonstrating that adolescents' perceptions of maternal and paternal monitoring are similar. In addition, the correlation between caregiver reports of monitoring and perceptions of maternal and paternal monitoring suggest a similarity between these variables. Overall, approximately half of the correlations were significant suggesting that there was considerable bivariate correlation among the study variables.

### **3.3 - Hypothesis Testing**

**Adolescents' perceptions of maternal monitoring.** Model 1 examined the relationship that Wave 2 income had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of maternal monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = 7.08$ ,  $df = 1$ ,  $p = .01$ , a CFI = .95, and RMSEA = .17,  $p = .03$ . These statistics indicate moderate to poor model fit. Model 2 examined the relationship that Wave 2 aid had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of maternal monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = 7.10$ ,  $df = 1$ ,  $p = .01$ , a CFI = .96, and RMSEA = .17,  $p = .03$ . These statistics indicate moderate to poor model fit. Model 3 examined the relationship that Wave 2

Economic Strain scores had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of maternal monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = 7.17$ ,  $df = 1$ ,  $p = .01$ , a CFI = .95, and RMSEA = .17,  $p = .03$ . These statistics indicate moderate to poor model fit.

Due to poor model fit of Models 1 through 3, the models were trimmed in order to improve model fit. As presented in Figure 2, in trimming the model, the paths that were non-significant in all Models from 1 through 3 were dropped from the analyses. These paths included the relationship from economic hardship to adolescent self-regulation, adolescent perceptions of maternal monitoring to academic performance, as well as the relationships from adolescent self-regulation and economic hardship to substance use. After trimming, revised Model 1 had a  $\chi^2 = 9.56$ ,  $df = 5$ ,  $p = .09$ , a CFI = .97, and RMSEA = .06,  $p = .29$  indicating an acceptable model fit. After trimming, revised Model 2 had a  $\chi^2 = 9.28$ ,  $df = 5$ ,  $p = .10$ , a CFI = .97, and RMSEA = .06,  $p = .31$  indicating acceptable model fit. After trimming, revised Model 3 had a  $\chi^2 = 12.34$ ,  $df = 5$ ,  $p = .03$ , a CFI = .94, and RMSEA = .08,  $p = .15$  indicating acceptable model fit.

As presented in Figure 2, when examining the path coefficients in revised Models 1 through 3, the trimmed models demonstrated that receiving financial aid led to lower adolescents' perceptions of maternal monitoring, but neither Wave 2 income nor Economic Strain scores were related to adolescents' perceptions of maternal monitoring. Higher adolescents' perceptions of maternal monitoring predicted higher adolescent self-regulation (scores on the BSCS) but lower levels of substance use. Older adolescents reported lower perceptions of maternal monitoring. Older adolescents also reported a higher consumption of alcoholic drinks in the past thirty days than did younger adolescents as well as lower levels of academic performance (See Figure 2). In addition, there were significant indirect effects of adolescents' perceptions of maternal monitoring on adolescent academic performance through adolescent self-regulation ( $Z = .10$ ,  $p < .01$ ) in all three of the models. No other mediational pathways were significant. However, economic hardship – as measured receiving government aid – negatively predicted perceptions of maternal monitoring as was hypothesized. All measures of economic hardship significantly predicted higher substance use for higher levels of hardship. In addition, adolescents' perceptions of maternal monitoring supported the proposed relationships leading to higher self-regulatory skills as well as lower substance use.

As presented in Figure 3, Model 4 examined the relationship that Wave 2 income had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of maternal monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = .58$ ,  $df = 1$ ,  $p = .45$ , a CFI = 1.00, and RMSEA = .00,  $p = .56$ . These statistics indicate acceptable model fit. Model 5 examined the relationship that Wave 2 aid had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of maternal monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = .43$ ,  $df = 1$ ,  $p = .51$ , a CFI = 1.00, and RMSEA = .00,  $p = .62$ . These statistics indicate acceptable model fit. Model 6 examined the relationship that Wave 2 economic strain scores had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of maternal monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = .60$ ,  $df = 1$ ,  $p = .44$ , a CFI = 1.00, and RMSEA = .00,  $p = .55$ . These statistics indicate acceptable model fit.

When examining the results of Models 4, 5, and 6, it can be seen that receiving financial aid was negatively related to adolescents' perceptions of maternal monitoring, but neither Wave 2 income nor scores on the Economic Strain Questionnaire were related to adolescents' perceptions of maternal monitoring. Income was positively related to adolescent academic outcomes while financial aid and economic strain scores were negatively related to adolescent academic outcomes. Adolescents' perceptions of maternal monitoring were negatively related to discounting rates and substance use. Inspection of the path coefficients indicated that older adolescents' age was negatively related to adolescents' perceptions of maternal monitoring. Older adolescents reported higher levels of alcohol use in the past thirty days compared to younger adolescents as well as lower levels of academic performance (See Figure 3). In Model 5, there were also significant indirect effects of receiving financial aid on adolescent substance use through adolescents' perceptions of maternal monitoring ( $Z = .05$ ,  $p < .05$ ). Therefore, this result supports the hypothesized mediating effects of maternal monitoring on the relationship between economic hardship and adolescent substance use. However, no other indirect effects that were hypothesized were significant. Economic hardship – as measured by receiving government financial aid – supported the hypothesis that economic hardship would negatively influence perceptions of maternal monitoring. However, other measures of economic hardship

did not support this hypothesis. In addition, adolescent perceptions of maternal monitoring predicted lower levels of adolescent impulsivity and substance use, supporting the hypothesized relationship.

**Adolescents' perceptions of paternal monitoring.** Model 7 examined the relationship that Wave 2 income had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of paternal monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = 11.39$ ,  $df = 4$ ,  $p = .02$ , a CFI = .94, and RMSEA = .09,  $p = .11$ . These statistics indicate moderate to poor model fit. Model 8 examined the relationship that Wave 2 aid had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of paternal monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = 11.00$ ,  $df = 4$ ,  $p = .02$ , a CFI = .94, and RMSEA = .08,  $p = .12$ . These statistics indicate moderate to poor model fit. Model 9 examined the relationship that Wave 2 Economic Strain scores had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of paternal monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = 12.26$ ,  $df = 4$ ,  $p = .02$ , a CFI = .93, and RMSEA = .09,  $p = .09$ . These statistics indicate moderate to poor model fit.

Due to poor model fit of Models 7 through 9, the models were trimmed in order to improve the model fit indices as presented in Figure 4. In trimming the model, the path that were non-significant in all Models from 7 through 9 were dropped from the analyses excluding the path of the covariate of child age with academic performance. These paths included the relationship from economic hardship to adolescents' perceptions of paternal monitoring, economic hardship to adolescent self-regulation, adolescent self-regulation to academic performance, as well as the relationships from adolescent self-regulation and economic hardship to substance use. After trimming, revised Model 7 had a  $\chi^2 = 14.00$ ,  $df = 7$ ,  $p = .05$ , a CFI = .94, and RMSEA = .06,  $p = .25$  indicating a moderate model fit. After trimming, revised Model 8 had a  $\chi^2 = 13.24$ ,  $df = 7$ ,  $p = .07$ , a CFI = .94, and RMSEA = .06,  $p = .29$  indicating a moderate model fit. After trimming, revised Model 9 had a  $\chi^2 = 14.06$ ,  $df = 7$ ,  $p = .05$ , a CFI = .94, and RMSEA = .06,  $p = .24$  indicating moderate model fit.

Closer inspection of the path coefficients in the trimmed Models 7 through 9 demonstrated that higher levels of economic hardship led to poorer adolescent academic outcomes. Greater levels of adolescents' perceptions of paternal monitoring led to better



adolescent self-regulation (scores on the BSCS), academic outcomes, and substance use (See Figure 4). Older adolescents reported higher levels of alcohol use in the past thirty days compared to younger adolescents. Ethnic minority and older adolescents reported lower levels of paternal monitoring. These models do not provide support for the mediational hypotheses presented in this study. However, key study variables still have the predicted relationship. Economic hardship led to lower levels of academic performance and adolescents' perceptions of paternal monitoring led to better self-regulation, higher academic achievement, and fewer instances of substance use.

As presented in Figure 5, Model 10 examined the relationship that Wave 2 income had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of paternal monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = 3.18$ ,  $df = 4$ ,  $p = .53$ , a CFI = 1.00 and RMSEA = .00,  $p = .75$ . These statistics indicate acceptable model fit. Model 11 examined the relationship that Wave 2 aid had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of paternal monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = 2.84$ ,  $df = 4$ ,  $p = .59$ , a CFI = 1.00 and RMSEA = .00,  $p = .79$ . These statistics indicate acceptable model fit. Model 12 examined the relationship that Wave 2 Economic Strain scores had on adolescent academic and substance use outcomes as mediated by adolescents' perceptions of paternal monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = 3.78$ ,  $df = 4$ ,  $p = .44$ , a CFI = 1.00, and RMSEA = .00,  $p = .68$ . These statistics indicate acceptable model fit.

As shown in Figure 5, when looking at the path coefficients for Models 10, 11, and 12, higher levels of economic hardship led to lower levels of academic outcomes. Higher levels of adolescents' perceptions of paternal monitoring led to better adolescent academic and substance use outcomes. Older adolescents and ethnic minority adolescents reported lower levels of paternal monitoring. Older adolescents also reported higher levels of alcohol use in the past thirty days compared to younger adolescents (See Figure 5). There were no significant indirect effects in Models 4, 5, and 6. Therefore, the hypothesized mediation pathways were not supported by these results. In addition, the economic hardship only significantly predicted academic performance; thus, the hypotheses that economic hardship would predict adolescents'

perceptions of paternal monitoring, discount rates, and substance use were not supported. However, adolescents' perceptions of paternal monitoring did follow the predicted relationship of leading to higher levels of academic achievement as well as lower levels of substance use.

**Primary caregiver monitoring.** As presented in Figure 6, Model 13 examined the relationship that Wave 2 income had on adolescent academic and substance use outcomes as mediated by primary caregiver reports of monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = .15$ ,  $df = 1$ ,  $p = .70$ , a CFI = 1.00, and RMSEA = .00,  $p = .77$ . These statistics indicate acceptable model fit. Model 14 examined the relationship that Wave 2 aid had on adolescent academic and substance use outcomes as mediated by primary caregiver reports of monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = .11$ ,  $df = 1$ ,  $p = .74$ , a CFI = 1.00, and RMSEA = .00,  $p = .80$ . These statistics indicate acceptable model fit. Model 15 examined the relationship that Wave 2 Economic Strain scores had on adolescent academic and substance use outcomes as mediated by primary caregiver reports of monitoring and adolescent self-regulation (the Brief Self-Control Scale). This model had a  $\chi^2 = .13$ ,  $df = 1$ ,  $p = .72$ , a CFI = 1.00, and RMSEA = .00,  $p = .79$ . These statistics indicate acceptable model fit.

Closer inspection of the path coefficients in Figure 6 indicate that higher levels of economic strain led to lower levels of parental monitoring although neither Wave 2 income nor Wave 2 financial aid was related to parental reports of monitoring. As income levels got higher, so did adolescent academic outcomes while receiving financial aid was negatively related to adolescent academic outcomes. However, economic strain scores were not related to adolescent academic outcomes. Greater adolescent ability to self-regulate (the Brief Self-Control Scale) led to better academic performance and lower levels of substance use. Primary caregiver reports of monitoring positively predicted adolescent self-regulation (the Brief Self-Control Scale) in Model 13 but were unrelated in Model 14 and 15. Primary caregivers reported monitoring older adolescents less than younger adolescents. Older adolescents reported higher levels of alcohol use in the past thirty days compared to younger adolescents and also lower levels of academic performance (See Figure 6). There were no significant indirect effects in Models 13, 14, or 15; therefore, the hypothesized mediation was not supported. However, higher levels of economic hardship did follow the hypothesized relationship of negatively affecting both monitoring and academic performance. In addition, primary caregiver reports of monitoring followed the

predicted relationship of increasing adolescent ability to self-regulate. Finally, although it was not a hypothesized relationship, it is consistent with extant literature that older adolescents would engage in more frequent substance use and that they would be monitored less as they gain independence from their caregivers.

As presented in Figure 7, Model 16 examined the relationship that Wave 2 income had on adolescent academic and substance use outcomes as mediated by primary caregiver reports of monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = .02$ ,  $df = 1$ ,  $p = .88$ , a CFI = 1.00, and RMSEA = .00,  $p = .91$ . These statistics indicate acceptable model fit. Model 17 examined the relationship that Wave 2 aid had on adolescent academic and substance use outcomes as mediated by primary caregiver reports of monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = .00$ ,  $df = 1$ ,  $p = .95$ , a CFI = 1.00, and RMSEA = .00,  $p = .96$ . These statistics indicate acceptable model fit. Model 18 examined the relationship that Wave 2 economic strain scores had on adolescent academic and substance use outcomes as mediated by primary caregiver reports of monitoring and adolescent discounting rates found using the Kirby Monetary Choice Questionnaire. This model had a  $\chi^2 = .01$ ,  $df = 1$ ,  $p = .91$ , a CFI = 1.00, and RMSEA = .00,  $p = .93$ . These statistics indicate acceptable model fit (See Figure 7).

As can be seen when examining the resulting path coefficients in Models 16 through 18, primary caregivers with higher economic strain scores reported lower levels of adolescent monitoring; however, neither Wave 2 income nor Wave 2 financial aid was related to primary caregivers' report of monitoring. Higher levels of income were related to better adolescent academic outcomes while financial aid was related to poorer adolescent academic outcomes. Economic Strain scores were unrelated to adolescent academic outcomes. Greater adolescent self-regulation as measured by scores on the KMCQ was associated with poorer academic performance in adolescents. Inspection of the path coefficients indicated that primary caregivers reported monitoring older adolescents less than younger adolescents. In addition, older adolescents reported higher levels of alcohol use in the past thirty days compared to younger adolescents and also lower levels of academic performance (See Figure 7). There were no significant indirect effects in Models 16, 17, or 18; therefore, the hypothesized mediation was not supported. However, higher levels of economic hardship did follow the predicted

relationship of decreasing parental monitoring and adolescent academic outcomes. Primary caregiver report of monitoring was not related to impulsivity in adolescents, academic outcomes, or substance use leaving the hypothesis that parental monitoring would help adolescents have better adjustment outcomes unsupported.

**Additional analyses.** Per capita income was utilized as a predictor in the models examining the effects of income. These analyses were conducted to control for family size. However, the models using income or per capita income provided similar results. In addition, other types of substance use were examined as outcomes in the models. The present study's main variable of interest was alcohol use in the past thirty days. However, cigarette use in the past thirty days as well as binge drinking was examined as alternative substance use outcomes. The results of these analyses were similar to those results found using alcohol use in the past thirty days. Therefore, for conciseness, only the main analyses of interest are presented in the figures and main results section of the paper because the results from the additional analyses using per capita income and other types of substance use were quite similar to the results found using the main study variables of interest.

**Examining Wave 1 and Wave 2 difference scores and gender differences.** The difference in Wave 1 and Wave 2 scores on variables examining income level, receiving financial aid, how well off the primary caregiver feels the family is, how satisfied the primary caregiver is with the current family financial situation, how satisfied the primary caregiver is with the current family income, how satisfied the primary caregiver is with the family's possessions, and how often the primary caregiver worries about the family's financial situation were examined. However, as can be seen in Table 3, the change scores between Wave 2 and Wave 1 were small (all .04 and below) with some instances of zero change at the mean level. Therefore, none of the models including change scores were significant. Finally, gender differences in the effects of parental monitoring on adolescent adjustment outcomes (self-regulation, academic achievement, and substance use) were examined using two-group structural equation models. However, no gender differences were found.

## 4.0 - Discussion

The present study hypothesized that economic hardship would be related to lower levels of parental monitoring as well as adolescent ability to self-regulate and academic outcomes but would be associated with higher levels of adolescent substance use. Two mediating mechanisms in the link between economic hardship and adolescent outcomes were proposed. First, it was predicted that parental monitoring would mediate the link between economic hardship and adolescent self-regulation, academic performance and substance use such that parents with greater economic hardship would show lower monitoring, which in turn would be related to lower levels of self-regulation and academic achievement and higher levels of substance use. Second, it was hypothesized that adolescent self-regulation would mediate the link between economic hardship and adolescent outcomes of academic performance and substance use.

In general, the results support the proposed hypotheses of the present study and the significant path coefficients were in the expected direction. While not all hypothesized relationships were significant, higher levels of economic hardship were associated with lower levels of parental monitoring and academic performance although economic hardship was unrelated to adolescent self-regulation and substance use. Parental monitoring was also associated with higher levels of adolescent self-regulation and lower levels of substance use although only adolescents' perceptions of paternal monitoring was directly related to adolescent academic outcomes. Also, adolescent self-regulation was associated with better academic performance and lower levels of substance use in adolescents although this relationship was not significant in all models. Finally, there was limited support for the mediational hypotheses proposed in the study. There were significant indirect associations between adolescents' perceptions of maternal monitoring and adolescent academic performance through adolescent self-regulation. In addition, there were also significant indirect associations of receiving financial aid on adolescent substance use through adolescents' perceptions of maternal monitoring. However, no other mediational pathways conducted in the analyses were significant.

The models examining adolescents' perceptions of maternal and paternal monitoring as a mediator in tandem with adolescent self-regulatory ability as measured by discount rates using the Kirby Monetary Choice Questionnaire had acceptable model fit indices. In addition, the models using primary caregiver report of monitoring and adolescent self-regulatory ability as

measured by the Brief Self-Control Scale and discount rates as measured by the Kirby Monetary Choice Questionnaire also had acceptable model fit indices. When comparing models using primary caregiver reports of monitoring to those models using adolescent perceptions of monitoring, the path coefficients within these models seemed to indicate that adolescent perceptions of parental monitoring are more important to their well-being than are parent reports of monitoring. Only adolescent perceptions of maternal and paternal monitoring were significantly related to academic and substance use outcomes whereas primary caregiver reports of monitoring were not significantly related to adolescent academic and substance use outcomes in the SEM models. Indeed, as shown in Table 2, the correlations between adolescents' perceptions of maternal and paternal monitoring are more strongly correlated with adolescent outcomes than are parent reports of monitoring. Adolescents' perceptions of paternal monitoring are more strongly related to academic performance than are primary caregiver reports of monitoring ( $Z = -2.21, p < .05$ ) and adolescents' perceptions of both paternal and maternal monitoring are more strongly related to substance use than are primary caregiver reports of monitoring ( $Z = 5.26, p < .01$ , and  $Z = 5.02, p < .01$ , respectively). These findings extend the previous finding by Shek (2005) whose research showed that adolescent perceptions of monitoring have a vital association with adolescent behaviors by contrasting the effects of adolescents' perceptions of monitoring to parental reports of monitoring and illustrating the relative importance of adolescents' perceptions. In addition, future research might expand upon this finding to determine if adolescent perceptions of parental monitoring are more important for their health and well-being outcomes than are primary caregiver reports of monitoring.

Although higher levels of economic hardship tend to be related to lower levels of parental monitoring, this trend was not statistically significant for all measures of economic hardship. Only economic hardship as measured by receiving financial aid was found to lead to lower adolescent perceptions of maternal monitoring. Because the other measures of economic hardship (income and economic strain scores) were not related to adolescents' perceptions of maternal monitoring, there may be some distinct characteristic of family stress that is measured by government aid that adolescents are sensitive to in perceiving levels of maternal monitoring. In addition, economic strain scores had a significant negative effect on primary caregiver reports of monitoring. These relationships suggest that some environmental factors associated with economic hardship may be responsible for having negative effects on adolescents' perceptions of

monitoring. Alternatively, the important factor determining perceptions of their own monitoring for caregivers may be their own thoughts of their family economic strain. For example, Cohen, Kamarck, and Mermelstein (1983) found that parents' perception of stress was a better predictor of outcomes than was a measure of life-events, indicating that one's own perceived levels of stress may be a better predictor than are the ratings of the event as stressful by another. Thus, adolescents and caregivers may have different perceptions of the socioeconomic environment as well as the stressors associated with this environment. Future studies should examine the differential factors that are associated with adolescent as well as caregiver perceptions of socioeconomic stress and parental monitoring.

It is also interesting to note that adolescents' perceptions of paternal monitoring were not significantly associated with measures of economic hardship contrary to the proposed hypotheses of the study. It may be that economic hardship measures did not significantly relate to adolescents' perceptions of paternal monitoring because mothers are more likely to be primary caregivers to their adolescents. According to a report by Child Trends (2002), only one-in-five fathers will be primary caregivers to their children. Therefore, adolescents may be more sensitive to stress in mothers because they interact with mothers more frequently than they do with fathers. Similarly, there is evidence that adolescents are more sensitive to the effects of negative parenting when they have a closer relationship with the parent (Ghazarian & Buehler, 2010). On the other hand, because mothers are more likely to be the primary caregivers who buy clothes and other needs for their adolescents, they may be more sensitive to socioeconomic stresses in the family that prevent or impede them from providing adequately for their adolescents. Future research should inspect this finding to determine the pathways through which socioeconomic stress is related to parental monitoring as well as the pathways through which adolescents perceive this socioeconomic stress and its effects on parental monitoring.

The results of the present study also provide support for ecological systems theory (Bronfenbrenner, 1986). Ecological systems theory proposes that adolescents are directly affected by the environment around them. Therefore, the stresses that are associated with living in a poor environment would be directly related to adolescent outcomes. The results of this study demonstrate that economic hardship had a direct and negative association with adolescent academic outcomes but not substance use outcomes. This relationship may exist because adolescents whose families are in a lower socioeconomic class may be more likely to live in

poorer neighborhoods and thus attend poorer school systems that are unable to provide these adolescents with the resources and materials they need to advance academically compared to those adolescents in higher income neighborhoods (Jimenez-Castellanos, 2010). Because schools are nested within a neighborhood context, the direct negative association of economic hardship may be more likely to be found on academic performance rather than substance use because the negative effects of a low-income home environment are compounded by the additional negative effects of attending a poor quality school (Kirk, 2006). However, future research should attempt to examine the differential effects of socioeconomic environment on adolescents, especially the intertwined influences of home and school.

There were significant indirect effects of adolescents' perceptions of maternal monitoring on adolescent academic performance through adolescent self-regulation. That is, adolescents who perceived higher levels of maternal monitoring showed higher self-regulation, which in turn was related to their higher academic outcomes. However, there were no significant direct associations of maternal monitoring on adolescent academic outcomes. Therefore, this result suggests that the association of maternal monitoring on adolescent academic outcomes may not be direct, but rather are indirectly related through creating high levels of adolescent self-regulation. This result is consistent with the findings by Coley and Hoffman (1996) which showed that parental monitoring and supervision did not have direct associations with children's outcomes. Rather, the effects of monitoring acted in tandem with other contextual variables. The finding that adolescents' perceptions of maternal monitoring were only indirectly related to academic performance is in contrast to the finding that adolescents' perceptions of paternal monitoring were directly – but not indirectly – related to adolescent academic outcomes. Thus, the effects of adolescents' perceptions of paternal monitoring may have a direct positive relationship with adolescent academic outcomes whereas the relationship of adolescents' perceptions of maternal monitoring on academic performance is indirectly through adolescent ability to self-regulate. These results suggest that the link between maternal monitoring on adolescents academic outcomes operate through adolescent self-regulation. This finding may suggest that mothers focus more on developing regulation abilities in their adolescents than do fathers as the mediational pathway was not significant for fathers.

Additionally, there were significant indirect links of receiving financial aid at Wave 2 on adolescent substance use outcomes through perceptions of maternal monitoring whereas the



direct association of receiving financial aid on adolescent substance use was not significant. In other words, adolescent perceptions of maternal monitoring were negatively affected by receipt of financial aid, and their perceptions of low maternal monitoring in turn were related to higher levels of substance use. Therefore, these results suggest that receiving financial aid may not have a direct relationship with adolescent substance use outcomes but that its relationship may be indirectly felt through the stress that receiving financial aid places on the family. These findings are consistent with previous research showing that stressful family characteristics were a mediator between economic hardship and adolescent behaviors (Gutman, McLoyd, & Tokoyawa, 2005) as well as research showing that parents can provide a buffer between the negative effects of a low-income environment and adolescent outcomes (Ceballos, Ramirez, Hearn & Maltese, 2003).

Moreover, these results provide support for the family stress model of economic hardship because they present evidence that adolescents primarily feel the effects of economic hardship through the strain and stress that it places on the adolescent's parents and the parent's relationships. Adolescents may be beginning to become aware of financial strain in the family and to understand these stresses directly while younger children may not have a grasp of financial stresses in the family. For example, research by Mussen, Sullivan, and Eisenberg-Berg (1977), demonstrated that as adolescents aged their understanding of political-economic issues became more complex. However, consistent with existing literature, the evidence of these direct effects may not be seen until later in life when adolescents have a more complete and complex understanding of financial situations and how these financial situations can impact family functioning.

The main results presented in the current study examined the predictor variable of family income and the outcome variable of adolescent alcohol use in the past thirty days. However, per capita income levels as well as other substance use measures – cigarette use in the past thirty days and binge drinking – were also examined within the same sample to determine the robustness of the finding. First, the results of this study are robust in that other measures of substance use were used in analysis and similar results were found. The results considering cigarette use in the past thirty days as well as binge drinking had similar statistical findings to those found using the main indicator of alcohol use in the past thirty days. Second, the results are also robust in that the results in the analyses utilizing income were similar when examining

the variable of per capita income. Because there can be large differences in family size within the same level of income, it may be important to consider how many people are being supported by the family's household income. Third, the results of the present study have been replicated across different types of substance use –albeit within the same sample – as well as accounting for the effects of household size when examining the effects of income on parental monitoring as well as adolescent adjustment outcomes.

In addition, adolescent scores on the Brief Self-Control Scale and the Kirby Monetary Choice Questionnaire predicted academic outcomes similarly, suggesting that these scales measure similar constructs of adolescent self-regulation. As the Brief Self-Control Scale measures self-regulation and the Kirby Monetary Choice Questionnaire measures delayed gratification, both of these scales may measure more of a behavioral aspect of self-regulation rather than emotion regulation, and behavioral regulation may be particularly important when trying to understand adolescent academic and substance use outcomes. For example, behavioral regulation may be important when adolescents are trying to break down a large school assignment into smaller, more manageable parts (Duckworth & Selgiman, 2005) or when they encounter a social situation that may involve peer pressure to engage in risky behaviors such as drug use. Therefore, behavioral inhibition and self-control appear to be significantly related to adolescent academic and substance use outcomes. This finding is consistent with extant literature (i.e. Wills, Walker, Mendoza, & Ainette, 2006) demonstrating that both emotional regulation and behavioral regulation have distinct effects on adolescent outcomes. Thus, it may be particularly effective to aim interventions programs for preventing or decreasing adolescent substance use or increasing academic performance at teaching adolescents effective behavioral regulation skills.

Although gender differences were examined and tested for in the presents study, no significant gender differences were found. Consistent with the findings in previous literature (Wills, Resko, Ainette, & Mendoza, 2004) the effects of parental monitoring were found to operate similarly in both girls and boys. Therefore, the models fit similarly across genders and the mediating effects of maternal monitoring were not significantly different across genders.

While the contributions of the present study to extant literature are significant, the present study has a few limitations as well. The sample – while representative of the area in which it was collected – is not representative of the United States population as a whole. Therefore,

future studies should examine the model proposed in the present study using samples with a more diverse population including a wider range of socioeconomic groups as well as a greater amount of ethnic minority participants. In addition, the present study utilized solely self-report measures as study variables. Future studies should attempt to replicate the results of the present study by utilizing a wider variety of methods and informants in order to attenuate possible informant or method bias caused by having a single informant on a construct as well as to help attenuate self-report bias. For example, utilizing more observational measures in order to better and possibly more accurately evaluate actual levels of parental monitoring and adolescent ability to self-regulate would be a beneficial for future studies.

While the present study has some limitations, its results provide a valuable and unique contribution to extant literature by expanding the understanding of the direct associations of family economic hardship as well as indirect pathways by which economic hardship is related to adolescent adjustment outcomes such as self-regulation as well as academic and substance use outcomes. The present study tests a more comprehensive model of the associations between family economic hardship and adolescent adjustment outcomes than has been conducted in previous studies by examining possible mediating roles of both parenting behaviors (such as parental monitoring) and adolescent characteristic (such as self-regulation). Specifically, the present study expands upon extant literature by examining how socioeconomic context is associated with adolescent academic performance and substance use behaviors directly but also indirectly through the path of self-regulation and parental monitoring, thus providing extant literature with a more complex view of adolescent behavior than was previously had. In addition, the present study examines these adolescent adjustment outcomes within the adolescent's socioeconomic environment – the macrosystem of ecological systems theory. Ecological systems theory as well as the family stress model of economic hardship both suggest that adolescent environment and context – especially socioeconomic context – are vital to consider when analyzing adolescent outcomes and development. In line with these theoretical views, the findings of the present study demonstrate some preliminary evidence that adolescents' perceptions of maternal monitoring may be more sensitive to economic hardship as measured by receiving financial aid than are their perceptions of paternal monitoring. In addition, adolescents' substance use outcomes appear to only be indirectly related with economic hardship through maternal monitoring. The findings of this study also demonstrate that adolescents who

perceived higher levels of monitoring by their parents reported greater self-regulation, higher academic performance, and lower levels of substance use compared to adolescents who perceived less monitored by their parents. Thus, future intervention programs seeking to aid children in low-income neighborhoods can better target their curriculum to be most effective by targeting key variables – such as adolescent self-regulation or parental monitoring – which may positively influence adolescent academic and adjustment outcomes. Parental monitoring appears to be a particularly valuable intervention point because of its direct and indirect relationship with adolescent academic outcomes and substance use. Those adolescents who experience high levels of monitoring have not only the direct benefits of this monitoring on their academic and substance use outcomes; they additionally experience the indirect benefits of parental monitoring on these outcomes through higher self-regulation. Therefore, this study highlights the importance of high levels of parental monitoring for beneficial adolescent self-regulation, academic, and substance use outcomes.

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Table 1.

*Summary Statistics of Study Variables*

Statistic	CAge	CRace	Inc.	ESQ	AID	BSCS	Disc.	CMon	MMon	PMon	AP	SU
<i>M</i>	15.12	.11	11.62	1.71	.10	3.51	.15	4.48	4.26	3.98	4.03	1.24
<i>SD</i>	1.56	.32	2.62	.72	.30	.63	.12	.47	.75	.93	.84	.69
Range	11.82- 18.86	0.00- 1.00	1.00- 15.00	1.10- 4.58	0.00- 1.00	2.08- 4.85	.0002- .25	2.38- 5.00	1.62- 5.00	1.00- 5.00	0.00- 5.00	1.00- 6.00

*Note.* CAge = Child Age, CRace = Child Race, Inc. = Income, ESQ = score on the Economic Strain Questionnaire, AID = family receiving financial aid from government, BSCS = score on Brief Self-Control Scale, Disc. = Discount Rate, CMon = Caregiver Monitoring, MMon = Maternal Monitoring, PMon = Paternal Monitoring, AP = Academic Performance, SU = Substance Use

Table 2.

*Bivariate Correlations of Study Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. CAge												
2. CRace	-.12											
3. Inc.	-.01	-.27**										
4. ESQ	-.01	.11	-.54**									
5. AID	-.04	.22**	-.52**	.39**								
6. BSCS	.00	.02	.08	-.08	-.08							
7. Disc.	-.01	.07	-.11	.08	.11	-.14*						
8. CMon	-.17**	.08	.05	-.15*	-.10	.13	-.02					
9. MMon	-.29**	-.09	.04	.04	-.15*	.50**	-.14*	.35**				
10. PMon	-.25**	-.15*	.12	.02	-.13	.45**	-.09	.32**	.80**			
11. AP	-.17**	-.08	.21**	-.14*	-.18**	.19**	-.18**	.13	.18**	.33**		
12. SU	.25**	-.09	-.01	.03	-.03	-.20**	-.04	.15*	-.34**	-.32**	-.06	

*Note.* CAge = Child Age, CRace = Child Race, Inc. = Income, ESQ = score on the Economic Strain Questionnaire, AID = family receiving financial aid from government, BSCS = score on Brief Self-Control Scale, Disc. = Discount Rate, CMon = Caregiver Monitoring, MMon = Maternal Monitoring, PMon = Paternal Monitoring, AP = Academic Performance, SU = Substance Use

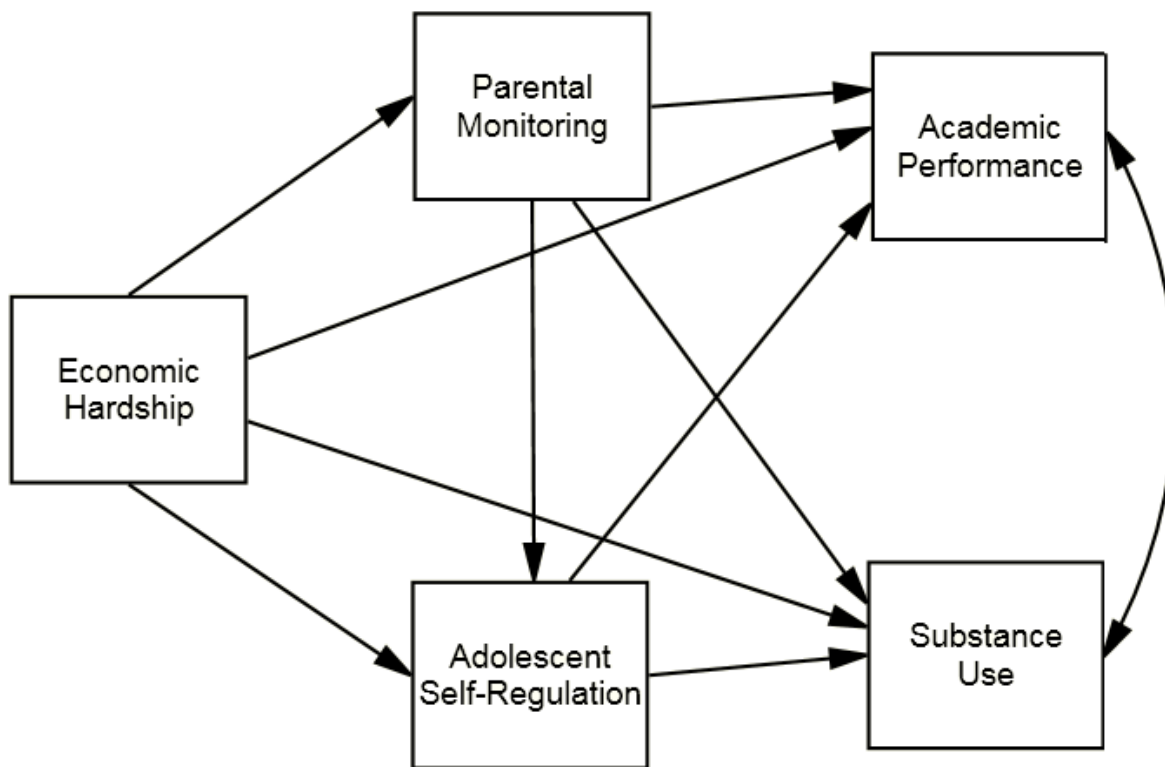
\* $p < .05$ , \*\* $p < .01$

Table 3.

*Summary of Wave 1 and Wave 2 Change Statistics*

Variable Name	Wave 1 Mean	Wave 2 Mean	Difference (Wave 2-Wave 1)
Inc.	11.58	11.62	.04
AID	.09	.10	.01
WellOff	3.83	3.83	0.00
FinSat	2.17	2.21	.04
IncSat	2.23	2.25	.02
PossSat	1.73	1.73	0.00
FinWorry	2.42	2.41	-.01

*Note.* Inc. = Income, AID = family receiving financial aid from government, WellOff = how well off the primary caregiver feels the family is, FinSat = how satisfied the primary caregiver is with the current family financial situation, IncSat = how satisfied the primary caregiver is with the current family income, PossSat = how satisfied the primary caregiver is with the family's possessions, FinWorry = how often the primary caregiver worries about the family's financial situation.



*Figure 1.* The hypothesized relationships among wave 2 family economic hardship, parental monitoring, adolescent self-regulation, and adjustment outcomes.

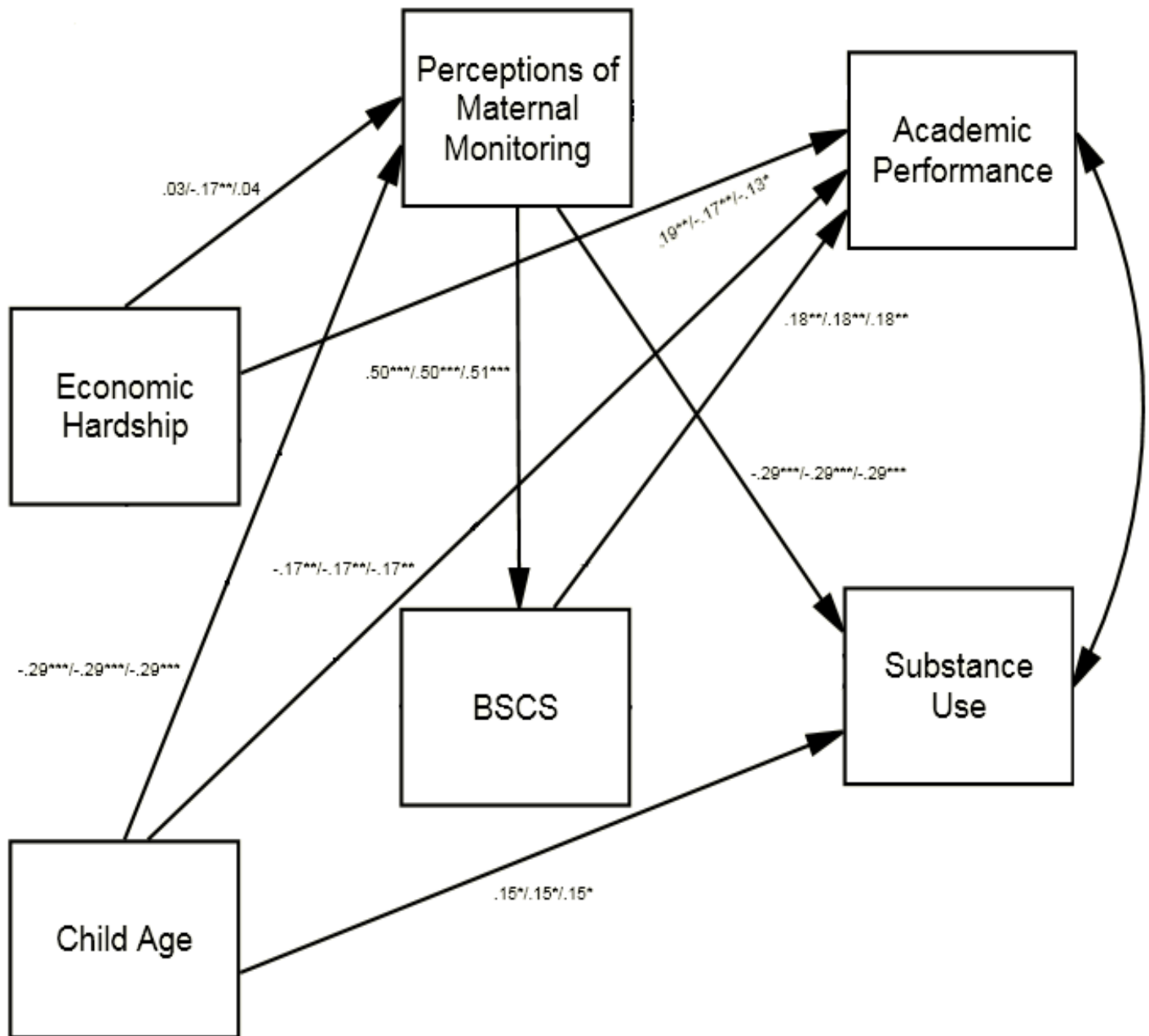


Figure 2. Summarized model fitting results Wave 2 of economic hardship variables, adolescent adjustment outcomes, perceptions of maternal monitoring, and scores on the Brief Self-Control Scale. BSCS = Score on the Brief Self-Control Scale. Path coefficients on the left are in the model using Wave 2 income as a measure of hardship (Revised Model 1), path coefficients in the middle are in the model using Wave 2 aid as a measure of hardship (Revised Model 2), and path coefficients on the right are in the model using Wave 2 scores on the Economic Strain Questionnaire as a measure of hardship (Revised Model 2).

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



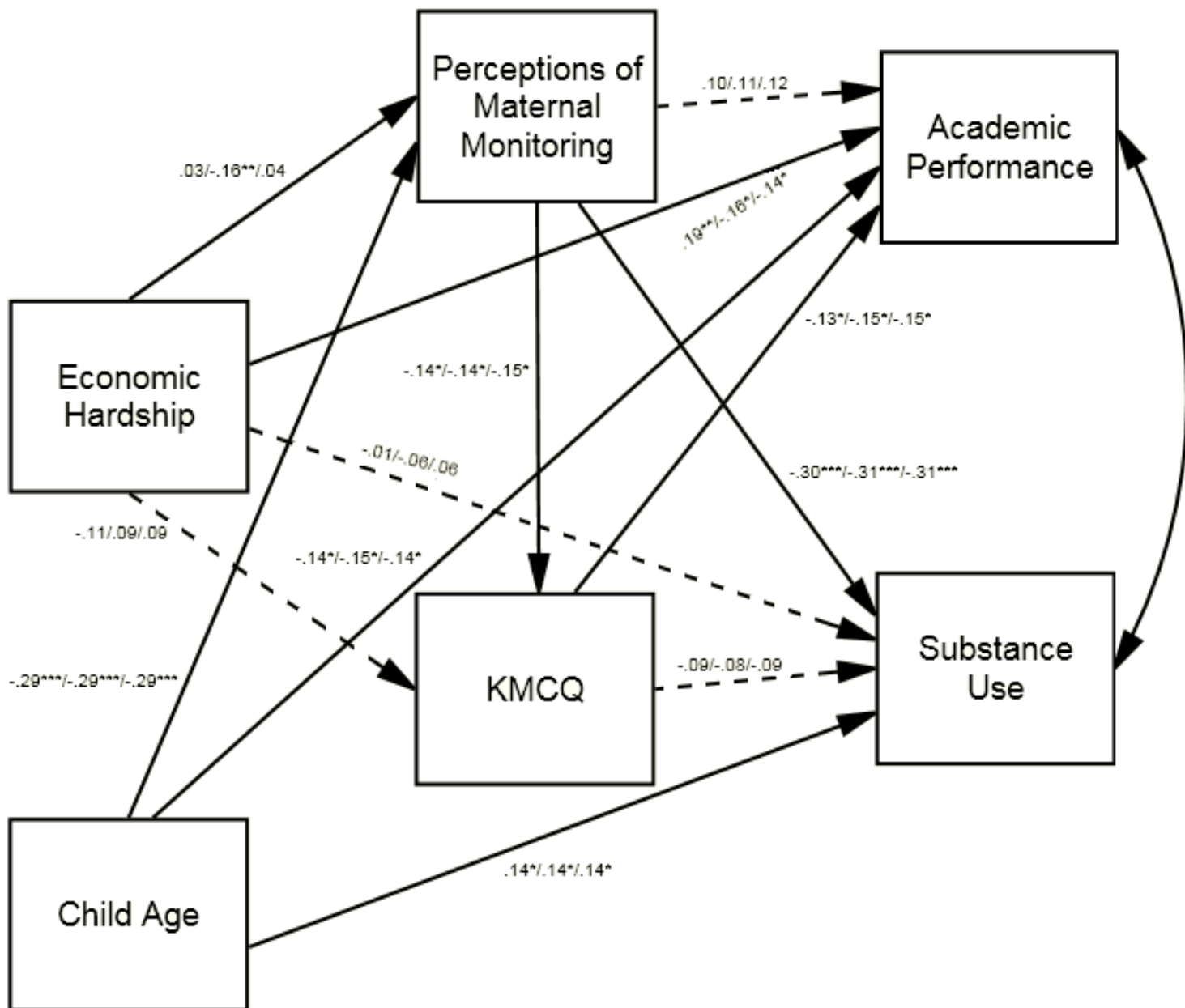


Figure 3. Summarized model fitting results of Wave 2 economic hardship variables, adolescent adjustment outcomes, perceptions of maternal monitoring, and scores on the Kirby Monetary Choice Questionnaire. KMCQ = Score on the Kirby Monetary Choice Questionnaire. Path coefficients on the left are in the model using Wave 2 income as a measure of hardship (Model 4), path coefficients in the middle are in the model using Wave 2 aid as a measure of hardship (Model 5), and path coefficients on the right are in the model using Wave 2 scores on the Economic Strain Questionnaire as a measure of hardship (Model 6). Dashed lines indicate no significant paths.

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

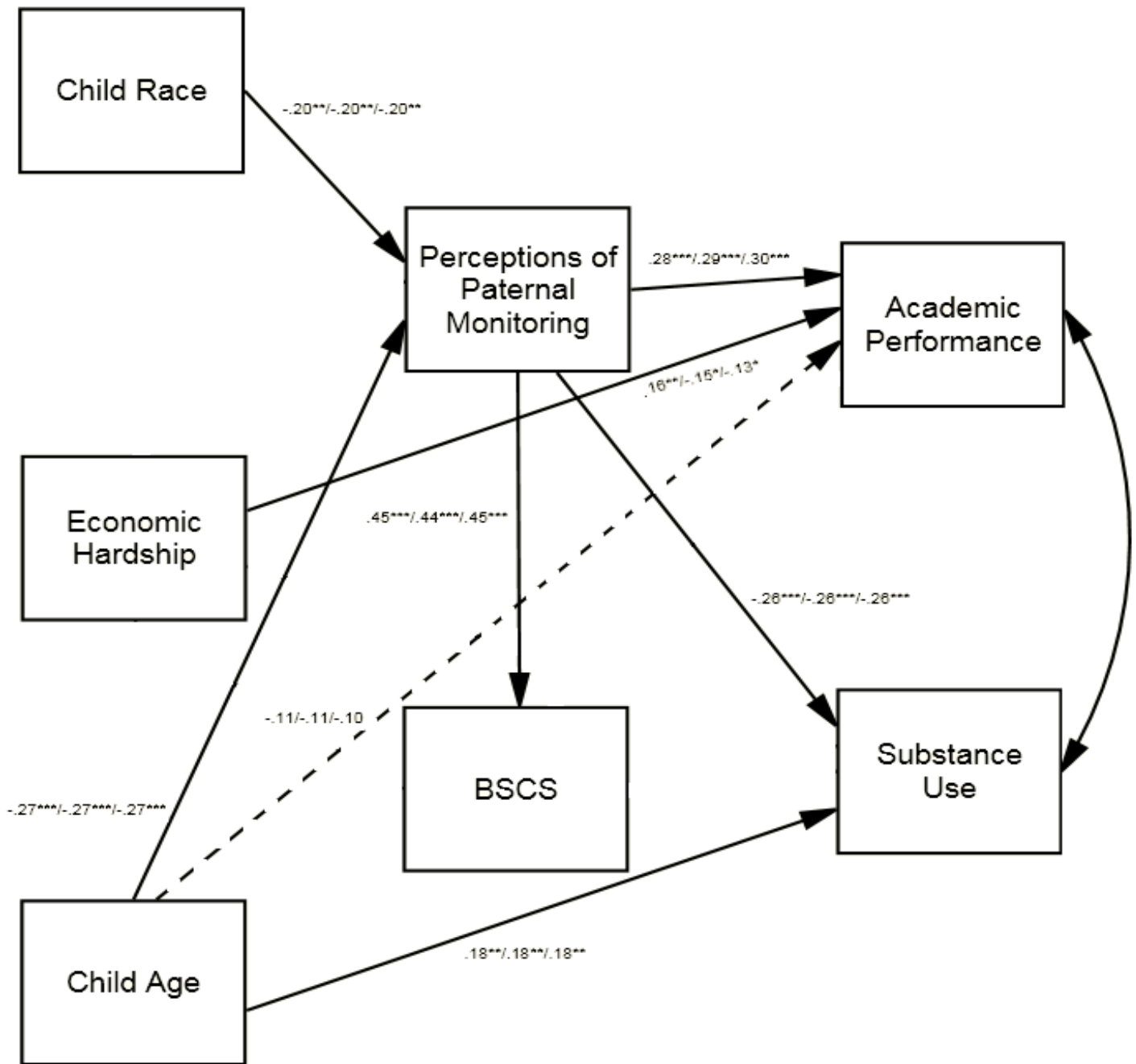


Figure 4. Summarized model fitting results of Wave 2 economic hardship variables, adolescent adjustment outcomes, perceptions of paternal monitoring and scores on the Brief Self-Control Scale. BSCS = Score on the Brief Self-Control Scale. Path coefficients on the left are in the model using Wave 2 income as a measure of hardship (Model 7), path coefficients in the middle are in the model using Wave 2 aid as a measure of hardship (Model 8), and path coefficients on the right are in the model using Wave 2 scores on the Economic Strain Questionnaire as a measure of hardship (Model 9). Dashed lines indicate no significant paths.

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

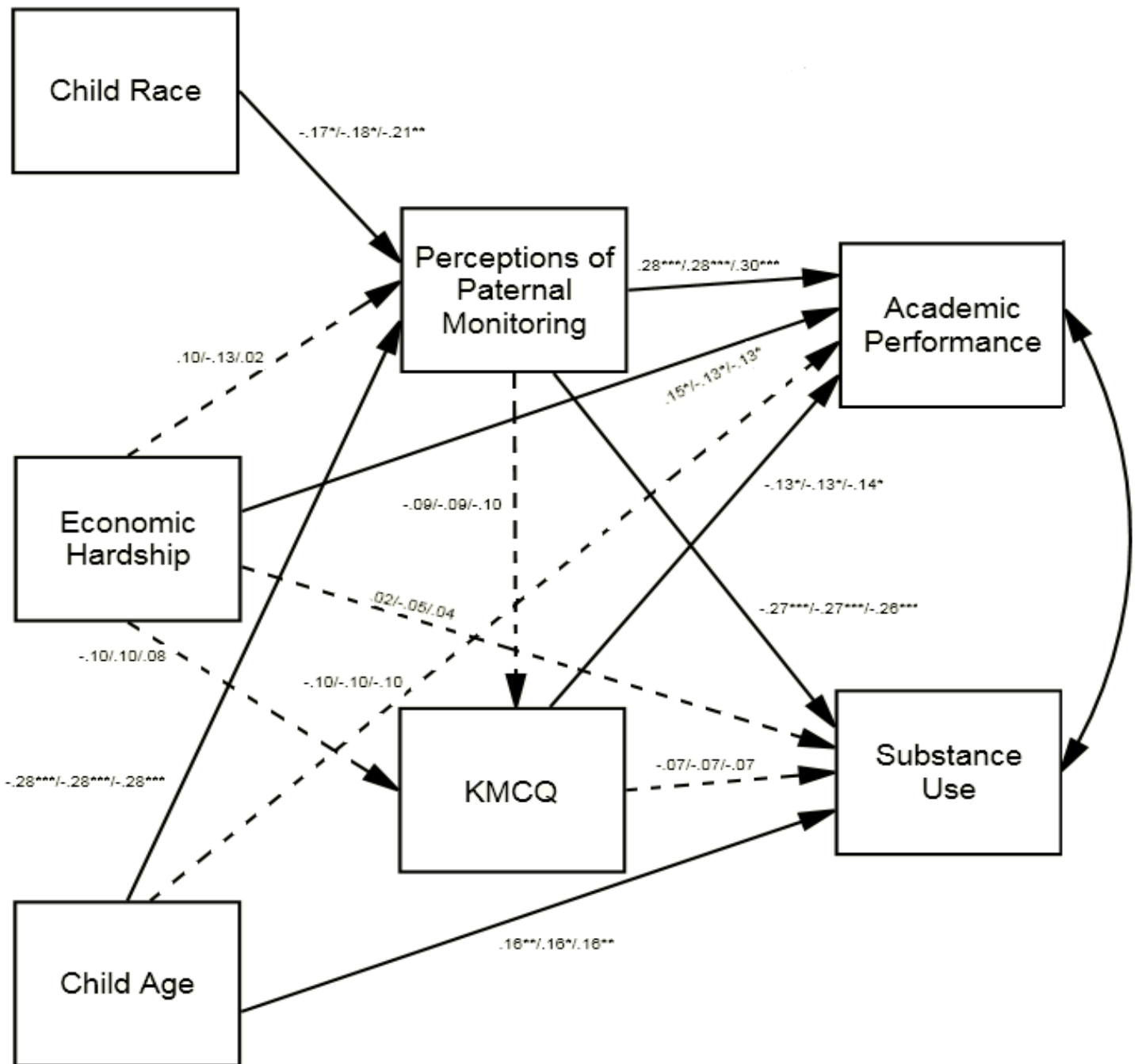


Figure 5. Summarized model fitting results of Wave 2 economic hardship variables, adolescent adjustment outcomes, perceptions of paternal monitoring and scores on the Kirby Monetary Choice Questionnaire. KMCQ = Score on the Kirby Monetary Choice Questionnaire. Path coefficients on the left are in the model using Wave 2 income as a measure of hardship (Revised Model 10), path coefficients in the middle are in the model using Wave 2 aid as a measure of hardship (Revised Model 11), and path coefficients on the right are in the model using Wave 2 scores on the Economic Strain Questionnaire as a measure of hardship (Revised Model 12).

Dashed lines indicate no significant paths.

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

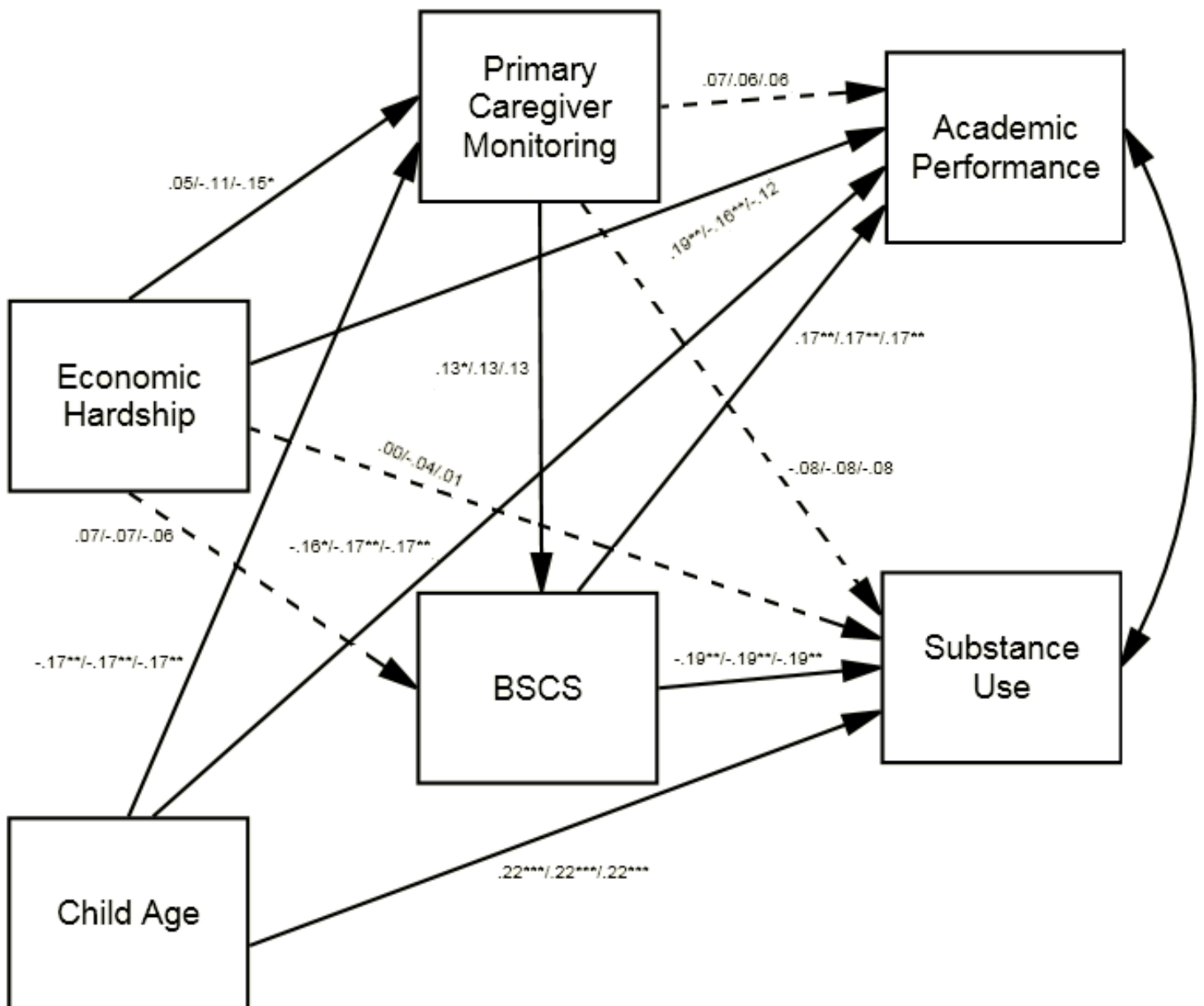


Figure 6. Summarized model fitting results of Wave 2 economic hardship variables, adolescent adjustment outcomes, primary caregiver report of monitoring, and scores on the Brief Self-Control Scale. BSCS = Score on the Brief Self-Control Scale. Path coefficients on the left are in the model using Wave 2 income as a measure of hardship (Model 13), path coefficients in the middle are in the model using Wave 2 aid as a measure of hardship (Model 14), and path coefficients on the right are in the model using Wave 2 scores on the Economic Strain Questionnaire as a measure of hardship (Model 15). Dashed lines indicate no significant paths. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

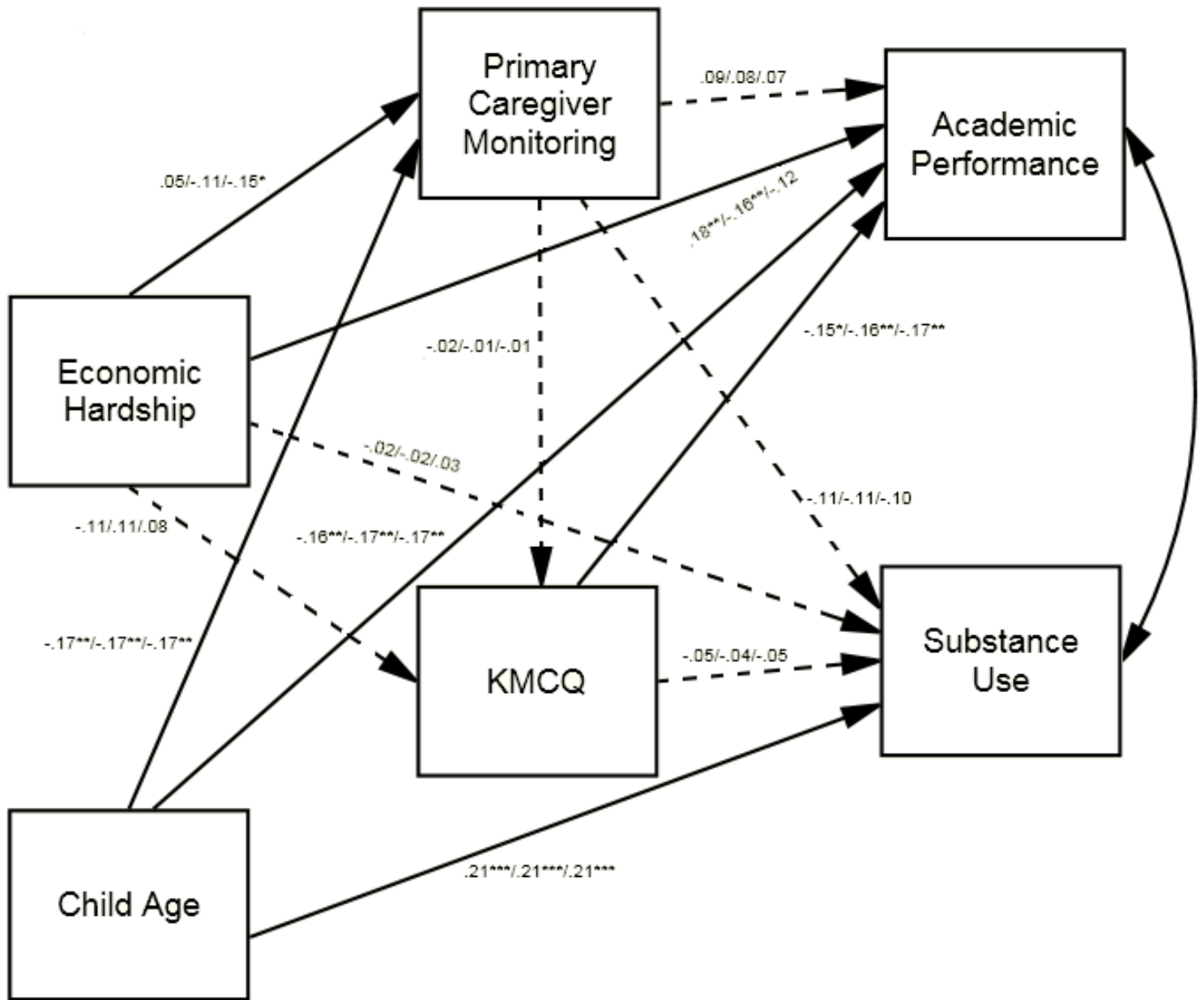


Figure 7. Summarized model fitting results of Wave 2 economic hardship variables, adolescent adjustment outcomes, primary caregiver report of monitoring, and scores on the Kirby Monetary Choice Questionnaire. KMCQ = Score on the Kirby Monetary Choice Questionnaire. Path coefficients on the left are in the model using Wave 2 income as a measure of hardship (Model 16), path coefficients in the middle are in the model using Wave 2 aid as a measure of hardship (Model 17), and path coefficients on the right are in the model using the Economic Strain Questionnaire as a measure of hardship (Model 18). Dashed lines indicate no significant paths. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## Appendix A

### Demographic Interview

#### Introduction:

I am going to ask you some basic questions about the work and educational experiences of yourself and of the people in your household. These questions are very important and need to be answered honestly. No one outside of the project will ever have access to this information. The information that you provide us will not affect any services or assistance that you might be receiving. This information will only be used for the purposes of our research.

(INTERVIEWER- Please mark form but give parent a blank form to read along)

What is your relation to the child?

RESNM \_\_\_\_\_

(1=mother, 2=father, 3=grandmother, 4=grandfather, 5=foster parent,  
6=other – specify who other is \_\_\_\_\_).

R\_GENDER: Male Female

If respondent is not the biological parent ask:  
“How long has this child been in your care?” RCARE \_\_\_\_\_

**Now I am going to ask you about your current family situation.**

1. What is your current marital status- married, widowed, separated, divorced, or never married?  
(If separated, ask “Is this separation legal or not legal?”)

- 1 = never married
- 2 = married
- 3 = widowed
- 4 = divorced
- 5 = legally separated
- 6 = separated, not legally

living with someone as though married

RMASTAT\_\_\_\_\_ 7 =  
1-7

2a. Starting with your oldest, please tell me all of the children to whom you have given birth (fathered), including the child participating in this study if applicable: (For each child ask about the child’s sex, race, birth date. *Please use the race codes on the following page*)

First name / Last name	Sex	Race / sub	Date of Birth

RBRTKIDS\_\_\_\_\_

2b. Are there any children who are not your own but who live in your household? (Ask first / last name, child’s sex, race [code below] and D.O.B. Include the child participating in this study if applicable)

First name / Last name	Sex	Race / sub	Date of Birth

3. How would you describe your own race?

**1. Black**

- 40 African American
- 41 Caribbean or West Indian
- 42 Cuban
- 43 Dominican
- 44 Puerto Rican
- 90 Other \_\_\_\_\_ (specify) Black mix- with 2 or more black ethnicities.

**2 White**

80 White, Caucasian, Euro-American not of Latino Origin

**3 Latino or Hispanic, Non-Black**

50 Cuban

51 Dominican

52 Puerto Rican

53 Mexican

Other \_\_\_\_\_(specify)

90 Other \_\_\_\_\_(specify) Latino/ Nonblack mix with 2 or more

Latino/nonblack ethnicities

**4,5, or 6 Biracial or Multiracial**

4 90 Black / White

5 90 Latino / White

6 90 Latino / Black

9 90 Other \_\_\_\_\_(specify)

**7 Asian or Asian-America**

30 Chinese

31 (East) Indian

32 Filipino

33 Japanese

34 Other \_\_\_\_\_(specify)

90 Other \_\_\_\_\_(specify) Asian mix- with 2 or more Asian

ethnicities

**8 20 American Indian**

**9 Other**

10 Alaskan Native / Eskimo / Aleut

60 Middle Eastern

70 Pacific Islander

91 Other \_\_\_\_\_(specify)

RACE \_\_\_\_\_  
SUBRACE \_\_\_\_\_

4a. How many years of school do you have credit for altogether?

REDUC \_\_\_\_\_  
01-17

4b. What is the highest education degree or certificate you hold?

0 = None

1 = Elementary School / Junior High

2 = GED (General Education Development)

3 = High School Diploma

4 = Vocational / Technical Diploma

5 = Associate Degree

6 = RN Diploma

7 = Bachelor Degree

8 = Master Degree

9 = Doctorate: MD., Ph.D., J.D., etc.

RDEGREE \_\_\_\_\_  
0-9

RHED \_\_\_\_\_  
Hollingshead education score 1-7



5a. During the past week, were you working full-time or part-time?

5b. (If Yes) 1= full time (35 + hrs) or 2 = part-time \_\_\_\_\_

(If No, ask) Which one of these best describes your current situation?

3 = unemployed or laid off and looking for work

4 = unemployed or laid off and not looking for work

5 = retired

6 = in school

7 = keeping house/taking care of children

8 = disabled and not looking for work

9 = other (specify) \_\_\_\_\_

**For a current spouse / partner (within 1 yr, ask questions 10-12).**

6a. How many grades / years of school does your partner have credit for altogether?

SEDUC \_\_\_\_\_  
(01-17)

6b. What is the highest education degree or certificate your partner holds?

0 = None

1 = Elementary School / Junior High

2 = GED (General Education Development)

3 = High School Diploma

4 = Vocational / Technical Diploma

5 = Associate Degree

6 = RN Diploma

7 = Bachelor Degree

8 = Master Degree

9 = Doctorate: MD., Ph.D., J.D., etc.

SDEGREE \_\_\_\_\_  
0-9

SHED \_\_\_\_\_  
Hollingshead education score 1-7

7a. During the past week, was your partner working full-time or part-time?

7b. (If Yes, ask) 1 = fulltime (35+ hrs) or 2 = part time \_\_\_\_\_

(If No, ask) Which one of these best describes your partner's current situation?

3 = unemployed or laid off and looking for work

4 = unemployed or laid off and not looking for work

5 = retired

6 = in school

7 = keeping house/taking care of children

8 = disabled and not looking for work

9 = other (specify)

**For the following questions, please circle the number or letter that is associated with your answer.**

8. Do you receive any public income assistance such as TANF (Temporary Assistance for Needy Families), AFDC (Aid to Families with Dependent Children), food stamps, fuel assistance, rent vouchers or SSI (Supplemental Security Income)?

1 = Yes

2 = No

9. What is your total annual family income before taxes for all the adults in your household? Please include all (including TANF, AFDC, food stamps, SSI, rent voucher, fuel assistance and child support). If you are not sure about the amount, please estimate.

- a. None or \$0 per month
- b. Less than 1,000 or Less than \$83 per month
- c. \$1,000 - \$2,999 or \$83 - \$249 per month
- d. \$3,000 - \$4,999 or \$250 - \$416 per month
- e. \$5,000 - \$7,499 or \$417 - \$624 per month
- f. \$7,500 - \$9,999 or \$625 - \$833 per month
- g. \$10,000 - \$14,999 or \$834 - \$1,249 per month
- h. \$15,000 - \$19,999 or \$1,250 - \$1,666 per month
- i. \$20,000 - \$24,999 or \$1,667 - \$2,083 per month
- j. \$25,000 - \$34,999 or \$2,084 - \$2,916 per month
- k. \$35,000 - \$49,999 or \$2,917 - \$4,167 per month
- l. \$50,000 - \$74,999 or \$4,168 - \$6,249 per month
- m. \$75,000 - \$99,999 or \$6,250 - \$8,333 per month
- n. \$100,000 - \$199,999 or \$8,334 - \$16,666 per month
- o. \$200,000 or more or \$16,667 or more per month

10. How well off would you say your family is?

- 1) very poor (at times no money for food, clothing, and / or shelter)
- 2) poor (limited money for anything more than the basics)
- 3) lower middle class (able to afford necessities for modern life)
- 4) middle class (own house, meet the bills with some extra)
- 5) upper middle class (own nice home, many luxuries)

11. How satisfied are you with your overall financial situation?

- 1) very satisfied
- 2) satisfied
- 3) unsatisfied
- 4) very unsatisfied

12. How satisfied are you with your current income?

- 1) very satisfied
- 2) satisfied
- 3) unsatisfied
- 4) very unsatisfied

13. How satisfied are you with your material possessions, for example, TV's, household appliances, and other things that your family owns?

- 1) very satisfied
- 2) satisfied
- 3) unsatisfied
- 4) very unsatisfied

14. How often do you worry about your family's financial situation?

- 1) very often
- 2) often
- 3) seldom
- 4) never

## Appendix B

### ESQ

Please rate each statement according to how much you agree or disagree with it.

At the present time:

1. Are you able to afford a home suitable for your family?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

2. Are you able to afford furniture or household equipment that needs to be replaced?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

3. Are you able to afford the kind of car that you need?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

4. Do you have enough money for the kind of food your family should have?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

5. Do you have enough money for the kind of medical care your family should have?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

6. Do you have enough money for the kind of clothing your family should have?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

7. Do you have enough money for the leisure activities your family wants?

1	2	3	4	5
Completely Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Completely Disagree

8. Do you have difficulty in paying your bills?

1	2	3	4
No Difficulty	A Little Difficulty	Some Difficulty	A Great Deal of Difficulty

9. At the end of the month, do you end up with money left over?

1	2	3
Some Money Leftover	Just Enough to Make Ends Meet	Not Enough Money to Make Ends Meet

## Appendix C

### Parenting

We are interested in how much you know about what your child \_\_\_\_\_(name) does in school and out of school, who his/her friends are, and so forth. For each item below, circle the number that best describes your child.

How much do you know about your child's life in the following areas? Please use the following key to answer the questions.

- 1 = Always knows
- 2 = Usually knows
- 3 = Sometimes knows
- 4 = Seldom knows
- 5 = Never knows

	How much you know				
1. Your child's choice of friends, who they are, what they are like.	1	2	3	4	5
2. Your child's intellectual interests, both in and out of school.....	1	2	3	4	5
3. Your child's activities outside of school (e.g. sports, jobs, clubs, etc.).....	1	2	3	4	5
4. Your child's interest in and activities with (boy or girl) friends; his/her dating behaviors.....	1	2	3	4	5
5. The extent of his/her sexual behavior.....	1	2	3	4	5
6. Your child's health habits, such as amount of sleep, diet, exercise.....	1	2	3	4	5
7. Your child's use of tobacco.....	1	2	3	4	5
8. Your child's use of alcohol.....	1	2	3	4	5
9. Your child's use of drugs.....	1	2	3	4	5
10. Your child's problem behaviors in school (e.g., skipping school, cutting classes, acting out, being late, being sent to the principal's office, etc). ....	1	2	3	4	5

11. Your child's school life such as who his/her teachers are, if and how well he/she does homework, your child's grades..... 1 2 3 4 5
12. Your child's extracurricular activities, sports, clubs, etc..... 1 2 3 4 5
13. Where your child is and what he/she is doing when he/she is not at home..... 1 2 3 4 5

## Appendix D

### BSCS: Adolescents

Using the scale below, please indicate how much each of the following statements reflects how you typically are.

- |  | Not at all |       |   |       | Very Much |       |   |       |   |
|--|------------|-------|---|-------|-----------|-------|---|-------|---|
| 1. I am good at resisting temptation.....  | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 2. I have a hard time breaking bad habits.....   | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 3. I am lazy.....  | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 4. I say inappropriate things.....   | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 5. I do certain things that are bad for me,<br>if they are fun.....                        | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 6. I refuse things that are bad for me.....  | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 7. I wish I had more self-discipline.....  | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 8. People would say that I have iron self-discipline.....                                  | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 9. Pleasure and fun sometimes keep me from getting<br>work done.....                       | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 10. I have trouble concentrating.....  | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 11. I am able to work effectively toward<br>long-term goals.....                           | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 12. Sometimes I can't stop myself from doing<br>something, even if I know it is wrong..... | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |
| 13. I often act without thinking through all<br>the alternatives.....                      | 1          | ----- | 2 | ----- | 3         | ----- | 4 | ----- | 5 |



## Appendix E

### The Kirby Monetary Choice Questionnaire (KMCQ) ,used under fair use.

Directions: Please take the choices seriously: they may be for *REAL MONEY*. After you complete this interview, you will pick a slip out of a bag. The slips are labeled 1 through 30. If you draw a ten (10), then you will win one of your 27 choices. The numbers of the questions below are written on a piece of paper in another bag. If you draw a ten from the first bag, you will get to pick a number from the second bag. The number you pick from the second bag corresponds to the amount of money you will win; you will win whatever you chose on that particular question. For example, if you pulled the number 9 from the second bag, you would win whatever you answered to question #9 below. If you had circled the smaller reward (\$78.00 today reward), you would get \$78.00 after the interview is complete. If you chose the delayed reward on that question (\$80.00 in 162 days) you will get \$80.00 162 days from now. We would contact your parent at the time your payment came due and will ask him or her to either return to the lab to collect the money or we will mail them a check. It will ultimately be up to your parent in either case to work with you to figure out how to deal with the money you are rewarded.

1. Would you prefer \$54.00 today, or \$55.00 in 117 days?

\$54.00 today

\$55.00 in 117 days

2. Would you prefer \$55.00 today, or \$75.00 in 61 days?

\$55.00 today

\$75.00 in 61 days

3. Would you prefer \$19.00 today, or \$25.00 in 53 days?

\$19.00 today

\$25.00 in 53 days

4. Would you prefer \$31.00 today, or \$85.00 in 7 days?

\$31.00 today

\$85.00 in 7 days

5. Would you prefer \$14.00 today, or \$25.00 in 19 days?

\$14.00 today

\$25.00 in 19 days

6. Would you prefer \$47.00 today, or \$50.00 in 160 days?

\$47.00 today

\$50.00 in 160 days

7. Would you prefer \$15.00 today, or \$35.00 in 13 days?

\$15.00 today

\$35.00 in 13 days

8. Would you prefer \$25.00 today, or \$60.00 in 14 days?

\$25.00 today                      \$60.00 in 14 days

9. Would you prefer \$78.00 today, or \$80.00 in 162 days?

\$78.00 today                      \$80.00 in 162 days

10. Would you prefer \$40.00 today, or \$55.00 in 62 days?

\$40.00 today                      \$55.00 in 62 days

11. Would you prefer \$11.00 today, or \$30.00 in 7 days?

\$11.00 today                      \$30.00 in 7 days

12. Would you prefer \$67.00 today, or \$75.00 in 119 days?

\$67.00 today                      \$75.00 in 119 days

13. Would you prefer \$34.00 today, or \$35.00 in 186 days?

\$34.00 today                      \$35.00 in 186 days

14. Would you prefer \$27.00 today, or \$50.00 in 21 days?

\$27.00 today                      \$50.00 in 21 days

15. Would you prefer \$69.00 today, or \$85.00 in 91 days?

\$69.00 today                      \$85.00 in 91 days

16. Would you prefer \$49.00 today, or \$60.00 in 89 days?

\$49.00 today                      \$60.00 in 89 days

17. Would you prefer \$80.00 today, or \$85.00 in 157 days?

\$80.00 today                      \$85.00 in 157 days

18. Would you prefer \$24.00 today, or \$35.00 in 29 days?

\$24.00 today                      \$35.00 in 29 days

19. Would you prefer \$33.00 today, or \$80.00 in 14 days?

\$33.00 today

\$80.00 in 14 days

20. Would you prefer \$28.00 today, or \$30.00 in 179 days?

\$28.00 today

\$30.00 in 179 days

21. Would you prefer \$34.00 today, or \$50.00 in 30 days?

\$34.00 today

\$50.00 in 30 days

22. Would you prefer \$25.00 today, or \$30.00 in 80 days?

\$25.00 today

\$30.00 in 80 days

23. Would you prefer \$41.00 today, or \$75.00 in 20 days?

\$41.00 today

\$75.00 in 20 days

24. Would you prefer \$54.00 today, or \$60.00 in 111 days?

\$54.00 today

\$60.00 in 111 days

25. Would you prefer \$54.00 today, or \$80.00 in 30 days?

\$54.00 today

\$80.00 in 30 days

26. Would you prefer \$22.00 today, or \$25.00 in 136 days?

\$22.00 today

\$25.00 in 136 days

27. Would you prefer \$20.00 today, or \$55.00 in 7 days?

\$20.00 today

\$55.00 in 7 days

## **Appendix F**

### **Academic Performance**

1. To the best of your knowledge, what is your average level of academic achievement using the following scale?

A – Excellent

B – Above Average

C – Average

D – Below Average

F – Poor

## Appendix G

### Youth Behaviors

**The next questions ask about tobacco use.**

1. Which is the most true for you about smoking cigarettes?
  - A. Never used
  - B. Tried once – twice
  - C. Used three – five times
  - D. Usually use a few times a month
  - E. Usually use a few times a week
  - F. Usually use every day
  
2. How old were you when you smoked a whole cigarette for the first time?
  - A. I have never smoked a whole cigarette.
  - B. 8 years old or younger
  - C. 9-10 years old
  - D. 11-12 years old
  - E. 13-14 years old
  - F. 15-16 years old
  - G. 17 years old or older
  
3. During the past 30 days, on how many days did you smoke cigarettes?

A. 0 days	E. 10 to 19 days
B. 1 or 2 days	F. 20 to 29 days
C. 3 to 5 days	G. All 30 days
D. 6 to 9 days	
  
4. During the past 30 days, on the days that you smoked, how many cigarettes did you smoke?
  - A. I did not smoke cigarettes during the past 30 days
  - B. Less than 1 cigarette per day
  - C. 1 cigarette per day
  - D. 2 to 5 cigarettes per day
  - E. 6 to 10 cigarettes per day
  - F. 11-20 cigarettes per day
  - G. More than 20 cigarettes per day

**The next questions ask about drinking alcohol.** This includes drinking beer, wine, wine coolers, and liquor such as rum, gin, vodka, or whisky. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

5. Which is the most true for you about using alcohol?
  - A. Never used
  - B. Tried once – twice
  - C. Used three – five times
  - D. Usually use a few times a month
  - E. Usually use a few times a week
  - F. Usually use every day
  
6. How old were you when you had your first drink of alcohol other than a few sips?
  - A. I have never had a drink of alcohol other than a few sips.
  - B. 8 years old or younger
  - C. 9-10 years old
  - D. 11-12 years old
  - E. 13-14 years old
  - F. 15-16 years old
  - G. 17 years old or older
  
7. During the past 30 days, on how many days did you have at least one drink of alcohol?

A. 0 days	E. 10 to 19 days
B. 1 or 2 days	F. 20 to 29 days
C. 3 to 5 days	G. All 30 days
D. 6 to 9 days	
  
8. How many times did you have 3 or more alcoholic drinks on one occasion in the past 30 days?
  - A. Never happened
  - B. Happened once
  - C. Happened twice
  - D. Happened three or more times
  
9. How many times did you have 3 or more alcoholic drinks on one occasion in the past 6 months?
  - A. Never happened
  - B. Happened once – twice
  - C. Happened three – five times
  - D. Happened a few times a month
  - E. Happened a few times a week
  - F. Happened every day

**The next questions ask about marijuana use. Marijuana is also known as grass, pot, or weed.**

10. Which is the most true for you about using marijuana?
- A. Never used
  - B. Tried once – twice
  - C. Used three – five times
  - D. Usually use a few times a month
  - E. Usually use a few times a week
  - F. Usually use every day
11. How old were you when you tried marijuana for the first time?
- A. I have never tried marijuana.
  - B. 8 years old or younger
  - C. 9-10 years old
  - D. 11-12 years old
  - E. 13-14 years old
  - F. 15-16 years old
  - G. 17 years old or older
12. During the past 30 days, on how many days did you have at least one puff of marijuana?
- |                |                  |
|----------------|------------------|
| A. 0 days      | E. 10 to 19 days |
| B. 1 or 2 days | F. 20 to 29 days |
| C. 3 to 5 days | G. All 30 days   |
| D. 6 to 9 days |                  |