



Published in final edited form as:

J Adolesc. 2015 June ; 41: 121–130. doi:10.1016/j.adolescence.2015.02.010.

Early Adolescent Temperament, Parental Monitoring, and Substance Use in Mexican-Origin Adolescents

D. Angus Clark,

Michigan State University

M. Brent Donnellan,

Texas A & M University

Richard W. Robins, and

University of California, Davis

Rand D. Conger

University of California, Davis

Abstract

Previous studies suggest that temperamental dispositions are associated with substance use. However, most research supporting this association has relied on European American samples (Stautz & Cooper, 2013). We addressed this gap by evaluating the prospective relations between 5th grade temperament and 9th grade substance use in a longitudinal sample of Mexican-origin youth ($N = 674$). Effortful control and trait aggressiveness predicted 9th grade substance use, intentions, and expectations, even after controlling for 5th grade substance use. Additionally, we found an interaction between temperament and parental monitoring such that monitoring is a protective factor for early substance use primarily for youth with temperamental tendencies associated with risk for substance use (e.g., low effortful control and aggression). Results add to the growing literature demonstrating that early manifestations of self-control are related to consequential life outcomes.

Keywords

adolescence; temperament; substance use; parental monitoring; Mexican-origin

The abuse of tobacco, alcohol, and other substances has long-term negative consequences for both physical and mental health (Fergusson & Boden, 2008; Mathers, Toumbourou, Catalano, Williams, & Patton, 2006; Rooke, Norberg, Copeland, & Swift, 2013; Steinhausen, Eschmann, & Metzke, 2007). One seemingly robust predictor of problematic substance use is early experimentation and initiation (Flory, Lynam, Milich, Leukefeld, &

© 2015 Published by Elsevier Ltd on behalf of The Foundation for Professionals in Services for Adolescents.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Clayton, 2004; Georgiades & Boyle, 2007; Tucker, Ellickson, Orlando, Martino, & Klein, 2005). In light of these findings, there is increasing interest in identifying the dispositional and family/contextual variables that place youth at heightened risk for early substance use. The present investigation examines how well early emerging individual differences (i.e., temperament) and parental monitoring prospectively predict substance use behaviors, intentions, and expectancies in a longitudinal sample of early adolescent Mexican-origin (i.e. of Mexican ancestry) youth. This is an important population to study given recent demographic shifts in the population of the United States (U.S. Census, 2011), as well as data suggesting that “Hispanic” adolescents may be at greater risk for the use of certain substances than other groups (Eaton et al., 2008; Mercado-Crespo & Mbah, 2013).

Temperament and Substance Use

Temperament refers to early emerging, “constitutionally based individual differences in reactivity and self-regulation” (Rothbart, 2011, p.10). Reactivity is conceptualized in terms of affective and motivational responses to stimuli, and captures, for example, the tendency for some children to feel threatened in response to novel stimuli and others to feel intrigued. Self-regulation refers to individual differences in the top-down control of reactive processes, and goal setting and goal striving behaviors; it reflects the fact that children differ in the ability to control their appetitive impulses, as illustrated in delay of gratification tasks (e.g., Mischel & Ebbesen, 1970).

There are numerous approaches for classifying the myriad aspects of childhood temperament. One prominent model posits that childhood temperament can be partitioned into three broad dimensions: effortful control, negative affectivity, and surgency (Rothbart, 2011). Effortful control reflects an individual’s ability to control their attention and impulses. This domain is conceptually similar to the adult personality dimensions of disinhibition (Clark & Watson, 2008; Tellegen & Waller, 2008) and conscientiousness (e.g., Kochanska & Knaack, 2003; Roberts, Lejuez, Krueger, Richards, & Hill, 2014). Negative affectivity captures an individual’s tendency to experience fear, anger, and other types of psychological distress. It is conceptually similar to the adult dimensions of negative emotionality (Clark & Watson, 2008; Tellegen & Waller, 2008) and neuroticism (John, Soto, & Naumann, 2008). Last, surgency refers to an individual’s tendency to experience positive emotions and approach potential rewards. It is conceptually similar to the adult dimensions of positive emotionality (Clark & Watson, 2008; Tellegen & Waller, 2008), and extraversion (John, Soto, & Naumann, 2008).

Traits related to effortful control, such as impulsivity, have the strongest and most robust connections with substance use (Creemers, Dijkstra, Vollebergh, Ormel, Verhulst, & Huizink, 2010; Hartman, Hopfer, Corley, Hewitt, & Stallings, 2013; Kotov, Gamez, Schmidt, & Watson, 2010; Stautz & Cooper, 2013; Williams et al., 2010). In contrast, results for negative affectivity are more equivocal. Some studies have found that negative affectivity predicts increased substance use (e.g. Elkins, King, McGue, & Iacono, 2006; Hicks, Durbin, Blonigen, Iacono, & McGue, 2011; Willem, Bijttebier, Claes, Sools, Vanerbussche, & Nigg, 2011), whereas other studies have not (e.g. Galera et al., 2010; Gunnarsson, Gustavsson, Tengstrom, Franck, & Fahlke, 2008; Willem, Bijttebier, Claes, &

Uytterhaegen, 2012). There are even hints that negative affectivity can predict *decreased* substance use (Gunnarsson et al., 2008; Willem et al., 2012). Some of the inconsistencies might stem from the varying ways negative affectivity is conceptualized (Pardini, Lochan, & Wells, 2004) and measured (Colder, 2001). For instance, fear, anger, and hostility are all components of negative affectivity, but fear might protect against early substance use, whereas anger and hostility might increase risk (Pardini et al., 2004; Willem et al., 2012).

A related but somewhat more complex dispositional characteristic – aggressiveness – has also been linked to substance use (Flannery, Vazsonyi, & Rowe, 1996; Mercado-Crespo & Mbah, 2013; White, Brick, & Hansell, 1993). Aggressiveness can be thought of as an emergent behavioral tendency related to low levels of effortful control and high levels of surgency and negative affectivity (particularly the elements related to hostility and anger; Meehan, Panfilis, Cain, & Clarkin, 2013; Rathert, Fite, & Gaertner, 2011; Rothbart, Ahadi, & Hershey, 1994). Although some have posited reciprocal relations between aggressiveness and substance use, White and colleagues (1993) found support for a unidirectional relationship whereby aggressiveness was related to subsequent substance use, but not vice versa. Therefore, aggressiveness might be an especially important dispositional predictor of early substance use.

One concern with the current literature on temperament and substance use is that many of the existing studies lack ethnic diversity. Stautz and Cooper (2013) noted that the majority of studies reviewed in their meta-analysis consisted of predominantly Caucasian samples. Although ethnicity moderated the relationship between impulsivity and substance use, the authors concluded that there was not enough ethnic variation to draw firm conclusions (Stautz & Cooper, 2013). Although Stautz and Cooper (2013) focused exclusively on alcohol use, their findings highlight the need to evaluate the relation between temperament and substance use in diverse populations. The current study helps address this gap by evaluating connections between temperament and substance use in a sample of Mexican-origin adolescents.

Parental Monitoring and Substance Use

Substance use is a multiply determined outcome that is influenced by contextual, as well as dispositional, factors. A large literature suggests that family dynamics contribute to adolescent substance use, and that such processes may moderate the effects of dispositional variables (Wills & Dishion, 2004; Wills, Sandy, & Yaeger, 2000; Wills & Yaeger, 2003). One family factor consistently related to substance use is parental monitoring (Wills & Yaeger, 2003), or, “parenting behaviors involving attention to and tracking of the child’s whereabouts, activities, and adaptations” (Dishion & McMahon, 1998, p.61). Monitoring is considered a protective factor against substance use, and studies confirm that increased parental monitoring predicts less use, even in high-risk (Clark, Shamblen, Ringwalt, & Hanley, 2012; Farrell & Dintcheff, 2006; Warren, Wagstaff, Hecht, & Elek, 2008) and diverse (Yabiku et al., 2010) samples.

Despite the well-documented association between parental monitoring and adolescent substance use, the actual direction of the effect between these variables is controversial.

Although it is typically assumed that parental monitoring reduces problem behaviors in adolescence, monitoring may also reflect the outcome of a reactive process whereby parents increase or decrease monitoring efforts in response to adolescent behaviors (Kerr & Stattin, 2003). Indeed, parents sometimes decrease their monitoring efforts when their adolescents engage in delinquency (Kerr & Stattin, 2003). Moreover, parental monitoring may serve a protective role only for youth who have dispositional tendencies toward substance use. That is, monitoring might decrease risk for youth who have temperamental traits associated with substance use (e.g., low effortful control, high aggression), but be less relevant for adolescents who do not have such characteristics. The current study will contribute to the existing literature by testing both additive and interactive effects of temperament and parental monitoring.

Method

Participants and Procedures

The data come from the California Families Project, a longitudinal study of 674 Mexican-origin youth (50.0% girls) and their parents. To recruit participants, children were drawn at random from rosters of students in the Sacramento and Woodland, CA, school districts. The focal child had to be in the 5th grade, living with her or his biological mother, and of Mexican origin (i.e. of Mexican Ancestry); 29% of focal children were born in Mexico. Participants were interviewed in their homes in Spanish or English, depending on their preference. The parents were not present when their child was interviewed. The first assessment occurred when the youth were in 5th grade ($M_{\text{age}} = 10.40$ years, $SD = 0.61$). The current study is based on data from the 5th and 9th grade assessments in order to maximize the distance between reports of temperament and substance use outcomes (M_{age} at 9th grade = 14.27 years, $SD = 0.53$). The retention rate in 9th grade was 90% for the youth ($N = 605$) and 89% ($N = 600$) for the mothers (the combined retention rate, including families where either the child or mother participated, was 91%).

Measures

Temperament—Adolescent temperament was assessed using the 64-item *Early Adolescent Temperament Questionnaire – Revised* (EATQ - R; Ellis & Rothbart, 2001). The EATQ-R scales assess three broad dimensions of temperament - effortful control, negative affectivity, and surgency (Muris, Meesters, & Blijlevens, 2007). Effortful control was measured using 16 items that reflect activation control (the ability to perform an action despite the inclination not to do so) and inhibitory control (the ability to anticipate and suppress inappropriate responses). Negative affectivity was measured using 13 items pertaining to fear (negative affect associated with the anticipation of distress), and frustration (unpleasant affect stemming from the interruption of an ongoing task, or an obstructed goal). Surgency was measured using 6 items that assessed the amount of pleasure one derives from novel and “high intensity” experiences.

The EATQ-R also contains scales assessing depressive mood and aggression. The depressive mood scale contains six items related to sadness and the loss of enjoyment in

activities, and the aggression scale contains six items related to hostile actions (verbal and physical) and hostile reactivity.

Temperament scores were obtained from both the adolescents (reporting on themselves), and their mothers (reporting on the adolescent). Ratings were made on a scale ranging from 1 “*not at all true of you/your child*” to 4 “*very true of you/your child*”. Sample items include, “It is easy for you/your child to really concentrate on homework problems”, “When you/your child is angry, you/your child throw or break things”, and “You/your child feel(s) shy with kids of the opposite sex”.

Table 1 provides basic descriptive information for the EATQ-R scales, including alpha reliabilities and mother-child agreement correlations. All alphas were acceptable except for the surgency scale in the 5th grade; therefore, correlations based on this scale are likely to be attenuated by measurement error and should be interpreted with caution. Mother and adolescent temperament ratings were averaged together to form a composite score for each dimension. Although the mother-child agreement correlations were small to moderate (ranging from .11 to .34; see Table 1), the same patterns of results emerged no matter whose ratings were used.

Parental monitoring—Parental monitoring was measured using a 14-item scale adapted from Small and Kerns (1993). This scale assesses the degree to which parents are aware of their youth’s behavior and various life circumstances using a response scale ranging from 1 “*Almost never or never*” to 4 “*Almost always or always*”. Adolescents completed the scale once in reference to their mother, and once in reference to their father. Sample items include, “Your Father/Mother knew how you spent your money”, “When you went out, your Mother/Father asked you where you were going”, and “Your Mother/Father knew what you were doing after school”. Monitoring scores were computed by summing up responses to the individual items. Adolescent reported maternal and paternal monitoring were correlated ($r = .48$ at 5th grade and $r = .60$ at 9th grade), so scores were averaged to create one composite “Parental Monitoring” score. Mother and Father reported monitoring scores (i.e. the degree to which parents reported monitoring their child) were kept separate.

Substance use intentions: This 9-item scale, adapted from Gibbons et al. (2004), assesses willingness to use particular substances, as well as plans to use those substances in the next year. Three items were dedicated to alcohol use, three to cigarette use, and three to “illegal drug” use. Participants responded on either a three or four point scale ranging from 1 “*Do not plan to/Definitely will not/Not at all willing*” to either 3 “*Very willing*”, or 4 “*Do plan to/Definitely will.*” Sample items include, “How likely is it that you will drink alcohol in the next year”, and “Do you plan to smoke cigarettes in the next year?” Scores for this measure were computed by summing up the individual items.

Substance use expectancies: This 18-item scale assesses positive expectations regarding the use of alcohol, cigarettes, and other drugs. The scale was developed by Rand Conger for use in the Family Transitions Project. Participants responded to a variety of “pro-drug” statements on a scale ranging from 1 “*Strongly Disagree*” to 5 “*Strongly Agree*”. Sample items include, “Drinking alcohol helps people relax”, and “Smoking marijuana makes life

more exciting”. A total positive expectancies composite was created by aggregating across the items.

Substance use: This 9-item scale, adapted from Elliott, Huizinga, and Ageton (1985), measures lifetime use of a wide range of substances. Participants responded “yes” or “no” to questions such as, “Have you ever used or tried cigarettes?”, and “Have you ever used or tried beer – more than just a few sips?” “Yes” responses were coded as 1s, and “no” responses were coded as 0s. Responses across the scale were summed up to generate a total use variety score.

Means, standard deviations, and reliability information are presented in Table 2 for parental monitoring, substance use intentions, substance use expectancies, and substance use.

Results

We used a .05 alpha level (two-tailed) to determine statistical significance for all analyses, but placed more emphasis on effect sizes and consistency with previous research when interpreting results. All analyses reported here were based on the total sample. Consistent with prior research (Else-Quest, Hyde, Goldsmith, Van Hulle, 2006), we found gender differences in aggression (girls lower), effortful control (girls higher), negative affectivity (girls higher), and depressive mood (girls higher). However, none of the effects reported below were significantly moderated by gender; that is, the relations among temperament, parental monitoring, and substance use did not differ for boys and girls.

Do Temperament and Parental Monitoring Assessed in Fifth Grade Predict Substance Use Variables in Ninth Grade?

Prospective correlations are reported in Table 3. Aggression assessed in fifth grade was associated with future substance intentions and expectancies, as well as reports of actual use. Effortful Control was negatively correlated with future substance use variables, but the effect sizes were roughly half that of the correlations involving Aggression. Depressive mood was related to intentions and actual use, but not expectancies. Child reports of parental monitoring were related to substance use variables more consistently than parental reports. Overall, there were consistent prospective zero-order correlations supporting an association between certain individual differences and early substance use.

Regression analyses were used to control for fifth grade levels of the respective substance use variables when predicting the ninth grade variables (expectancies data from 5th grade was unavailable). As seen in Table 3, although controlling for the baseline substance use variables reduced effect size estimates, all relevant predictors remained statistically significant.¹ We should note that endorsements of the substance use variables in fifth grade were quite low (see Table 2), and floor effects may have attenuated the predictive power of the fifth grade assessments. However, these distributions might simply reflect the reality of low substance use at relatively young ages (SAMHSA, 2014).

¹When all three higher order dimensions of temperament are entered into the model, controlling for prior use, effortful control remains the one statistically significant predictor.

The prospective associations were supplemented with concurrent analyses using temperamental variables, parental monitoring variables, and substance use variables measured in ninth grade (see Table 3). The correlations tended to increase in magnitude, but the pattern was generally consistent with the prospective correlations. Aggressive temperament and child reports of monitoring were the strongest correlates of substance use intentions, expectancies, and actual use. Effortful Control was also consistently linked with these outcomes.

Interactions between Temperament and Parental Monitoring

We found support for the idea that certain temperamental traits are related to substance use, and some evidence that parental monitoring (especially as perceived by the child) is associated with substance use. We also tested whether temperament interacted with parental monitoring to predict substance use variables. We focused on child reports of monitoring for these analyses because parental reports of monitoring were not generally associated with substance use outcomes (see Table 3).² Prior to analysis, the three substance use variables were log transformed to address concerns about skewness (raw score analyses were similar and available upon request). All predictors were grand mean centered, and interaction variables were computed as the product of the two centered variables. When the interaction term was significant in a regression model, a set of simple slopes analysis was performed for “high” (1 SD above the mean) and “low” levels (1 SD below the mean) of a given dimension of temperament.

We first considered prospective relations, using temperament and monitoring assessed in 5th grade to predict substance use variables in 9th grade. Selected results are presented in Table 4. Complete results are available upon request. Two sets of temperament by monitoring interactions replicated across both substance use and intention variables – those involving effortful control and depressive mood. Results suggested that parental monitoring had very little association with substance use intentions and substance use in 9th grade for adolescents with high levels of effortful control in 5th grade. However, parental monitoring was a significant predictor of these variables when adolescents were low in effortful control. Likewise, monitoring was primarily a protective factor when depressed mood was relatively high in 5th grade. These interactions are illustrated in Figures 1 and Figure 2. In short, there were indications that parental monitoring might be most relevant for youth with dispositional tendencies associated with substance use.

We then evaluated concurrent relations using 9th grade data. Selected results are presented in Table 6. Significant results were restricted to the substance use intention variable, but the effortful control and depressive mood pattern was replicated. In general, the significant patterns were consistent with the prospective analyses and indicated that monitoring was a stronger predictor for youth with temperamental dispositions that placed them at risk for greater substance use (i.e., low effortful control, high depressive mood, high aggression, high negative affectivity). However, these interactions were restricted to only one substance use variable, and thus should be viewed with caution.

²Interaction analyses run using parental reported monitoring failed to show any interactive effects (tables available upon request).

Discussion

We investigated the prospective influence of temperament and parental monitoring on substance use using data from a longitudinal study of Mexican-origin youth and their families. We focused on willingness to use substances (intentions), expectations for positive outcomes (expectancies), and lifetime use of alcohol, cigarettes, and other drugs. The rates of substance use in this sample were similar to what has been reported for Hispanic adolescents in nationally representative surveys (Kann et al., 2014; SAMHSA, 2014). Specifically, around 40% of participants had tried a substance at least once by 9th grade (see Table 2), and furthermore, considerably more participants had tried a substance by 9th grade compared to 5th grade. These rates are thus also similar to what has been reported for European American and African American adolescents, and higher than what has been reported for Asian American adolescents (Kann et al., 2014; SAMHSA, 2014).

As expected, low effortful control and high aggressive tendencies assessed in 5th grade were the most robust predictors of substance use variables in 9th grade. These findings fit with previous research indicating that temperamental traits related to impulsivity are associated with substance use (e.g., Belcher et al., 2014; Stautz & Cooper, 2013). Moreover, these associations held while controlling for previous levels of the substance use variables in 5th grade (data on expectancies were not available in 5th grade). This finding is consistent with White and colleagues' (1993) suggestion that aggression serves as a risk factor for future substance use irrespective of previous use. These longitudinal findings are particularly noteworthy because Mexican Americans are the largest and fastest growing ethnic minority group in the United States, yet this population has received relatively little attention in research on the temperamental correlates of substance use.

Beyond finding evidence that temperament prospectively predicts substance use, we also examined the main and interactive effects of parenting monitoring. Consistent with previous research (Wills & Yaeger, 2003), child-reported parental monitoring in 5th grade was associated with 9th grade substance use variables, even after controlling for prior levels. In contrast, parent reports of monitoring had only concurrent associations with substance use variables. Although the greater predictive power of child reports could simply reflect shared method biases, we believe that a pure methodological explanation is unlikely to fully account for the findings. Instead, we suspect that youth perceptions of parental behaviors are especially salient developmental considerations when attempting to understand risk for substance use. Youth who believe their behavior is being monitored will likely behave differently than youth who do not believe there is surveillance of their behaviors. Indeed, beliefs about parental behaviors and values might be more consequential than actual parental behaviors and values for understanding adolescent substance use. This is consistent with Voisine and colleagues' (2008) suggestion that parental injunctive norms are more effective in preventing substance use than parental monitoring per se. Nonetheless, further research is needed to better understand the relative importance of child vs. parent reported monitoring for substance use outcomes.

We found a number of significant interactions between temperament and child-reported parental monitoring. Most notably, both effortful control and depressive mood interacted

with monitoring in 5th grade to predict intentions and use in 9th grade. These interaction effects suggest that parental monitoring is a protective factor for youth with the temperamental tendencies associated with risk for substance use. Considered from another perspective, the interaction effects suggest that certain temperamental traits are risk factors for substance use when parental monitoring is low, but not when it is high. Either interpretation is consistent with the findings and points to a similar conclusion about how temperament and parenting work together to increase risk for early substance use. Being raised in a home with a perception of minimal monitoring by parents may be a more salient risk factor for substance use for those adolescents with dispositional proclivities toward substance use, and possessing a disposition toward substance use may be a stronger risk factor when youth do not believe they are closely monitored by their parents. The broader developmental consideration is that temperamental factors and family variables should be considered jointly in models that attempt to understand early risk for substance use.

Although the current study was notable for its multi-informant longitudinal design, and for the size and ethnic composition of the sample, there are limitations that merit consideration. For instance, our ability to detect effects for surgency was hampered by the low reliability of the scale in the 5th grade; thus, results involving surgency should be interpreted with caution. Also, we relied exclusively on youth reports of their substance use, intentions, and expectancies. However, intentions and expectancies are inherently subjective variables and are thus best assessed via self-report. Likewise, focal youth might be in the best position to report on their actual use given understandable motivations to hide substance use from parents, teachers, and other potential informants.

In closing, we found evidence from a longitudinal study of Mexican-origin youth that temperament and parental monitoring assessed in 5th grade are prospectively related to substances use outcomes in 9th grade. These findings are important because they suggest that theoretical models concerning the influence of temperament on substance use can be applied to adolescents of Mexican origin. Indeed, we suspect that factors like temperament and parental monitoring have transcontextual validity to the extent that they are risk factors for early substance use for a diverse range of youth. Of particular importance, we also found that relatively high levels of perceived monitoring might attenuate some of the risks associated with dispositional tendencies toward substance use. Although the current results should be replicated, we suggest that future intervention and prevention efforts could be enhanced by attending to individual differences in temperament. Such attention might be especially important when considering efforts to increase parental monitoring.

Acknowledgements

This research was supported by a grant from the National Institute on Drug Abuse (DA017902) to Richard W. Robins, Rand D. Conger, and Keith F. Widaman. We thank the participating families, staff, and research assistants who took part in this study.

References

Belcher AM, Volkow ND, Moeller FG, Ferre S. Personality traits and vulnerability or resilience to substance use disorders. *Trends in Cognitive Sciences*. 2014; 18(4):211–217. [PubMed: 24612993]

- Clark HK, Shamblen SR, Ringwalt CL, Hanley S. Predicting high risk adolescents' substance use over time: The role of parental monitoring. *Journal of Primary Prevention*. 2012; 33:67–77. [PubMed: 22370765]
- Clark, LA.; Watson, D. *Handbook of Personality: Theory and Research*. New York, NY: The Guilford Press; 2008. Temperament: An organizing paradigm for trait psychology; p. 265-286.
- Colder CR. Life stress, physiological and subjective indexes of negative emotionality, and coping reasons for drinking: Is there evidence for a self-medication model of alcohol use? *Psychology of Addictive Behaviors*. 2001; 15(3):237–245. [PubMed: 11563801]
- Creemers HE, Dijkstra JK, Vollebergh WAM, Ormel J, Verhulst FC, Huizink AC. Predicting life-time and regular cannabis use during adolescence; the roles of temperament and peer substance use: The TRAILS study. *Addiction*. 2010; 105:699–708. [PubMed: 20148797]
- Dishion TJ, McMahon RJ. Parental monitoring and the prevention of child and Adolescent problem behavior: A conceptual and empirical formulation. *Clinical Child and Family Psychology Review*. 1998; 1(1):61–75. [PubMed: 11324078]
- Eaton DK, Kann L, Kinchen S, Shanklin S, Ross J, Hawkins J, Wechsler H. Youth risk behavior surveillance---United States, 2007. *Morbidity and Mortality Weekly Report*. 2008; 57:1–131. (SS04). [PubMed: 18185492]
- Elkins IJ, King SM, McGue M, Iacono WG. Personality traits and the development of nicotine, alcohol, and illicit drug disorders: Prospective links from adolescence to young adulthood. *Journal of Abnormal Psychology*. 2006; 115(1):26–39. [PubMed: 16492093]
- Elliott, DS.; Huizinga, D.; Ageton, SS. *Explaining delinquency and drug use*. Beverly Hills, CA: Sage; 1985.
- Ellis, LK.; Rothbart, MK. Poster presented at the biennial meeting of the Society for Research in Child Development. Minneapolis, MN: Apr. 2001 Revision of the Early Adolescent Temperament Questionnaire.
- Else-Quest NM, Hyde JS, Goldsmith HH, Van Hulle CA. Gender differences in temperament: A meta-analysis. *Psychological Bulletin*. 2006; 132(1):33–72. [PubMed: 16435957]
- Farrell MP, Dintcheff BA. Effects of parental monitoring and peer deviance on substance use and delinquency. *Journal of Marriage and Family*. 2006; 68(4):1084–1104.
- Fergusson DM, Boden JM. Cannabis use and later life outcomes. *Addiction*. 2008; 103:969–976. [PubMed: 18482420]
- Flannery DJ, Vazsonyi AT, Rowe DC. Caucasian and Hispanic early adolescent substance use: Parenting, personality, and school adjustment. *The Journal of Early Adolescence*. 1996; 16:71–90.
- Flory K, Lynam D, Milich R, Leukefeld C, Clayton R. Early adolescent through young adult alcohol and marijuana use trajectories: Early predictors, young adult outcomes, and predictive utility. *Development and Psychopathology*. 2004; 16:193–213. [PubMed: 15115071]
- Galera C, Bouvard M-P, Melchior M, Chastang J-F, Lagarde E, Michel G, Fombonne E. Disruptive symptoms in childhood and adolescence and early initiation of tobacco and cannabis use: The Gazel Youth study. *European Psychiatry*. 2010; 25:402–408. [PubMed: 20813507]
- Georgiades K, Boyle MH. Adolescent tobacco and cannabis use: Young adult outcomes from the Ontario Child Health Study. *Journal of Child Psychology and Psychiatry*. 2007; 48(7):724–731. [PubMed: 17593153]
- Gibbons F, Gerrard M, Vande Lune L, Wills T, Brody G, Conger R. Context and intentions : Environmental risk, social influence, and adolescent substance use. *Personality and Social Psychology Bulletin*. 2004; 30:1048–1061. [PubMed: 15257788]
- Gunnarsson M, Gustavsson JP, Tengstrom A, Franck Fahlke C. Personality traits and their associations with substance use among adolescents. *Personality and Individual Differences*. 2008; 45:356–360.
- Hartman C, Hopfer C, Corley Hewitt J, Stallings M. Using Cloninger's temperament scales to predict substance-related behaviors in adolescents: A prospective longitudinal study. *The American Journal on Addictions*. 2013; 22:246–251. [PubMed: 23617866]
- Hicks BM, Durbin CE, Blonigen DM, Iacono WG, McGue M. Relationship between personality change and the onset and course of alcohol dependence in young adulthood. *Addiction*. 2011; 107:540–548. [PubMed: 21851441]

- John, OP.; Naumann, LP.; Soto, CJ. *Handbook of Personality: Theory and Research*. New York, NY: The Guilford Press; 2008. Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues; p. 114-158.
- Kann L, Kinchen S, Shanklin SL, Flint KH, Hawkins J, Harris WA, Zaza S. Youth risk behavior surveillance - United States, 2013. *Morbidity and Mortality Weekly Report*. 2014; 63(4):1-168. [PubMed: 24402465]
- Kerr, M.; Stattin, H. Children's influence on family dynamics: The neglected side of family relationships. Mahwah, NJ: Lawrence Erlbaum Associates, Inc; 2003. Parenting of adolescents: Action or Reaction?; p. 121-151.
- Kochanska G, Knaack A. Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality*. 2003; 71(6):1087-1112. [PubMed: 14633059]
- Kotov R, Gamez W, Schmidt F, Watson D. Linking big personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*. 2010; 136(5):768-821. [PubMed: 20804236]
- Mathers M, Toumbourou JW, Catalano RF, Williams J, Patton GC. Consequences of youth tobacco use: A review of prospective behavioral studies. *Addiction*. 2006; 101:948-958. [PubMed: 16771887]
- Meehan KB, Panfilis CD, Cain NM, Clarkin JF. Effortful control and externalizing problems in young adults. *Personality and Individual Differences*. 2013; 55:553-558.
- Mercado-Crespo MC, Mbah AK. Race and ethnicity, substance use, and physical aggression among U.S. high school students. *Journal of Interpersonal Violence*. 2013; 28:1367-1384. [PubMed: 23262830]
- Mischel W, Ebbesen EB. Attention in delay of gratification. *Journal of Personality and Social Psychology*. 1970; 16(2):329-337.
- Muris P, Meesters C, Blijlevens P. Self-reported reactive and regulative temperament in early adolescence: Relations to internalizing and externalizing problem behavior and "Big Three" personality factors. *Journal of Adolescence*. 2007; 30:1035-1049. [PubMed: 17467051]
- Pardini D, Lochman J, Wells K. Negative emotions and alcohol use initiation in high-risk boys: The moderating effect of good inhibitory control. *Journal of Abnormal Child Psychology*. 2004; 32(5): 505-518. [PubMed: 15500030]
- Rathert J, Fite PJ, Gaertner AE. Associations between effortful control, psychological control and proactive and reactive aggression. *Child Psychiatry and Human Development*. 2011; 42:609-621. [PubMed: 21671004]
- Roberts BW, Lejuez C, Krueger RF, Richards JM, Hill PL. What is conscientiousness and how can it be assessed? *Developmental Psychology*. 2014; 50(5):1315-1330. [PubMed: 23276130]
- Rooke SE, Norberg MM, Copeland J, Swift W. Health outcomes associated with long-term regular cannabis and tobacco smoking. *Addictive Behaviors*. 2013; 38:2207-2213. [PubMed: 23501136]
- Rothbart, MK. *Becoming who we are: Temperament and personality in development*. New York, NY: The Guilford Press; 2011a.
- Rothbart MK, Ahadi SA, Hershey KL. Temperament and social behavior in childhood. *Merrill-Palmer Quarterly*. 1994; 40(1):21-39.
- Small SA, Kerns D. Unwanted sexual activity among peers during early and middle adolescence: Incidence and risk factors. *Journal of Marriage & Family*. 1993; 55:941-952.
- Stautz K, Cooper A. Impulsivity-related personality traits and adolescent alcohol use: A meta-analytic review. *Clinical Psychology Review*. 2013; 33:574-592. [PubMed: 23563081]
- Steinhausen HC, Eschmann S, Metzke CW. Continuity, psychosocial correlates, and outcome of problematic substance use from adolescence to young adulthood in a community sample. *Child and Adolescent Psychiatry and Mental Health*. 2007; 1:12-21. [PubMed: 17931415]
- Substance Abuse and Mental Health Services Administration. NSDUH Series H-47, HHS Publication No. (SMA). Rockville, MD: Substance Abuse and Mental Health Services Administration; 2014. Results from the 2013 National Survey on Drug Use and Health: Mental Health Findings; p. 13-4805.

- Tellegen, A.; Waller, NG. The SAGE handbook of personality theory and assessment 2. Thousand Oaks, CA: SAGE Publishing Inc.; 2008. Exploring personality through test construction: development of the Multidimensional Personality Questionnaire; p. 261-292.
- Tucker JS, Ellickson PL, Orlando M, Martino SC, Klein DJ. Substance use trajectories from early adolescence to emerging adulthood: A comparison of smoking, binge drinking, and marijuana use. *The Journal of Drug Issues*. 2005; 35(2):307–332.
- U.S. Census. Overview of race and Hispanic origin: 2010. 2011.
- Voisine S, Parsai M, Marsiglia FF, Kulis S, Nieri T. Effects of parental monitoring, permissiveness, and injunctive norms on substance use among Mexican and Mexican American adolescents. *Families in Society: The Journal of Contemporary Social Services*. 2008; 89(2):264–274.
- Warren JR, Wagstaff DA, Hecht ML, Elek E. The effects of Mexican origin family structure on parental monitoring and pre-adolescent substance use expectancies and substance use. *Journal of Substance Use*. 2008; 13(4):283–292. [PubMed: 20703368]
- White HR, Brick J, Hansell S. A longitudinal investigation of alcohol use and aggression in adolescence. *Journal of Studies on Alcohol*. 1993; 11:62–77.
- Willem L, Bijttebier P, Claes L, Sools J, Vanerbussche Nigg JT. Temperamental characteristics of adolescents with substance abuse and/or dependence: A case-control study. *Personality and Individual Differences*. 2011; 50:1094–1098.
- Willem L, Bijttebier P, Claes L, Uytterhaegen A. Temperament and problematic alcohol use in adolescence: An examination of drinking motives as mediators. *Journal of Psychopathology and Behavioral Assessment*. 2012; 34:282–292.
- Williams LR, Fox NA, Lejuez CW, Reynolds EK, Henderson HA, Perez-Edgar KE, Steinberg L, Pine DS. Early temperament, propensity for risk-taking and adolescent substance-related problems: A prospective multi-method investigation. *Addictive Behaviors*. 2010; 35:1148–1151. [PubMed: 20813463]
- Wills TA, Dishion TJ. Temperament and adolescent substance use: A transactional analysis of emerging self-control. *Journal of Clinical Child & Adolescent Psychology*. 2004; 33(1):69–81. [PubMed: 15028542]
- Wills TA, Sandy JM, Yaeger A. Temperament and adolescent substance use: An epigenetic approach to risk and protection. *Journal of Personality*. 2000; 68(6):1127–1151. [PubMed: 11130735]
- Wills TA, Yaeger AM. Family factors and adolescent substance use: Models and mechanisms. *Current Directions in Psychological Science*. 2003; 12(6):222–226.
- Yabiku ST, Marsiglia FF, Kulis S, Parsai MB, Becerra D, Del-Colle M. Parental monitoring and changes in substance use among Latino/a and non-Latino/a preadolescents in the Southwest. *Substance Use & Misuse*. 2010; 45:2524–2550. [PubMed: 20394523]

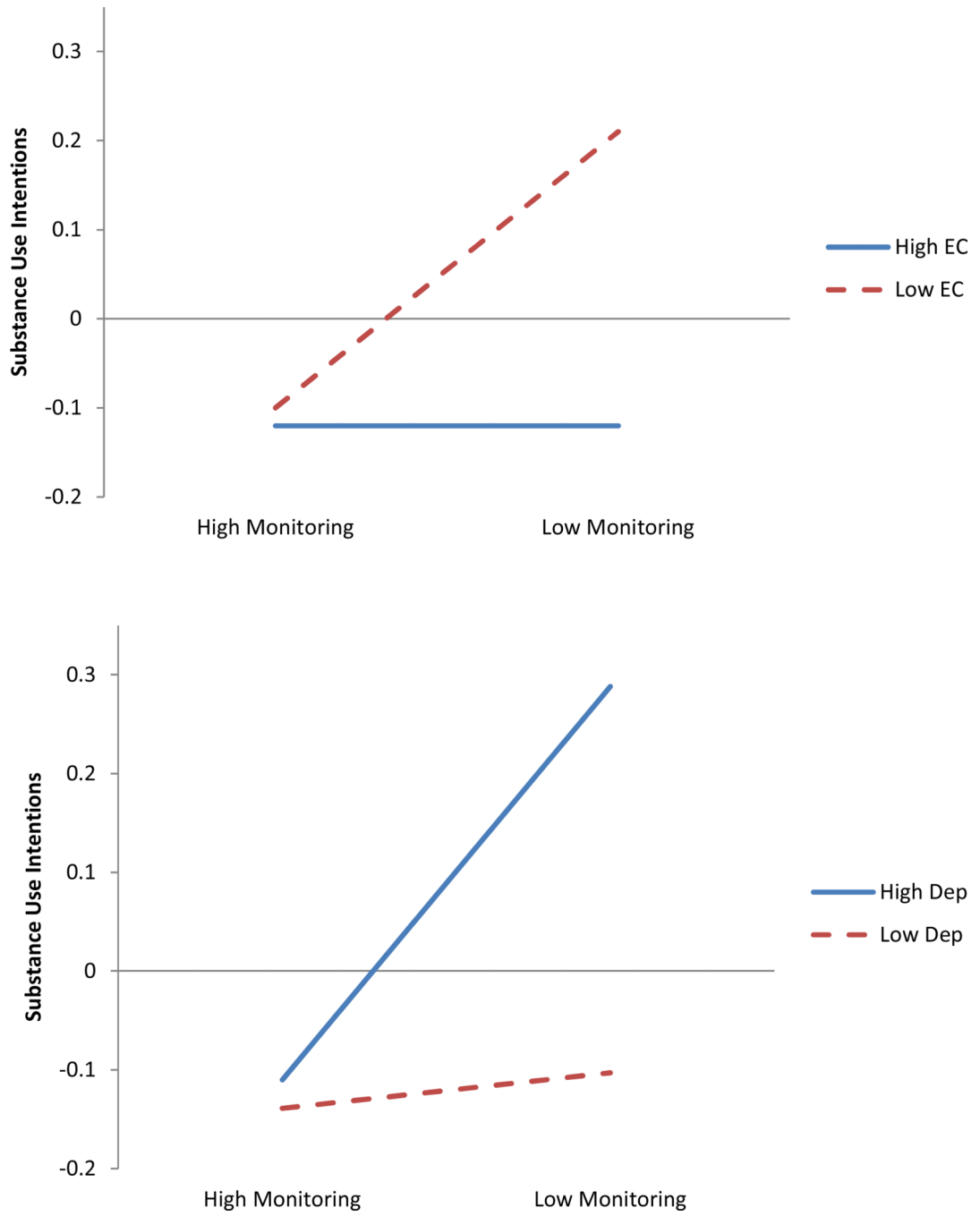


Figure 1. Temperament x Parental Monitoring Interactions in 5th Grade Predict Substance Use Intentions in 9th Grade

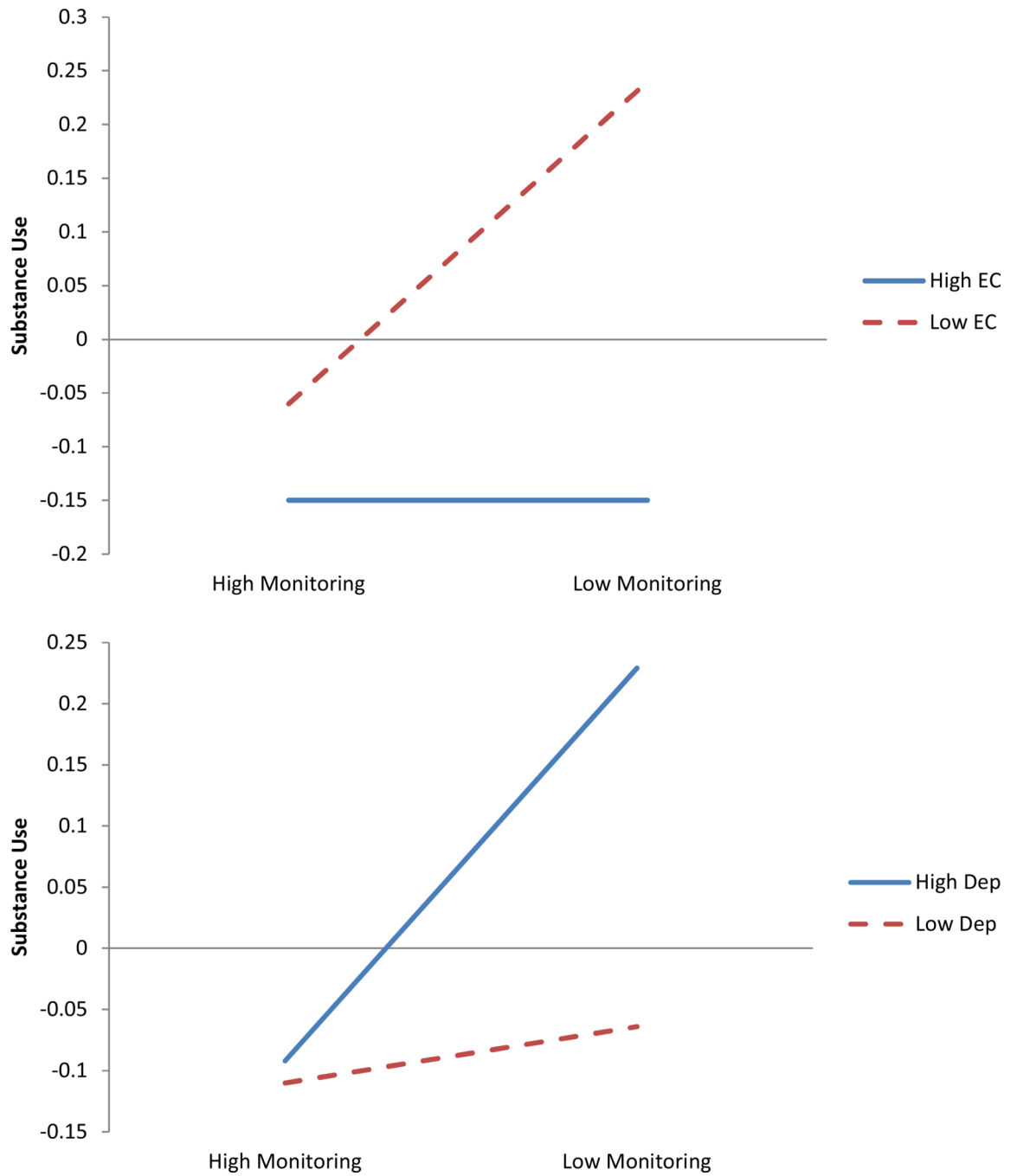


Figure 2. Temperament x Parental Monitoring Interactions in Grade 5 Predict Substance Use in 9th Grade

Table 1
Descriptive Statistics and Child/Mother Agreement Correlations for EATQ-R Temperament Scales

	5 th Grade				9 th Grade				r_{cm}
	M	SD	α (C)	α (M)	M	SD	α (C)	α (M)	
Effortful Control	2.96	.34	.65	.79	2.94	.35	.77	.82	.34*
Negative Affectivity	2.61	.38	.74	.75	2.20	.37	.80	.76	.11*
Surgency	2.55	.50	.15	.32	2.66	.37	.75	.72	.26*
Aggression	1.42	.40	.74	.78	1.41	.40	.81	.80	.30*
Depressive Mood	2.01	.41	.61	.64	1.78	.40	.72	.71	.14*

Note. Means and standard deviations were computed using the child-mother composite scales. α = Cronbach's alpha; (C) = child reported; (M) = mother reported; r_{cm} = Correlation between child and mother reported temperament.

* $p < .05$.

Table 2
Descriptive Statistics and Reliability Information for Parental Monitoring and Substance Use Variables

	5 th Grade				9 th Grade			
	M	SD	α	% No Use	M	SD	α	% No Use
Parental Monitoring (C)	46.06	7.64	.88(.94)	-	42.55	8.66	.92(.95)	-
Parental Monitoring (M)	50.92	5.62	.81	-	51.12	6.61	.87	-
Parental Monitoring (D)	47.90	6.76	.84	-	48.07	7.63	.91	-
Substance Use Intentions	9.19	1.14	.87	91.3	11.03	3.18	.87	53.0
Substance Use Expectancies	-	-	-	-	33.93	14.51	.96	24.8
Substance Use	.06	.29	.32	95.6	1.06	1.83	.43	63.6

Note. Values in parentheses denote child reporting on father behavior; those next to parentheses represent child reporting on mother behavior. M = mean; SD = standard deviation; α = Cronbach's alpha; % No Use = Percentage of participants who reported no substance use thoughts/behaviors; (C) = child reported; (M) = mother reported; (D) = father reported.

Table 3
Prospective and Concurrent Correlations of Temperament and Parental Monitoring with 9th Grade Substance Use Variables

	Prospective			Concurrent		
	Substance Use Intentions	Substance Use Expectancies	Substance Use	Substance Use Intentions	Substance Use Expectancies	Substance Use
Effortful Control	-.12* (-.12*)	-.10*	-.13* (-.10*)	-.35*	-.38*	-.28*
Negative Affectivity	.07 (.06)	.03	-.02 (-.03)	.18*	.08*	.12*
Surgency	.05 (.04)	.06	.00 (-.02)	.09*	.08	.12*
Aggression	.22* (.19*)	.23*	.21* (.13*)	.41*	.37*	.34*
Depressive Mood	.13* (.12*)	.04	.10* (.09*)	.26*	.20*	.21*
Parental Monitoring (C)	-.12* (-.11*)	-.10*	-.12 (-.11*)	-.37*	-.38*	-.37*
Parental Monitoring (M)	-.04 (-.04)	-.09*	-.02 (-.03)	-.10*	-.17*	-.12*
Parental Monitoring (D)	-.05 (-.05)	-.03	-.04 (-.05)	-.12*	-.07	-.16*

Note. Prospective = associations of grade 5 temperament and parental monitoring with grade 9 substance use variables; Concurrent = associations of grade 9 temperament and parental monitoring with grade 9 substance use variables. Betas controlling for 5th grade substance use variables reported inside parentheses.

* $p < .05$.

Temperament x Parental Monitoring Interactions in 5th Grade Predicting Substance Use Intentions and Substance Use in 9 Grade

Table 4

Predicting Substance Use Intentions	b	β	t	R ²	R ²	df
Step 1				.020*		598
Effortful Control	-.27	-.09	-2.16*			
Parental Monitoring	-.01	-.07	-1.56			
Step 2				.028*	.006*	597
Effortful Control X Parental Monitoring	.03	.08	2.13*			
Step 1				.025*		598
Depressive Mood	.26	.11	2.59*			
Parental Monitoring	-.01	-.09	-2.27*			
Step 2				.041*	.016*	597
Depressive Mood X Parental Monitoring	-.04	-.13	-3.12*			
Predicting Substance Use						
Step 1				.026*		598
Effortful Control	-.34	-.12	-2.73*			
Parental Monitoring	-.01	-.06	-1.44			
Step 2				.035*	.009*	597
Effortful Control X Parental Monitoring	.03	.08	2.34*			
Step 1				.022*		598
Depressive Mood	.21	.08	2.06*			
Parental Monitoring	-.01	-.10	-2.49*			
Step 2				.030*	.008*	597
Depressive Mood X Parental Monitoring	-.03	-.09	-2.25*			

Note. All regression coefficients based on full model. Parental Monitoring is child reported. Effortful control, depressive mood, and parental monitoring were grand mean centered prior to analysis. Substance use variables were log transformed and standardized prior to analysis.

* $p < .05$.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Temperament x Parental Monitoring Interactions in 9 Grade Predicting Substance Use Intentions in 9 Grade

Table 5

	b	β	t	R ²	R ²	df
Step 1				.179*		601
Effortful Control	-.64	-.23	-5.57*			
Parental Monitoring	-.03	-.27	-6.71*			
Step 2				.186*	.007*	600
Effortful Control X Parental Monitoring	.03	.08	2.30*			
Step 1				.173*		601
Negative Affectivity	.49	.18	4.90*			
Parental Monitoring	-.04	-.37	-10.05*			
Step 2				.179*	.006*	600
Negative Affectivity X Parental Monitoring	-.02	-.08	-2.07*			
Step 1				.234*		601
Aggression	.75	.30	7.69*			
Parental Monitoring	-.03	-.26	-6.81*			
Step 2				.245*	.011*	600
Aggression X Parental Monitoring	-.03	-.11	-2.99*			
Step 1				.185*		601
Depressive Mood	.55	.22	5.89*			
Parental Monitoring	-.04	-.33	-8.85*			
Step 2				.193*	.009*	600
Depressive Mood X Parental Monitoring	-.03	-.09	-2.52*			

Note. All regression coefficients based on full model. Parental Monitoring is child reported. Effortful control, negative affectivity, aggression, depressive mood, and parental monitoring were grand-mean centered prior to analysis. Substance use intentions were log transformed and standardized prior to analysis.

$\cdot 50' < d$
*

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript