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Personality, puberty, and preadolescent girls' risky behaviors: Examining the predictive value of the Five-Factor Model of personality[☆]

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Abstract

Few studies have considered the importance of personality characteristics in influencing young girls' tendency to participate in health-compromising behaviors. The present study examined relations between 60 fifth grade girls' (mean age = 10.72 years) self-reports and maternal reports of the Five-Factor Model of personality (FFM), pubertal development, and girls' participation in risky behaviors one year later (mean age = 11.74 years). Results indicated that unconscientious and disagreeable girls were susceptible to participation in risky behaviors. These relations remained significant even after controlling for assessments of girls' pubertal development. An interaction between girls' openness to experience and pubertal development was found; girls who were open and who developed early were at risk for engaging in health-compromising behaviors. Findings are discussed in terms of their potential for helping health promotion efforts identify girls' most at risk for adopting unhealthy behaviors.

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1. Introduction

Since the time of early philosophers and psychologists, the adolescent years have been viewed as concomitant with turmoil (Aristotle, trans. 1941; Arnett, 1999; Hall, 1916). Among youths, rebelliousness, impulsivity, irresponsibility, and an inclination towards experimentation are characteristics often conceptualized as normative and transitory. However, recent empirical research suggests that these popular stereotypes are somewhat inaccurate; a great deal of variability exists in youths' adjustment during adolescence and their participation in experimental and risky behaviors (Arnett, 1999; Petersen, 1988). Further, the adolescent years are not disjointed from experiences later in life. Unhealthy behaviors that emerge during the adolescent years may have effects on psychosocial functioning throughout adulthood (Bardone et al., 1998; Robins & Price, 1991). While research has explored many social influences on youths' risk behaviors (e.g., family, peer influences), there is a clear need for research investigating individual differences in youths' tendency to participate in risky behaviors. Unfortunately, laypersons and researchers alike have historically overlooked young girls' vulnerability to health-compromising behaviors due to their presentation of oftentimes milder externalizing symptoms than boys (Bardone et al., 1998).

Girls are susceptible to participation in unhealthy behaviors that typically include substance use and unsafe sexual practices. Although brief experimentation may not pose serious risks in some contexts (Shelder & Block, 1990), early participation in these behaviors has been linked to health-compromising behaviors in adulthood, with potentially fatal consequences (Everett, Warren, Sharp, & Kann, 1999; US Department of Health & Human Services [USDHHS], 2000). Approximately 20% of deaths in the United States are related to individuals' use of tobacco products (Center for Disease Control [CDC], 1993). Thus, cigarette smoking is the deadliest behavior adopted by many youths in the US, and is also the largest preventable cause of death and disability (USDHHS, 2000). Alcohol consumption both directly and indirectly affects girls' health; nearly half of all young drinkers engage in an unhealthy amount and frequency of alcohol consumption (Brannon & Feist, 2000). Indirectly, alcohol is cited as the underlying factor in many diverse problems experienced among girls, including unintentional injuries, violence, HIV infection, teen pregnancy, and school failure (USDHHS, 2000). Precocious sexual activities (i.e., kissing, petting) place girls' at risk for early sexual intercourse. Age at first intercourse is, in turn, a risk factor for contracting sexually transmitted diseases (STDs) and unwanted pregnancy, with younger girls being least likely to be educated about safe sex practices and most likely to suffer from STDs and unintentional pregnancies (Belsky, Steinberg, & Draper, 1991; Conger & Galambos, 1997).

Compounding the seriousness of girls' participation in risky behaviors is the tendency for these behaviors to co-occur. Previous research has suggested that youths who participate in any single health-compromising behavior are likely to participate in other risky behaviors (Cooper, 2002; Graber & Brooks-Gunn, 1996). Jessor (1992) and his colleagues have described a behavioral cluster of activities, including substance use and sexual behaviors, as a "lifestyle." Adolescents who have these

high-risk lifestyles are susceptible to poor health during adolescence and into adulthood (Graber & Brooks-Gunn, 1996; Jessor, 1992).

What characterizes girls who participate in risky behaviors? Research examining girls' susceptibility to experimentation in health-compromising behaviors has tended to focus on social influences (e.g., parenting practices) and differential experiences of pubertal development. Among girls, pubertal development has often been conceptualized as a "trigger" initiating a gradual, and often consequential, deterioration in their behavioral health. Parental support and monitoring appear to play an important role in guiding youths away from unhealthy behaviors (Markey, Ericksen, Markey, & Tinsley, 2001). However, little research has examined the role of personality traits in determining girls' health behaviors during this important developmental period, and even fewer studies have examined how such traits may be moderated by other predictors (e.g., puberty) of girls' participation in risky behaviors.

1.1. Puberty as a predictor of girls' risky behaviors

In previous research, one of the constructs most frequently discussed in relation to girls' behavioral health is their pubertal developmental status. Although puberty typically begins for US females at approximately 9–10 years of age, there is a significant amount of variability in the initiation of girls' pubertal development. Research has demonstrated that the age of onset of pubertal development is consequential for girls' health. Early maturing females tend to participate in health-compromising behaviors including smoking, alcohol consumption, and early sexual behaviors, and are more likely to experience an unplanned pregnancy than are their later developing peers (Brooks-Gunn & Reiter, 1993; Graber, Lewinsohn, Seeley, & Brooks-Gunn, 1997). It has been speculated that post-pubertal girls' mature physical appearance gives them access to diverse social contexts (e.g., situations including older peers) where substance use and sexual promiscuity are more acceptable (Brooks-Gunn & Reiter, 1993; Stattin & Magnusson, 1990).

At least one study has suggested that pubertal development may not be the trigger initiating girls' decline in health during adolescence; puberty may only exacerbate previous individual differences in girls' psychosocial functioning (Caspi & Moffit, 1991). In other words, individual differences that exist prior to the onset of puberty may make some girls' susceptible to negative health outcomes during puberty, as the stress associated with the transition to adolescence makes individual differences more pronounced. In particular, early maturing girls may be most susceptible to experience a stressful transition and associated negative health consequences. An investigation of both girls' pubertal development and their personality traits may help researchers to determine the relative importance of these constructs in determining girls' behavioral health during the adolescent years.

1.2. Personality as a predictor of girls' risky behaviors

Examining personality influences on youths' behavioral health has the potential to facilitate identification of the youths most at risk for engaging in health-compromising

behaviors. During periods of transition and change, individuals rely on their perceived resources to help them adjust and equilibrate (Caspi & Moffit, 1991). These resources are typically perceived as the social support (e.g., parents) available during periods of instability (Werner, 1989). Unfortunately, little research has conceptualized these resources as individual differences in youths' abilities to cope with the vast developmental changes and challenging health issues unique to adolescence. During this transitional period it is likely that such individual differences become increasingly important as youths gain autonomy and become more involved in decisions regarding their health (Caspi & Moffit, 1991; Markey et al., 2001).

Preliminary research suggests that personality traits are significant predictors of behavioral health outcomes including behavioral problems, delinquency, and risky behaviors (e.g., substance use; Caspi et al., 1997; Caspi & Moffit, 1991; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Pulkkinen, 1983; Shelder & Block, 1990). Personality traits in middle childhood also predict risk behaviors in adolescence and adulthood (Caspi et al., 1997; Pulkkinen, 1983). However, previous studies tend to focus on relations between personality and health among adolescents (often boys, e.g., John et al., 1994), and typically do not address relations among *preadolescent girls'* personalities and health outcomes.

Research on youths' risky behaviors is also limited in its tendency to focus on specific personality traits, such as optimistic bias or sensation-seeking. Relatively few studies (e.g., Gullone & Moore, 2000; John et al., 1994; Markey et al., 2001) have specifically examined the relations among broad personality traits and youths' health outcomes. Many personality psychologists currently endorse the use of five-broad traits, referred to as the Five-Factor Model (FFM) of personality: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (McCrae & Costa, 1995).

The FFM has been demonstrated to be a parsimonious and valid means of discussing personality (Costa & McCrae, 1985; Digman, 1990; McCrae & John, 1992; Parker & Stumpf, 1998). These five factors are believed to encompass all, or nearly all, other personality traits (Goldberg, 1990; McCrae & Costa, 1995), and preliminary research suggests their potential for contributing to an understanding of youths most at risk for participation in health-compromising behaviors (John et al., 1994; Markey et al., 2001). Extraversion refers to activity level, sociability and dominance, and has been associated with externalizing behaviors and delinquency among adolescent boys (John et al., 1994). Agreeableness refers to kindness, likeability, and trustworthiness, and has been inversely associated with risky behaviors and delinquency among youths (John et al., 1994; Markey et al., 2001). Conscientiousness primarily describes organization, reliability and impulse control, and has been inversely related to deviant and unhealthy behaviors among youths (Gullone & Moore, 2000; John et al., 1994; Markey et al., 2001). Neuroticism refers to emotional instability including a tendency towards anxiety, sadness, and irritability. Openness to experience describes an individual's originality, imagination, intellect, and creativity. In previous research, neither neuroticism or openness have shown consistent relations to youths' risky behaviors (Gullone & Moore, 2000; John et al., 1994; Markey et al., 2001).

1.3. *Aims of the study*

This study represents one of the first empirical investigations aimed at examining relations between the FFM and preadolescent girls' health-compromising behaviors. This research extends previous studies by examining both individual differences in girls' pubertal development and girls' personality traits in relation to their participation in risk behaviors one year later. Risk behaviors will include a constellation of health outcomes (i.e., smoking, alcohol consumption, and early sexual behaviors) identified by Jessor (1992) as contributing to an unhealthy adolescent "lifestyle." Understanding influences on preadolescents' health-compromising behaviors is particularly important because during this developmental period many youths first begin participating in health-compromising behaviors. Identifying predictors of preadolescent girls' risky behaviors is critical to the development of prevention efforts aimed at reducing the initiation of these health-compromising behaviors.

There are three specific aims that will be addressed in this study. First, assessments of pubertal development will be related to girls' behavioral health 1 year later. Second, relations among the traits within the FFM and girls' behavioral health outcomes will be examined. Third, analyses will be conducted to determine if girls' pubertal development moderates any of the relations between the FFM and girls' participation in risky behaviors.

2. Method

2.1. *Participants*

Sixty (60) girls and their families, including at least one parent, participated in this study when the girls were in fifth and sixth grade (mean ages = 10.72 years and 11.74 years, respectively). However, only 56 girls are included in the present analyses because four girls did not provide complete information about the outcome of interest (risk behaviors). All participants were recruited through the school district of a mid-sized city on the US west coast (a total of 13 schools, with an average response rate of 35%), and represent a non-clinical sample of economically and ethnically diverse girls representative of the population in this geographic region (Euro-American = 53.7%, Mexican American = 46.3%). All participating girls were required to be in good health, not suffering from any chronic health conditions or learning disabilities, and had to be cognitively functioning at their approximate grade level.

2.2. *Measures*

2.2.1. *Tanner growth ratings*

Tanner ratings provide a means of quantifying the continuous growth process youths' experience during puberty (Marshall & Tanner, 1969). Five (5) stages of pubertal growth of the breasts and pubic hair are evaluated to track pubertal

development. Tanner Growth Ratings have been used extensively since their introduction and provide a reliable means of assessing pubertal growth (Brooks-Gunn, 1988; Coleman & Coleman, 2002). Tanner growth ratings were made among participants in this sample by a trained pediatrician when the girls were in fifth grade (approximately 11 years old). The pediatrician determined if girls were at stage 1, 2, 3, 4, or 5 by viewing pictures that represented each stage, and indicating which stage most closely matched the girls' breast and pubic development. Because girls' pubic hair and breast stages were strongly related ($r = .49, p < .01$), and to create a more reliable measure of *objective* pubertal development, a composite score of girls' pubertal development was used in these analyses (mean composite Tanner stage = 2.09, $SD = .84$).

2.2.2. Petersen pubertal development scale

The Petersen pubertal development scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988) is a questionnaire designed to assess pubertal developmental status. This measure provides similar information to the Tanner Growth Ratings, but is often conceptualized as an assessment of *subjective* perceptions of development (see Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987). This measure asks about perceived pubertal changes in skin (i.e., acne), height, pubic hair growth, and breast growth. A composite score of these four items is used as an overall measure of pubertal development. Mothers and girls completed the PDS when the girls were in fifth grade with reliabilities of $\alpha = .65$ for mothers and $\alpha = .62$ for girls. Because mothers' (mean = 2.13, $SD = .44$) and girls' (mean = 1.97, $SD = .33$) scores were highly related ($r = .57, p < .001$), and in order to clarify analyses, items were standardized across mothers and daughters and combined to create a single measure of *subjective* pubertal development ($\alpha = .71$). The PDS and Tanner Growth Ratings are related to each other in this sample ($r = .29, p < .05$); they are both used in the present study to help substantiate potential relations between girls' pubertal development and risk behaviors.

2.2.3. NEO-FFI personality assessment

When girls were in fifth grade their mothers were instructed to rate their preadolescent children's personality using the NEO-FFI. The NEO-FFI is a short, 60-item questionnaire designed specifically to assess the traits of the FFM (Costa & McCrae, 1992).¹ Written instructions were modified to indicate that mothers' were to rate the extent to which each item may or may not apply to their child.

Girls also rated themselves using the NEO-FFI. However, pilot testing with preadolescents revealed that the vocabulary used in the NEO-FFI was difficult for this age group. Subsequently, standard verbal "prompts" were created for most items. For example, the verbal prompt "trick" was used to help clarify the meaning of the word "manipulate." Pilot testing of these verbal prompts indicated that they

¹ Items 18 and 38 of the NEO-FFI were deleted from both mother and child reports due their inappropriateness for this age group (see Markey, Markey, Tinsley, & Ericksen, 2002).

Table 1
Relations between mothers' reports and daughters' self-reports on the Five-Factor Model of personality

	Child–Mother agreement
Extraversion	.18
Agreeableness	.64**
Conscientiousness	.44**
Neuroticism	.24*
Openness	.13

Note. $df = 54$.

* $p < .10$.

** $p < .05$.

provided a developmentally appropriate means of allowing preadolescents to understand the items of the NEO-FFI. Table 1 presents correlations between girls' self-ratings and mothers' ratings of their daughters' personalities. Internal reliabilities for the neuroticism, extraversion, openness, agreeableness, and conscientiousness scale for girls' self-reports were .62, .40, .41, .73, and .74, respectively. Internal reliabilities for the neuroticism, extraversion, openness, agreeableness, and conscientiousness scale for mothers' reports were .80, .70, .54, .74, and .91, respectively. For additional information regarding the validity and reliability of this instrument when used to assess preadolescents' personalities see Markey et al. (2002).

2.2.4. Risk behavior assessment

When girls were in the sixth grade they completed the Risk Behavior Assessment. This instrument was designed for this study to assess preadolescents' participation in health-compromising or risky behaviors (Markey et al., 2001). Health-compromising behaviors included smoking, alcohol consumption, and kissing (conceptualized as a "gateway" to sexual activity). As mentioned above, these behaviors are discussed by Jessor (1992) as contributing to an unhealthy adolescent lifestyle and may presage health problems in later life (USDHHS, 2000). For each of these three items, girls responded "yes" or "no," indicating whether or not they had ever participated in the behavior.² All responses were summed and an overall measure of health-compromising behaviors was created ($\alpha = .62$). In the current sample, 34% of the girls reported participated in *at least one* of the risk behaviors; 9% had smoked a cigarette, 13% had tried alcohol, and 16% had kissed a boy that was not a relative.

2.3. Procedures

Mothers and their preadolescent daughters completed the measures used in this study among other measures assessing a wide range of individual characteristics of

² The exact wording of the three items was: "Have you already tried cigarettes, even one or two puffs?"; "Have you already tried alcohol, other than for religious purposes?"; "Have you already kissed a boy that you are not related to?"

children and their rearing environments. Written consent was obtained from all participating mothers documenting their voluntary participation in this research and their willingness to have their preadolescent daughters participate. Additionally, verbal assent was obtained from all girls. Girls and parents always completed measures separately to ensure confidentiality, and girls were always interviewed by a trained researcher. To help girls respond to the items, they were shown a “response scale” which displayed the possible answers. Girls were instructed to refer to the “response scale” when answering the questions. Parents had the option of completing measures on their own or as an interview. All participants had the option of completing measures in English or in Spanish (three girls and six mothers chose to complete measures in Spanish). All Spanish measures were translated and back-translated from English versions to assure their comparable meaning (Marín & Marín, 1991).

When girls were in fifth grade, mothers either completed the questionnaires as part of a laboratory visit, or completed the questionnaires at home. In both scenarios, mothers were given identical written instructions. Children were interviewed by trained research assistants during a laboratory visit or over the telephone. Girls’ pubertal developmental status was assessed by a trained pediatrician during a separate, pediatric well visit (i.e., a routine physical exam). When girls’ were in sixth grade they completed the Risk Behavior Assessment during an interview with a trained research assistant over the telephone.

3. Results

Due to the modest sample size used in this study, and since complete data were not available for some participants, missing data for measures conceptualized as predictors were imputed using an EM-algorithm (Little & Rubin, 1987).³ To address the first aim of this study, relations between girls’ pubertal development and their participation in health-compromising behaviors were examined. Pearson correlations indicated positive relations between girls’ pubertal development and their reported participation in risky behaviors 1 year later. While both the objective and subjective assessments of pubertal development were related to girls’ risky behaviors in the predicted direction, only the subjective assessment of puberty was significantly related to girls’ risky behaviors (see Table 2).

The second aim of this study was to explore relations between girls’ personalities and their participation in health-compromising behaviors. Pearson correlations indicated significant relations between both mothers’ reports and girls’ reports of conscientiousness and agreeableness and girls’ participation in risky behaviors (see Table 2). Girls who were less conscientious and less agreeable were more likely to participate in risky behaviors. As shown in Table 2, these findings remained significant even after controlling for girls’ objective and subjective pubertal development.

³ Subsequent analysis of the nonimputed data revealed parameter estimates very similar to the more complete data set reported in this paper using the imputed data.

Table 2

Relations between girls' personalities and pubertal development in fifth grade and their participation in risky behaviors a year later

Assessments in fifth grade	Girls' report of participation in risk behaviors in 6th grade	
	r^a	Semi-partial r controlling for pubertal assessments ^b
<i>Puberty assessments</i>		
Subjective	.29**	—
Objective	.20	—
<i>Girls' ratings</i>		
Extraversion	.02	.03
Agreeableness	-.25*	-.23*
Conscientiousness	-.42**	-.39**
Neuroticism	.02	.02
Openness	.13	.02
<i>Mothers' ratings</i>		
Extraversion	.21	.13
Agreeableness	-.38**	-.37*
Conscientiousness	-.42*	-.39**
Neuroticism	.03	.04
Openness	-.04	-.03

^a $df = 54$.

^b $df = 52$.

* $p < .10$.

** $p < .05$.

To address the final aim of this study, analyses were conducted to determine whether any of the traits interacted with either subjective or objective measures of pubertal development when predicting girls' risk behaviors. To reduce issues associated with multicollinearity, all of the trait and pubertal variables were centered before computing their interactions (Cohen & Cohen, 1983). There were no interaction effects found for the traits of neuroticism, extraversion, agreeableness, or conscientiousness. However, both girls' and mothers' reports of openness to experience consistently interacted with both subjective ($t(52) = 3.86$, $p < .05$, $sr = .45$; $t(52) = 2.01$, $p < .05$, $sr = .26$, respectively) and objective ($t(52) = 3.34$, $p < .05$, $sr = .41$; $t(52) = 2.09$, $p < .05$, $sr = .27$, respectively) measures of pubertal development. Figs. 1–4 present graphical representations of these interactions derived by calculating simple regression equations corresponding to individuals scoring at the mean, .75 standard deviations above the mean, and .75 standard deviations below the mean for each of the predictor variables (Aiken & West, 1991). As these figures indicate, there tended to be a positive relation between openness to experience and risk behaviors when girls developed early relative to their peers and a negative relationship between openness to experience and risk behavior when girls developed later than their peers.

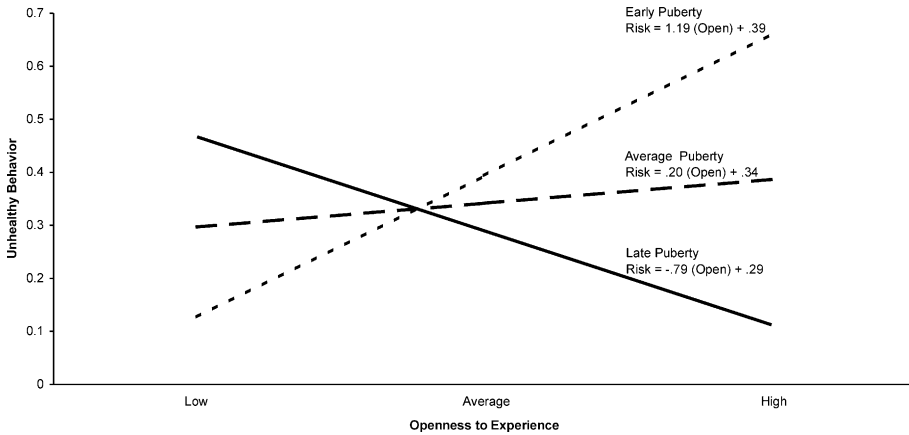


Fig. 1. Interaction between objective pubertal development and girls' self-reported openness to experience when predicting girls' risk behaviors. A graphic representation of the regression equation: Risky Behavior = .34 + .20(Openness) + .08(Objective Puberty) + 1.57 (Openness × Objective puberty), based on children's reports of their openness to experience

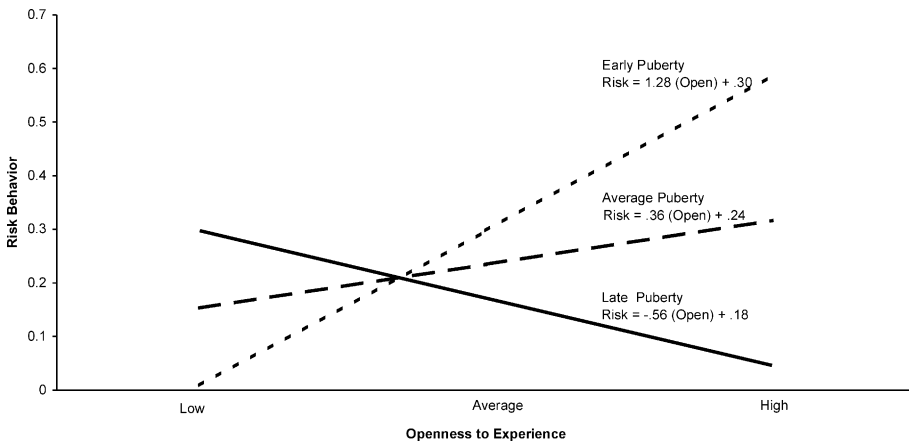


Fig. 2. Interaction between subjective pubertal development and girls' self-reported openness to experience when predicting girls' risk behaviors. A graphic representation of the regression equation: Risky Behavior = .24 + .36(Openness) + .19(Subjective Puberty) + 2.80 (Openness × Subjective Puberty), based on children's reports of their openness to experience.

4. Discussion

This study examined pubertal development and personality traits as predictors of preadolescent girls' participation in health-compromising behaviors one year later. The present study contributes to our current understanding of the well-documented decline in girls' behavioral health during the adolescent years by investigating the relative importance of the FFM and pubertal development in predicting girls' health

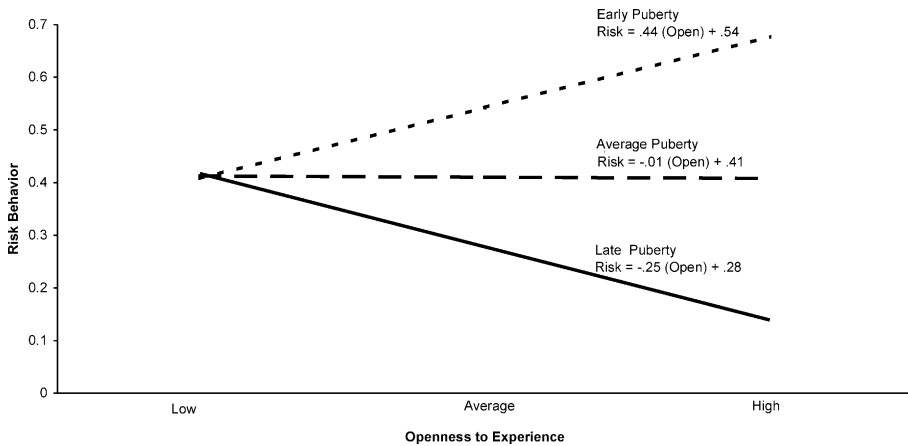


Fig. 3. Interaction between objective pubertal development and mothers' reports of girls' openness to experience when predicting girls' risk behaviors. A graphic representation of the regression equation: Risky Behavior = .41 - .01(Openness) + .21(Objective Puberty) + .72 (Openness × Subjective Puberty), based on mothers' reports of their child's openness to experience.

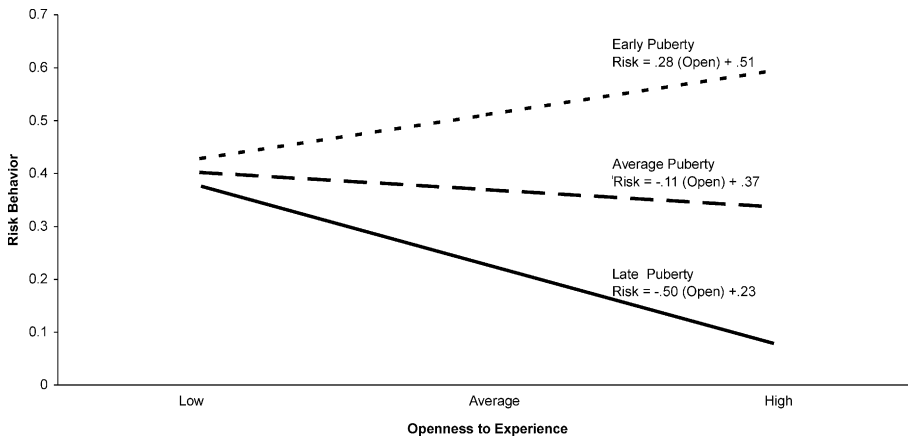


Fig. 4. Interaction between subjective pubertal development and mothers' reports of girls' openness to experience when predicting girls' risk behaviors. A graphic representation of the regression equation: Risky Behavior = .37 - .11(Openness) + .43(Subjective Puberty) + 1.17 (Openness × Subjective Puberty), based on mothers' reports of their child's openness to experience.

outcomes. Further, analyses were conducted to determine if girls' pubertal development moderated the relations between the FFM and girls' participation in risky behaviors.

Analyses indicate that pubertal development assessed in fifth grade was related to girls' participation in risk behaviors one year later. This finding is consistent with previous research suggesting that puberty is a risk factor for girls' participation in

health-compromising behaviors (Brooks-Gunn & Graber, 1994; Brooks-Gunn & Reiter, 1993). However, the strength of the relations between girls' puberty and their risk behaviors was not as strong as would be expected given the extant literature suggesting that pubertal development "triggers" girls' decline in behavioral health (Brooks-Gunn & Reiter, 1993; Graber et al., 1997). It is possible that the effects of puberty are more relevant when trying to understand the health of girls who are at later stages of pubertal development than the preadolescent girls examined in the present study.

In this study, girls' personalities were related to their participation in risky behaviors in a fairly intuitive pattern. Unconscientious and disagreeable girls were more likely to participate in health-compromising behaviors than their conscientious and agreeable peers. In other words, girls who were irresponsible, unplanful (i.e., unconscientious), unkind, and perhaps even rebellious in nature (i.e., disagreeable) were most susceptible to participation in risky behaviors. These findings parallels other reports that unconscientious youths are vulnerable to participation in health-compromising behaviors, maladjustment, delinquency, and even reduced longevity (Friedman et al., 1995; Gullone & Moore, 2000; John et al., 1994; Markey et al., 2001). These results are also consistent with John et al.'s (1994) findings that disagreeable boys are susceptible to risky and delinquent behaviors. Further, these findings coincide with a growing body of literature suggesting that conscientiousness and agreeableness are important predictors of adults' health behaviors (Hoyle, Fejfar, & Miller, 2000; Vollrath, Knoch, & Cassano, 1999).

Findings from the present study suggest that pubertal development may moderate the relations between girls' openness to experience and their participation in risky behaviors. It appears that being open to experience becomes a risk factor for preadolescent girls only if they develop relatively early compared to their peers. This finding was consistent across both mothers' and girls' reports of openness and across both objective and subjective assessments of pubertal development. This suggests that girls who develop early, and who are curious and imaginative (i.e., open to experience), may be at particular risk of engaging in health-compromising behaviors. Such findings are not surprising considering this type of girl would be curious at a time when her newly mature physical appearance is likely giving her access to situations that would facilitate experimentation and risky behaviors (Stattin & Magnusson, 1990).

Taken together, these findings provided support for relations between girls' personalities and their behavioral health. Interesting and intuitive relations were found among the broad traits included in the FFM and girls' participation in risky behaviors one year later. It appears that girls' individual differences are important during their preadolescent years rendering them more or less likely to participate in risky behaviors (Caspi & Moffit, 1991).

4.1. Limitations

While the findings from this study provide important information about potential influences on preadolescent girls' behavioral health, the knowledge obtained from

this study should be tempered with an understanding of its limitations. The present study is limited in that many of the utilized measures were self-report. Self-report measures are often undesirable because they are susceptible to biases including self-enhancement and self-deception. However, an objective measure of pubertal growth (i.e., Tanner Growth Ratings made by a pediatrician), and the use of maternal reports of perceptions of girls' pubertal development and personalities suggest that the present findings are not solely an artifact of self-report methodology.

Because the data utilized in this study (pediatrician and maternal reports) are costly and difficult to obtain, this study was also limited by its use of a relatively small sample of participants. A larger sample of girls might have permitted more significant findings to emerge and greater generalizability of these results. In order to facilitate a better understanding of the relations found in this study, and the implications of these findings for girls' healthy development, future research should examine a larger sample of young girls, beginning in preadolescence, and continuing through adolescence.

4.2. *Conclusions and implications*

This study suggests that personality traits are useful predictors of preadolescent girls' participation in risky behaviors. These findings extend our theoretical understanding of girls' participation in risky behaviors by suggesting that models examining girls at risk for participation in health-compromising behaviors should include assessments of personality traits. Future research that builds on these findings should contribute to our understanding of the relative importance of pubertal development and personality traits in determining girls' health-related behaviors.

The finding that personality traits are predictive of preadolescent girls' behavioral health may benefit prevention and intervention efforts aimed at maintaining young girls' health. Although personality traits are typically conceptualized as stable individual differences, previous research suggests the potential for personality change, and that recognition of unhealthy personality vulnerabilities is an important first step in implementing change (Caspi & Bem, 1990; Friedman, 1991). Further, efforts to assess preadolescents' personality traits that are predictive of health-related outcomes would provide clinicians and researchers with an opportunity for more appropriate prevention and intervention strategies aimed specifically at "high-risk" preadolescents. Because girls' risky behaviors may compromise their health during their adolescence and may lead to a life-long trajectory of morbidity and mortality (Bardone et al., 1998; CDC, 1993; Everett et al., 1999; USDHHS, 2000), it is critical that researchers achieve a comprehensive understanding of the preadolescent girls' most likely to adopt unhealthy behaviors.

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