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ADOLESCENT HEALTH RISK BEHAVIOR: PARENT AND PEER CONTRIBUTIONS AND HEALTH OUTCOMES

By

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ABSTRACT

ADOLESCENT HEALTH RISK BEHAVIOR:
PARENT AND PEER CONTRIBUTIONS AND HEALTH OUTCOMES

By

Allison Schettini Evans

Adolescence brings with it a sizeable increase in health risk behavior, most notably, alcohol and drug use, sexual risk taking, sensation seeking, and aggression. These behaviors are so widespread that some argue that involvement in health risk behavior is developmentally normative. However, a small group of adolescents engages in such high levels of health risk behavior that they put themselves at serious risk. Fully mediated, partially mediated, and moderated models were used to examine the combined effects of parent-adolescent relationships and peer factors on adolescent involvement in health risk behavior and the impact of all three on adolescent health status.

One hundred and fifty six adolescent participants (95 boys and 61 girls) involved with a rural Midwestern county's juvenile court were recruited over a two-year period. One parent or legal guardian of the adolescent also participated in the study. Adolescent participants ranged in age from 11 to 16 years ($\underline{M}$ = 14.7 years, $\underline{SD}$ = 1.34). Items for the measurement scales were extracted from four questionnaires: (1) the *Functional Impairment Scale for Children and Adolescents* – Self Report, (2) the *Youth on the Fringe Survey* (3) the *Child Health and Illness Profile: Adolescent Edition*, and (4) the *Social History Questionnaire*. CFA procedures determined final items for each scale as well as established the structural integrity among the various factors. Parent-adolescent relationships were defined by *conflictual dependency, mutuality, psychological control,*

and parent as well as child report of behavioral control; peer factors by *peer health risk behavior and peer acceptance of deviance*; adolescent health risk behavior by *aggression /sensation seeking and substance use/sexual risk taking* and adolescent health status by *health risk consequences, health discomfort, and satisfaction with health.*

Results of this research generally supported a partially mediated model describing associations between aspects of the parent-adolescent relationship, peer health risk behavior, adolescent health risk behavior, and adolescent health status. More specifically, parent-adolescent relationships directly predicted peer factors, with parent-reported behavioral control linked to peer health risk behavior and child-reported behavioral control linked to peer acceptance of deviance. High levels of conflictual dependency were associated with greater adolescent involvement in aggression and sensation seeking. However, it was the two peer constructs that had the greatest effect on adolescent involvement in health risk behavior; both were linked to adolescent aggression/sensation seeking and peer health risk behavior was associated with adolescent substance use and sexual risk taking. Moreover, conflictual dependency had direct and indirect implications for the adolescent's health status: directly linked to health discomfort and indirectly linked to health risk consequences via adolescent aggression/sensation seeking. Parent report of behavioral control had indirect implications for adolescent health risk consequences and health discomfort while child report of behavioral control had indirect implications for health risk consequences and health dissatisfaction. Unexpectedly, peer factors had direct implications for various health outcomes.

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INTRODUCTION

Adolescence brings with it a sizeable increase in health risk behavior, most notably, alcohol and drug use, sexual risk taking, sensation seeking, and aggression (US Preventive Services Task Force, 1989). These behaviors are so widespread that some theorists argue that involvement in health risk behavior is developmentally normative and can actually be "growth producing" – facilitating achievement of necessary developmental tasks, most notably, separating from parents and developing more adult-like forms of personal autonomy (Jessor & Jessor, 1977; Maggs, Almeida, & Galambos, 1995; Shedler & Block, 1990; Sibereisen, Eyferth, & Rudinger, 1986). However, a small group of adolescents engages in such high levels of health risk behavior that they put themselves at serious risk, increasing their chances of short-and long-term health problems that can ultimately result in severe morbidity or mortality. This seems especially true of transition-prone adolescents - those adolescents who are in a hurry to obtain the privileges of adulthood. Some researchers suggest that frequent and persistent patterns of health risk behavior may be the result of a lack of opportunities for age-appropriate positive forms of autonomy-seeking. However, involvement in this behavior pattern may provide adolescents with a false sense of maturity, often at the cost of physical as well as psychosocial well-being.

Previous research has looked mostly at either parent-adolescent relationship influences alone or peer influences alone on adolescent involvement in health risk behavior. This study, however, explores the combined influences of parent-adolescent relationships and peer influences on adolescent involvement in health risk behavior. In the past, adolescent development was viewed as a unidirectional transition from parent

influence to peer influence, with a normative decrease in the former associated with a normative increase in the latter. However, more recent research describes the process as being more mixed, with certain types of family relationships linked to over-involvement with deviant peers and other types of family relationships operating as protective factors that buffer or minimize the effects of negative peers on involvement in health risk behavior.

This study will also examine several alternative models that assess the direct (and indirect) effects of the parent-adolescent relationship as well as interactive effects of relationships with parents and peers on health risk behavior. Health risk behavior during adolescence may partly stem from parents' difficulties addressing adolescents' autonomy needs, which in turn, encourages adolescents to seek out compensatory experiences in relationships with deviant peers. Factors associated with these deviant peer relationships potentially fuel adolescents' involvement in health risk behavior which ultimately can lead to negative health consequences.

Clarifying Terminology

Although "deviance" and "health risk behavior" are often used interchangeably, there are important distinctions between the two. In fact, health risk behavior can be seen as a *subset* of deviant behavior that creates a unique type of risk to adolescents with regards to their physical well-being. The term delinquency also overlaps with notions of deviance and health risk behavior. However, delinquency is limited to acts of a criminal or legal nature (i.e., breaking and entering or stealing). All delinquent acts are deviant, but only a subset of deviant and/or delinquent behavior create health risks for the adolescent, i.e., drinking under age is deviant, delinquent, and a health risk behavior, but

vandalism is deviant and delinquent only and lying is deviant but neither delinquent nor a health risk behavior. The present review will be drawing from the literature on deviant and delinquent behavior, in general, and health risk behavior, specifically, given that (a) these categories of behavior overlap and (b) the literature does not provide a way to distinguish predictors specific to any one.

Background for This Study

Research consistently shows that adolescents, in general, are more likely to engage in health risk behaviors than any other age group. Some researchers suggest that normative involvement in health risk behavior serves particular functions in normal adolescent development and even addresses evolving needs for autonomy, mastery, and intimacy (Irwin & Millstein, 1986). First, since "normal" development is associated with "transition into adulthood," which encompasses such things as increasing independence, sexual awareness, physiological and cognitive maturation, and greater peer affiliation, adolescents might believe that involvement in health risk behaviors is an expression of their adult status. In addition, normal cognitive processes during adolescence, often described under the rubric of adolescent egocentrism, may place adolescents at heightened risk for involvement in health risk behavior. David Elkind argues for two aspects of adolescent egocentrism: imaginary audience and personal fable (Elkind, 1976, 1985). The former involves self-conscious behavior; the sense of always being noticed and visible, in essence, being "on stage;" reinforcing social pressures to go along with peers. The latter, the personal fable, gives adolescents a sense of personal uniqueness and individuality. On the one hand, it leads them to feel that no one can understand how they really feel (Santrock, 2000), and on the other, it results in feelings of invincibility

(Lawson & Lawson, 1992; Palmquist, 1992); for example, thinking, "What happens to others cannot happen to me" (Ryan & Kuczkowski, 1994). Warnings of health risks for smoking, drinking, and taking drugs seemingly have little personal relevance.

Egocentrism, in general, and imaginary audience and personal fable, in particular, are normal aspects of early adolescent development that diminish over time, usually by late adolescence. However, in a cross-sectional study of 850 adolescents in the 7th, 8th, 9th, and 12th grades, Ryan and Kuczkowski (1994) found that egocentric thinking evolved into more mature thought in the context of *secure* parental relationships. If parent-adolescent relationships were characterized by insecurity, egocentric thoughts remained salient through late adolescence.

Notably, societal influences, such as mass media and community norms, often present health risk behaviors in a positive light. The media regularly presents role models for unprotected sexual behavior, risky sexual activities, and alcohol and drug use, to name a few (Igra & Irwin, 1996), with adult role models depicted as young, good looking, and "having it all". Different communities and neighborhoods provide adolescents with opportunities and motivations to engage in these behaviors as well. Local peer norms create expectancies of "typical adolescent behavior (Crockett & Petersen, 1993). In some peer contexts more than others, those who do not participate in alcohol or drug use, sexual activity, aggressive behaviors, or risk taking are perceived as "stuck" in childhood, ridiculed as "sissies" or "babies." Cultural expectations may also influence the onset of health risk behaviors. For example, despite similar ages of "sexual debut", the US has the highest rates of adolescent childbearing and abortion in the developed world (Blum, 1991). This is thought to reflect the relatively liberal cultural

attitudes toward adolescent sexuality in the United States (Perry, Kelder, & Komro, 1993).

While several developmental processes during adolescence (i.e., egocentrism, social influences) contribute to "normative" involvement in health risk behavior, there are reasons why several health risk behaviors (i.e., sexual intercourse and alcohol use) are traditionally reserved for adults. These include, but are not limited to the inherent risk in such behaviors and the high degree of maturity needed for appropriate decision-making and behavioral constraint. Furthermore, research indicates that a subset of adolescents are involved in health risk behavior above and beyond so-called "normative" levels. Several studies suggest that the quality of parent and peer relationships may be particularly influential in predicting adolescents' level of health risk behavior. This study examines several aspects of these relationships as well as the interrelationship between the two.

Parental Influences

Parents have a major part to play in transmitting cultural expectations to their children. In fact, the parent-child relationship, is the most immediate and significant socialization influence on the growing child (Galambos & Ehrenberg, 1997), with increasing peer influence in addition to, rather than a substitute for parent influence during the adolescent years. Research suggests that increased reciprocity, or the lack thereof, in parent-child relationships in large part, mediates the effect of other macro-family risk factors, such as single parenthood or household poverty, on the adolescent's development and mastery of developmental tasks. Normal adolescent development encompasses such things as a move towards greater freedom, responsibility, and identity-

formation (Baer & Bray, 1999; Schulenberg, Maggs, & Harrman, 1997). To a great extent, the family context is the appropriate medium in which developmental tasks are achieved. The challenge for parents during this period is to facilitate adolescent development, which includes greater self-directedness, while simultaneously minimizing the adolescent's involvement in antisocial activity. Research indicates that when parents increasingly offer adolescents opportunities to exercise their developing competencies within the context of the family, the risk for involvement with antisocial peers, as well as a range of other problems, is minimized (Fuglini & Eccles, 1993). Alternatively, failure to provide these opportunities at home increases the likelihood that adolescents will seek opportunities to exercise autonomy in relationships with peers, especially deviant peers who, like themselves, are in a hurry to acquire the privileges associated with adult social status.

Unfortunately, there is no agreed upon language to describe the different aspects of relationships with parents that either facilitate or impede reciprocity and balance within the relationship. In this study, four empirically related, but conceptually distinct variables, will be used to refer to and distinguish among various aspects of the parent-adolescent relationship associated with issues of reciprocity and control: mutuality, conflictual dependency, psychological control, and behavioral control. All four of these variables refer to processes in the parent-adolescent relationship that have direct implications for adolescent development and outcomes, and together they take into account both interpersonal and intrapsychic dimensions of adolescent autonomy development within the family context. Examining these four factors extends prior work in the field, which too rarely considers multiple aspects of the parent-adolescent

relationship in general, and both interpersonal and intrapsychic factors, in particular. This study will broaden and sharpen previous research, not only providing a greater understanding of the implications of adolescent-parent relationships for negative peer involvement and adolescent health risk behavior, but also specifying components of the adolescent-parent relationship that are most predictive of specific maladaptive outcomes.

Mutuality

Parenting that fails to provide adolescents with opportunities for mutuality, indicated by warm, engaging adolescent-parent interactions that call for competent contributions from the adolescent (Smetana, 1995; Allen, Moore, Kumerminc, & Moore, 1998), is known to contribute to maladaptive, antisocial behavior. Mutuality has an *interpersonal* emphasis, with adolescents reporting high levels of mutuality in daily interactions with parents presumably enjoying a healthy balance between autonomy and connection; high levels of perspective sharing and a certain degree of challenge within a context of support (Grotevant & Cooper, 1985). Described as the product of authoritative parenting, mutuality is achieved through increasing bilateral respect and reciprocity (compared to childhood) in the adolescent-parent relationship and correlates positively and strongly with connection and parental warmth and ability to foster competence. Adolescents experiencing high levels of mutuality in their relationships with their parents experience their parents as respecting of the adolescents' need to individuate while attending to their continuing need for advice and support. Parents facilitate adolescent development by encouraging greater participation in family decision-making. Adolescents in families characterized by mutually respectful or "enabling" relationships with parents (Grotevant & Cooper, 1985; Hauser, 1991; Youniss, 1989) appear less likely

to have affiliations with violent peers or become involved in individual violence and health risk behavior (Dishion, Patterson, & Griesler, 1994; Henry, Tolan, & Gorman-Smith, 2001).

Conflictual Dependency

In addition to mutuality in adolescent-parent interactions, current research has underscored the importance of *intrapsychic* autonomy for adolescent development and adjustment (Frank & Jackson, 1996; Fuglini & Eccles. 1993). Psychoanalytic theorists often discuss the importance of intrapsychic reorganization during adolescence. Primary tasks include (a) repudiation of parental identifications or "deidealization," (b) greater emotional separateness, and (c) achievement of independence. These processes allow for a reorganization of the ego-superego balance for the adolescent: a shift from superego dominance (directed by parental introjects) to ego dominance (and self-direction; Blos, 1962; Blos, 1979). Intense conflicts associated with deidealization and emotional separateness, along with anxieties linked to increasing demands for competent behavior are subsumed under the notion of "conflictual dependency," often indicated by adolescents' feelings of anger and shame in relation to their parents (Frank, Avery, & Laman, 1988; Frank, Poorman, & VanEgeren, 1997; Frank, Schettini, & Lower, 2002; Hoffman 1984; Hoffman & Weiss, 1987). As adolescents become increasingly aware of their parents' (and by implication, their own) fallibility, they may become overwhelmed by the breakdown of childhood identifications and relevant ego ideal representations. This awareness results in feelings of vulnerability, which lead the adolescent to seek solace, guidance, or other affirmation elsewhere. At home, these adolescents often respond with feelings of anger or contempt for the parent. However, they simultaneously

dread the loss of connection and support and ultimately feel ashamed of their inability to live up to the same parental expectations they profess to reject (Reimer, 1996; Frank, Pirsch, & Wright, 1990).

Psychological Control

Presumably, parents' use of "psychological control" makes it more difficult for adolescents to become autonomous, primarily in the intrapsychic sense. While both psychological control and conflictual dependency can be linked to feelings of anger and shame in the adolescent, there is an important distinction between the two. Psychological control refers to parental attempts to dominate the psychological and emotional development of the child (by controlling the child's emotions, thought processes, self-expression, and attachment to parents; Barber, 1996). Psychological control can be distinguished from conflictual dependency because whereas the former refers to the *adolescent's perception* of parental attempts to dominate the adolescent's emotions and feelings, the latter refers to the adolescent's feelings of shame and anger *because* of an inability to live up to (perceived) parental expectations. Guilt, expressions of disappointment or shame, and manipulation of the "love relationship" are the primary vehicles for "controlling" the adolescent (Baumrind, 1966). Psychological control has been implicated in undermining independent functioning and self-confidence while contributing to feelings of personal distress and inadequacy (Barber, 1996; Steinberg, 1990).

Relationships high in psychological control are characterized by constraining interactions between parent and adolescent that evoke feelings of shame in the adolescent, inducing anger, guilt, and anxiety, rather than supporting the adolescent's

efforts to reevaluate parental identifications. Constraining interactions with parents devalue, distract, withhold or show indifference, judge, excessively gratify, and interfere in the development of individuality while undermining the adolescent's self-esteem (Hauser, 1991). They also may undermine the adolescent's participation in family interactions and discourage involvement and sharing of ideas and perceptions. Consequently, they are likely to diminish mutuality as well as increase intrapsychic conflict (Hauser et al., 1984).

Behavioral Control

Parental monitoring and supervision of the adolescent's activities, usually referred to as behavioral control, is a distinct aspect of "parental control" separate from psychological control (Pettit, Laird, Dodge, Bates, & Criss, 2001; Steinberg, 1990). The conceptual and empirical distinction between so-called behavioral control and psychological control has been discussed extensively, with research showing that these qualitatively distinct aspects of control lead to different behavioral and emotional outcomes (Barber, 1996; Steinberg, 1990; Steinberg, Elmen, & Mounts, 1989). Steinberg (1990) argues that psychological control has negative implications for adolescent development (i.e., impeding autonomy-seeking and identity development) whereas behavioral control (when not too harsh or punitive) is often a positive mechanism, providing adolescents with needed support and guidance.

Monitoring, a fundamental component of effective behavioral control, is usually measured in terms of parent's reported supervision of their children's whereabouts, activities and companions (Brown, Mounts, Lamborn, & Steinberg, 1993). It is this component of behavioral control that most often has been linked to positive outcomes.

For example, in a prospective, longitudinal, multi-informant study of mothers and their 13-year-old children, Pettit et al. (2001) found that more, as compared to less, monitoring was associated with fewer delinquent behavior problems. Others have found similar findings, with the risk of deviance and drug abuse increased, in part, by poor monitoring of adolescent behavior (Hawkins, Catalnao, & Miller, 1992). In fact, lack of parental monitoring is related to adolescent substance use not only directly, but indirectly as well via its influence on associations with deviant peers (Dishion, Capaldi, Spracklen, & Li, 1995). This study will measure and assess the effects of parent report as well as adolescent perceptions of parental supervision and monitoring on health risk behaviors.

Research indicates the relative independence of the four aspects of autonomy in the adolescent-parent relationship studied here. Behavioral control is a strategy used by parents to modify and constrain behaviors in an attempt to socialize their children to societal standards of the larger community (Steinberg, 1990; Pettit et al., 2001). Monitoring is designed to prevent adolescents' "drift" toward antisocial peers and to fend off related increases in risk behavior, delinquency, and other antisocial behaviors (Patterson, Crosby, & Vuchinich, 1992). In contrast, high levels of psychological control appear to stem from the parents' own intrapsychic disturbances. Disturbances such as these cause parents to feel the need to protect their "psychological power" in the adolescent-parent relationship, and in so doing, they manipulate the emotional and psychological boundaries of the relationship, ultimately stunting the child's emerging autonomy and self-development (Pettit et al., 2001). In fact, research has found, that high levels of psychological control are associated with both delinquent problems and greater anxiety/depression (e.g., Barber, Olsen, & Shagle, 1994; Patterson et al., 1992).

Although psychological and behavioral control can occur simultaneously, this is not always the case. Parents can be "strict" monitors without forcing psychological dependency on the child (Baumrind, 1966, Schaefer, 1965; Steinberg, 1990; Steinberg, et al., 1989). Likewise, mutuality and conflictual dependency, although correlated, can occur together or independently of the other. They also can have distinct implications for outcomes. For example, a study of early adolescents in grades 4 to 8 found that mutuality and conflictual dependency had independent and somewhat different effects on personality adjustment and behavioral outcome. Path analysis findings were mostly consistent with a mediated model predicting personality from both conflictual dependency and mutuality and behavioral problems from personality. However, conflictual dependency directly predicted emotional difficulties for females; further, conflictual dependency had stronger and more consistent implications for adolescent personality and behavioral difficulties than mutuality (Frank, et al., 2002).

In sum, differences in experiences of autonomy and connection that adolescents have with their parents may have direct implications for behavioral outcomes. Research shows that when adolescents experience a healthy balance between separation and connectedness, report low levels of psychological control, have appropriate levels of supervision, and experience high mutuality and low conflictual dependency, they are more likely to be psychosocially mature, well-adjusted, and self-reliant, in addition to having a healthy sense of identity (Grotevant & Cooper, 1985). Most pertinently, several studies suggest that these adolescents are less likely to engage in deviant activities, including activities that potentially compromise their physical health (Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Lamborn, Dornbusch, & Darling, 1992).

In contrast, adolescents with little supervision and who experience a lack of mutuality, accompanied by high levels of conflictual dependency more than likely will find it difficult to individuate and express autonomy in prosocial ways, leaving them more vulnerable to the influence of transition-prone peers (Jessor, 1993). These same adolescents appear to be vulnerable to negative outcomes in general (including depression and anxiety, negative peer influence, alcohol and drug problems, eating problems, and involvement in antisocial activity) as well as negative health outcomes that often follow (such as personal injuries, illnesses, overdoes from drug abuse, and sexually transmitted diseases; Allen, et al., 1998; Baer & Bray, 1999; Biglan, Metzler, Wirtz, & Ary, 1990; Frank et al., 1997; Frank and Jackson, 1996; Fuligni & Eccles, 1993; Kratzer & Hodgins, 1997).

The negative consequences of "negative" or "non-reciprocal" relationships with parents, in the interpersonal and intrapsychic sense, are fairly well documented. Some theorists argue that too much separation without connectedness can lead to adolescents' detachment from parents, declining school achievement, reliance on peer "subcultures", and poor school achievement (Eccles, Buchanan, Flanagan, & Fuglini, 1991; Lamborn & Steinberg, 1993; Ryan & Lynch, 1989; Simmons & Blyth, 1987; Steinberg, 1990). Relatedly, studies of college students have found that excessive angry or resentful feelings or conflictual dependence with parents are negatively related to positive college adjustment – both academic and personal and to reported emotional problems (Hoffman 1984; Hoffman & Weiss, 1987; Rice, Fitzgerald, Whaley, & Gibbs, 1995). In addition, Frank and Jackson (1996) studied late adolescent women and found that those reporting less individuated relationships with their parents also were more likely to report certain

personality dysfunctions, namely, interoceptive confusion (difficulties identifying internal feelings and states), feelings of ineffectiveness, and maturity fears (anxieties associated with impending adulthood); making them vulnerable to severe eating problems. This study will explore how these "negative" relationships with parents are related to increased levels of involvement in health risk behaviors, with the most problematic relationships with parents leading to non-normative levels of involvement in health risk behaviors.

Peer Influences

Another outcome of difficulties in the parent-adolescent relationship is that feelings of inadequacy and dependency lead adolescents to find ways to prove their autonomy and individuation outside the family and with peers. Engaging in health risk behaviors with peers is one possible mechanism through which adolescents whose autonomy struggles are constrained by parental control. It is also hypothesized, given past research, that difficulties in the parent-adolescent relationship predict excessive peer involvement during adolescence, which in turn predicts high levels of health risk behavior.

Although relationships with peers (as well as parents) are important well before the adolescent years, they appear to take on a different quality during adolescence (Brown, Dolcini, & Leventhal, 1997; Hartup, 1993). Major transformations in the peer environment occur alongside changes in the parent-adolescent relationship, independently and together motivating and shaping adolescents' behaviors and attitudes (Berndt, 1982; Hartup, 1993).

Brown et al., (1997) argue that there are three types of normative peer transformations that occur during adolescence. First, friendships shift from unstable, activity-based relationships to more stable, affectively oriented relationships. Second, sexual and romantic relationships become more acceptable and, to some extent, expected during this time. Third, adolescents become increasingly associated with peer "crowds", with each member within a crowd having similar lifestyles and values. Many other researchers identify the same transformations and most support the idea that adolescent friendships increasingly are a stable source of emotional and instrumental support (Berndt, 1982; Bigelow, 1977; Hartup, 1993; Sharabany, Gershoni, & Hofman, 1981).

Adolescent friendships also are qualitatively distinct from childhood friendships because of the adolescent's greater degree of independence from adult guidance and management. Adolescents typically place more importance on peers than younger children and feel that parental control over the types of friendships they form is no longer reasonable (Smetana & Asquith, 1994). In addition, as they enter their teens, they begin to spend a greater amount of time with peers and less time with family (Larson & Kleiber, 1993; Larson, Richards, Moneta, & Holmbeck, 1996).

Given the increased time spent with peers, peer influence over the adolescent's behavior and attitudes is likely to increase during adolescence as well. Peers can have both positive and negative influences on an adolescent, with the latter being the more frequently discussed. The influence of peers is often discussed in terms of "peer pressure," most-often with a negative connotation. Peers are known to pressure others (implicitly or explicitly) into engaging in deviant behavior (Maggs, et al., 1995; Oeting & Beauvais, 1987). In fact, peers are seen as the most proximal risk for involvement in

deviant behavior (Brook, Whiteman, Gordon, & Cohen, 1986; Dishion, Patterson, & Reid, 1988; Dishion, Spracklen, Andrews, & Patterson, 1996; Klein, Forehand, Armistead, & Brody, 1994). Even without assessing for deviance among peers, correlational research consistently shows a relationship between amount of time spent with peers and involvement in drug use, including tobacco, alcohol, marijuana, and so on, as well as involvement in other delinquent activities, deviant sexual practices, etc. (Agnew & Petersen, 1989; Flannery, Williams, & Vazsonyi, 1999; Patterson, Dishion, & Yoerger, 2000). Nonetheless, other researchers have said that above and beyond time spent with peers, two factors that may be even more indicative of individual behavior are: deviancy among peers and peer approval of deviance. Presumably time spent with peers leads to identification with these peers as a source of approval and support. If individuals look up to these peers or identify with them more readily than negative peer influences on adolescent behavior are especially likely to "stick" or adhere – exerting influence in behavior above and beyond the time factor alone. A study of 96 young adolescents (mean age at first contact=11 years) over a three-year period, found that adolescents who engaged in more frequent risk behaviors were likely to report greater deviant involvement in the company of peers than those less involved in these behaviors. Changes in the levels of risk behaviors covaried with changes in the frequency of activities with peers (Maggs et al., 1995). The situation is exacerbated further when "peer characteristics" (i.e., positive versus negative types) are considered: the more serious the peer deviance, the more harmful the effect on adolescents' behaviors (Tolan & Thomas, 1995).

The Relative Influences of Parents and Peers

The image of the family and peers as separate social worlds for teens is quickly being replaced by recognition of important links between these two worlds. For decades the common assumption was that there was a "trade-off" between parents and peers during adolescence, evidenced by an increased reliance on peers and a decreased reliance on parents; with peer influence swamping the influence of parents and/or schools (Brittain, 1963; Kandel & Andrews, 1987). Supporters of this view argued for qualitative differences between adolescent-peer and adolescent-parent relationships, with the former being more egalitarian and reciprocal, and the latter, more unilateral (Hartup, 1979). Greater opportunities for autonomy in relation to peers presumably results in greater distancing of adolescents from their parents, with both parents and adolescents reporting less closeness, cohesion, and engagement with each other (Collins, 1990; Collins & Russell, 1991).

Researchers now argue that family and peer relationships are not two separate dimensions but rather that there is a continuity and overlap between functions of the two (Bukowski, Newcomb, & Hartup, 1998; Cooper & Ayers-Lopez, 1985). Focusing on one relationship without simultaneously assessing the other leaves the picture incomplete and skewed. Because both relationships are profoundly influential in organizing adolescent behavior, the combined influences will be a focus of this investigation. Therefore, this study will not only explore implications of peer acceptance of deviance and involvement of health risk behavior, but will do so while also considering the parent-child relationship.

Two alternative models for how relationships with parents and peers influence adolescent involvement in health risk behavior (and subsequent health outcomes) will be examined. One model suggests that peer factors mediate (or partially mediate) the relationship between adolescent-parent relationships and adolescent involvement in health risk behavior, the other model suggests that adolescent-parent relationships interact with peer factors to predict level of adolescent involvement in health risk behavior. Researchers find that healthy parent-adolescent relationships provide a foundation for healthy peer involvement. Parents who facilitate autonomy development via mutuality and behavioral monitoring presumably provide the adolescent with opportunities to learn important skills such as problem solving, social skills, emotional regulation, and conflict resolution, which can then be used in peer relationships (Asher, Renshaw, & Geraci, 1980; Carson, Burks, & Parke, 1987; MacDonald & Parke, 1984). Further, researchers suggest that certain parenting practices (i.e., those that promote mutuality) not only facilitate the learning of these types of skills, but more generally, are responsible for the development of certain characteristics during childhood that lay the foundations for associations with positive peers during adolescence (Brown, et al., 1993; Feldman & Wentzel, 1990).

This study will not look at the reciprocal benefits of positive peer relationships on the quality of parent-adolescent relationships, but this type of reciprocal influence has been documented in a few studies. In particular, Youniss (1980) conducted a study with children from middle-childhood through adolescence and found that experiences of mutuality with peers helped adolescents coordinate their interests and beliefs in their relationship with their parents in a more egalitarian manner than during childhood. In

particular, Youniss (1980) argued that the negotiation and compromising skills learned in peer relationships increasingly were incorporated into the parent-adolescent relationships, thereby allowing parents to remain a major influence in the adolescents' lives, albeit in a new, reciprocal way.

This study will, however, examine whether certain types of parent-adolescent relationships are more likely to be associated with negative peer involvement, which in turn is associated with adolescent health risk behavior. More specifically, it is hypothesized that a lack of mutuality and monitoring in the face of high conflictual dependency and psychological control within the parent-adolescent relationship is likely to be associated with negative peer interactions (Fuglini & Eccles, 1993; Baumrind, 1991; Youniss, 1980). Research suggests that adolescents who are unable to obtain autonomy-enhancing experiences within their relationships with their parents are more susceptible to influence, especially negative influence, from their peers (Brown & Huang, 1995) and that negative peer influences, in turn, can result in an increase in health risk behavior For example, in a study of 1,771 children in 6th and 7th grades using self-report questionnaires, Fuligni and Eclles (1993) found that early adolescents who perceived fewer opportunities for decision making with their parents were less likely to turn to their parents, and more likely to turn to peers (especially negative peers) for personal and instrumental support than those who perceived greater opportunities. Further, Devereux (1970) found that peer-oriented 6th graders (those who frequently endorsed being with and relying on peers) were most likely to come from an overcontrolling home environment. He suggests that the negative family environment "drove them into the peer environment (p. 106)."

Unfortunately, Shulman et al.'s (1995) findings suggest that when adolescents seek autonomy experiences from their deviant peers, they are often disappointed. Beyond a transitory sense of "we-ness" surrounding shared involvement in deviant activities, deviant peers are unable to compensate for unmet autonomy needs within the family. Deviant peers are often more tolerant of social deficits and antisociality and by jointly engaging in deviant activities, the peer group may provide a false sense of cohesion and support. Extrinsic rewards (i.e., acceptance by others and interpersonal gratification) that promote cohesion between the adolescent and his/her deviant peers, increase the potential level of deviant behavior by all, further strengthening the ties between the adolescent and peers (Edwards, 1996; Giordano, Cernkkovich, & Pugh, 1986).

Research suggests that inadequate parental monitoring and inept discipline further promote involvement with deviant peers, oftentimes leading to greater adolescent involvement in risk behavior (Patterson & Stouthamer-Loeber, 1984; Steinberg, 1987). These studies lend support to Dishion et al.'s (1995) argument that poor parenting is a necessary component of risk but exerts its influence though increased association with deviant peers. Moreover, work by Brown and Huang (1995) extends these theories and findings, suggesting that peer and parent relationships may interact in predicting adolescent behavioral outcomes. As the basis to most of the work, they suggest that parental influences are "filtered" through adolescents' experiences in peer social contexts. They agree with other theorists that negative aspects of parenting are related to increased associations with "negative" peers, which directly influences greater involvement in health risk behaviors. However, they argue that the outcomes of the

parent-adolescent relationship and the peer relationships may not be entirely straightforward. Rather, they propose that maladaptive peer contexts may have a debilitating effect, moderating in the direction of magnifying the negative outcomes associated with inhibitive parenting.

Regardless of the types of peers, inhibitive parenting promoted deviance, but deviant behavior with peers may exacerbate the effects of constraining or non-supportive relationships with parents (Brown & Huang, 1995). Not only do adolescents in these situations receive compensatory interpersonal rewards (making up for conflicts in the parent-adolescent relationship), they also are enabled by their peers to engage in pseudo-mature but deviant acts; perhaps providing the basis for deviant peer group cohesion. Participation in deviance, including health risk behavior, with peers, therefore, helps to insulate the individual from rejection and ridicule within the peer group, rejection and ridicule that adolescents often feel within the family as well (Giordano et al., 1986).

Implications for Health

In light of Brown and Huang's research (1995), this study will examine both mediated and interactive models of parent and peer influences on adolescent health risk behavior. In addition, it will attempt to demonstrate if adolescent's involved in high levels of health risk behavior will also be at greater risk for health morbidity. It should not be surprisingly that adolescents who engage in drinking, smoking, risky driving, etc., at drastically high levels are also likely to compromise their own health and well-being, hence the term, *health risk behaviors*. In fact, engaging in health risk behaviors is the most serious threat to an adolescent's health and well being (US Preventive Services Task Force, 1989). Researchers have found that adolescent risk behaviors, most notably

those associated with violence, are a leading cause of morbidity and mortality in adolescence, identified by some as America's most important public health and social problem (Tolmas, 1998). Although these behaviors have profound implications for adolescents' physical well being, there is surprisingly limited research in this domain. In addition to assessing the relative impact of various predictors of health risk behavior, this study will assess the extent to which these risk behaviors lead to generally poor adolescent health.

Adolescent Health

Adolescence is a paradox when it comes to physical health (Steinberg, 1999). On the one hand, adolescence is considered one of the healthiest periods in the life span. Some argue that many adolescents attain levels of health, strength, and energy never again experienced in their lives (Santrock, 2000). Steinberg points out the relatively low incidence of disabling or chronic illnesses, and fewer short-term hospital stays during adolescence. Over the past 50 years the rate of death and disability *resulting from* illness and disease during adolescence has decreased and new and better medical technology and health care delivery have improved the general well being of adolescence.

Nonetheless, adolescence is also a period of high risk because of a rise during this period of unhealthy behaviors, violence, and risky activity. Although the "old" mortalities of adolescence have been rectified by improvements in medical practice there is a "new" mortality of adolescence that has emerged. Violence and injury are twice as likely to result in deaths among adolescents as compared to illness and disease - the converse of the trend fifty years ago. Death results more often from engagement in

health risk behaviors – automobile accidents, suicide, homicide, substance use, and sexually transmitted disease (especially AIDS).

The literature points to the potentially detrimental health effects of substance use, risky driving, and early sexual activity. In particular, the association between risky driving and morbidity/mortality is well known. Approximately, 78% of all unintentional injuries among youth are attributable to motor vehicle accidents and, interestingly, almost all motor vehicle deaths in youth ages 15 to 24 have been in rural areas (National Safety Council, 1993). Long-term use of tobacco, at least in the long-term, is clearly linked to lung cancer, atherosclerosis, coronary heart disease, chronic obstructive pulmonary disease, and other malignancies (Sells & Blum, 1996) Unprotected or early sexual activity can lead to pregnancy or sexually transmitted diseases. In fact, once every 104 seconds, a teenage female becomes pregnant (Children's Defense Fund, 1994). Engaging in any or all of these health risk behaviors can also lead to a trajectory of unhappiness, overall decreased life-satisfaction, poor health, low self-esteem, poor school and work performance; the list goes on.

Interestingly, adolescents often recognize that behaviors such as substance abuse and unprotected sex are potential health hazards. However, they also underestimate the potential negative outcomes that ensue (such as liver damage, sexually transmitted diseases, heart problems, general poor health, etc.). A denial of "mortality/illness" and feeling that "it will never happen to me" (as previously discussed) is potentially a function of adolescents' sense of uniqueness and invulnerability (Elkind, 1976; Santrock, 2000). In addition, adolescents are at greater risk for poor health because they are less

likely than adults to seek and receive medical and dental care (Millstein, Peteren, & Nightingale, 1993).

This study will examine three different aspects of general health status: overall health satisfaction, overall discomfort, and health disorders. Moreover, the model proposed here assumes that health disorders are primary and it is the presence (or absence) of these disorders that leads to health discomfort or health satisfaction.

Predicted Relationships

This study will examine and compare the utility of three models describing the effects of family and peer variables on adolescent health risk behavior and health outcomes. Distinctions among the three proposed models were suggested by work by Henry et al. (2001). Their research indicated that model in which family and peer factors had direct effects on adolescent behavior was far too simple; therefore, this model will not be tested in this study. Alternative models that are examined here include a full mediation model (Model A), a partial mediation model (Model B), and moderating model (Model C).

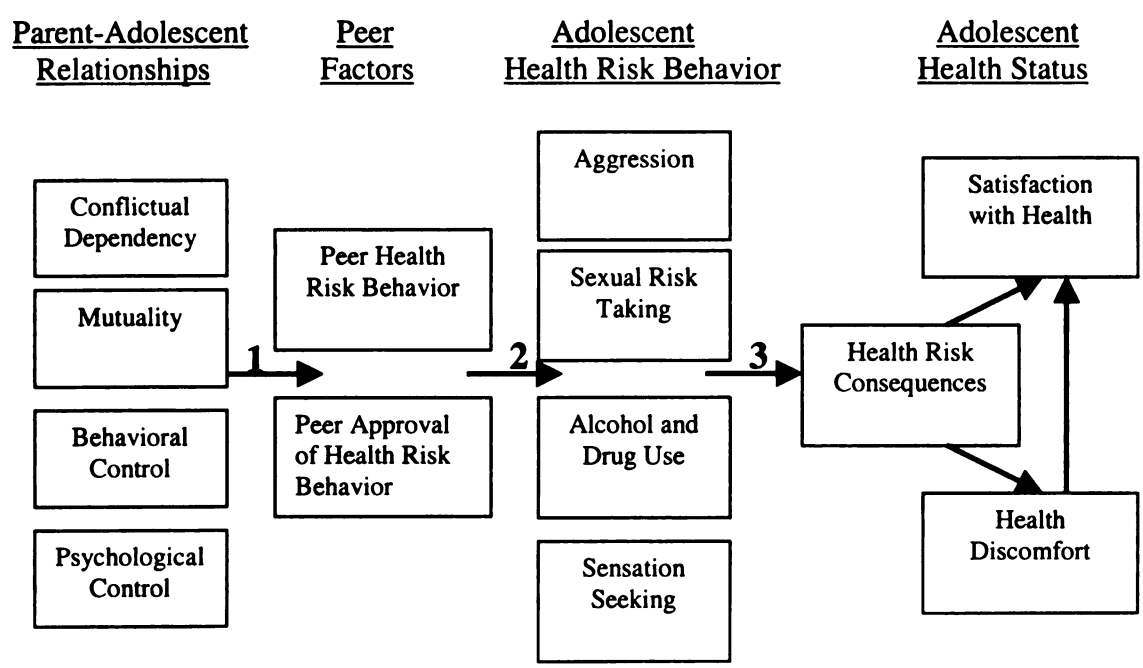
In each of the models, parent-adolescent relationships are defined by: psychological control, conflictual dependency, behavioral control, and mutuality; and peer factors by peer engagement in health risk behavior (i.e., alcohol and drug use, sexual risk taking, sensation seeking, and aggression) and peer acceptance of involvement in health risk behavior. Adolescent health risk behavior is defined by four constructs (i.e., alcohol and drug use, sexual risk taking, sensation seeking, and aggression) and adolescent health status is defined by adolescent health risk consequences, satisfaction with health, and health discomfort.

Model A: The Fully Mediated Model

As can be seen in Figure 1, the full mediation model proposes that parent-adolescent relationships will directly "predict" peer relationships (arrow 1) which will "predict" adolescent health risk behavior (arrow 2) which will "predict" adolescent general health (arrow 3). More specifically, it is hypothesized that maladaptive parent relationships (as defined by high psychological control and high conflictual dependency together with low behavioral control and low mutuality) will lead to negative peer relationships (peers engaging in high levels of health risk behavior and peers that approve of health risk behavior). Negative peer relationships are expected to predict high levels of adolescent involvement in health risk behaviors which, in turn, will predict more negative health consequences, undermining health satisfaction and increasing health discomfort.

Figure 1

Model A: Fully Mediated Model

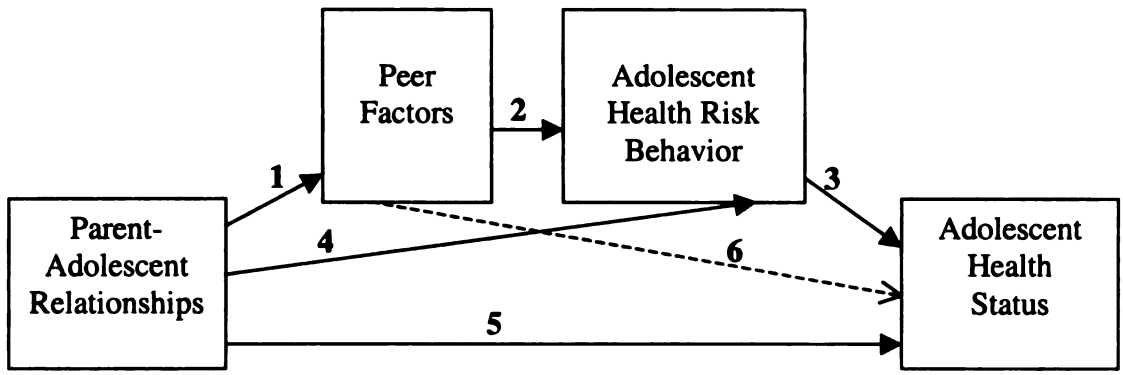


Model B: The Partially Mediated Model

Model B proposes that there is also a direct relationship between parent-adolescent relationships and adolescent health risk behavior (arrow 4) and a direct relationship from parent-adolescent relationship problems to adolescent health status (arrow 5). This model is based on the assumption that adolescents who do not experience a balance between separation and individuation in their relationship with their parents not only will be more involved with deviant peers but also will seek a sense of maturity, adequacy, and/or mastery by directly engaging in health risk behaviors. These adolescents may be more prone to self-medicate, using alcohol or drugs or engage in premature sexual relationships in order to suppress negative feelings associated with conflicted parent-child relationships. A direct pathway from negative parent-adolescent relationships to adolescent health status is based on the assumption that constrictive, negative parenting can be highly stressful for the adolescent, which, in turn can compromise the adolescent's health. Important research in the field of psychoneuroimmunology has found that stress can affect the immune system, which in turn, affects general health, behavior, and the central nervous system (Maier, Watkins, & Fleshner; 1994). The dotted line (arrow 6) in Figure 2 shows a final pathway from peer factors to adolescent health status. There is no theoretical reason to assume that such a relationship exists and hence it is not expected to be supported by the data collected for this study.

Figure 2

Model B: Partially Mediated Model

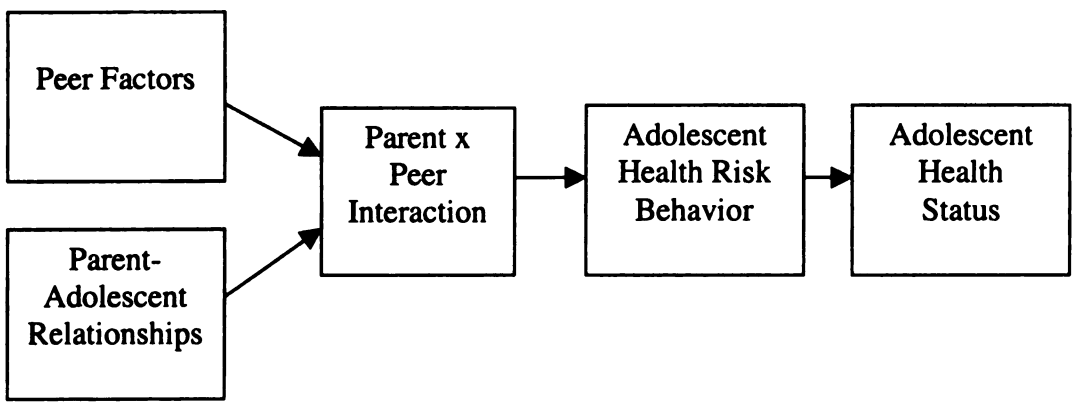


Model C: The Moderated Model

The moderated model shown in Figure 3 proposes that parent-adolescent relationships interact with peer relationships in predicting adolescent health behavior. This model is based on work by Brown and Huang (1995) suggesting that negative peer involvement magnifies the effect of negative parent-adolescent relationship on adolescent health risk behavior. The possibility that parent and peer factors interact in predicting adolescent health status also will be addressed.

Figure 3

Model C: Moderated Model



METHOD

Participants

One hundred and fifty six adolescent participants (95 boys and 61 girls) involved with a Midwestern county's juvenile court were recruited over a two-year period. The rationale for selecting a juvenile justice sample was to ensure a wide range of involvement in health risk behaviors as well as a wide range of relationships with parents and peers. This study assessed adolescents who came in *contact with* the juvenile justice system (with or without official hearings). This sampling procedure maximized the chances of selecting adolescent participants involved across a range of health risk behavior, behaviors described as part of "typical" or "normative" adolescent experimentation (i.e., minor in possession of tobacco or alcohol, vandalism, curfew violation, etc.) as well as behaviors considered to be more "pathological" or "non-normative" (i.e., assault and battery, larceny, felonious destruction).

The offenses of the adolescents ranged from first time to chronic, and minor to severe. In this sample, 89 (57%) of the adolescent offences were considered "lower" or minor offenses while 67 (43%) were considered "higher" or more severe offenses. See Appendix (Table A) for descriptions and crimes falling within the lower and higher categories. A more conceptual break down of the offenses (similar to the categories in this study) indicated that 65 (42 %) were classified as substance use offenses, 35 (22 %) as aggressive towards others, 5 (3 %) as non-aggressive towards others, 15 (10 %) as aggressive towards property, 11 (7 %) as non-aggressive towards property, 44 (28 %) as sensation seeking offenses. See Appendix (Table B) for clarification of categories. Unlike the higher-lower offenses, these categories were not mutually exclusive; those

with more than one offense were categorized as such (i.e., an adolescent with an assault and battery charge as well as a truancy charge was categorized as both *aggressive – other* and sensation seeking). Approximately 17 (11 %) adolescents had multiple crimes.

Most (N = 140) of the study participants were recruited when they appeared before a Hearing Officer in the County Juvenile Justice Court over a two-year period. An additional 16 were referred by probation officers and met inclusion criteria if they (1) committed an offense other than a Criminal Sexual Conduct (CSC) offense (research shows that CSC children experience a unique set of correlates; Office of Juvenile Justice and Delinquency Prevention Report, 2000), (2) had parental consent, (3) were within the same age range as the larger sample, and (4) had been released and been living in the community for a minimum of 3 months, if recently incarcerated. A parent or guardian (whoever was available at that time, or, if two were present - whoever knew the child best) also participated in the study. Parent participants (N=156) included 117 mothers (75%), 29 fathers (18.6%), 5 grandmothers (3.2%), 4 step-parents (2.5%), and 1 "other" legal guardian.

Participants ranged in age from 11 to 16 years (M = 14.7 years, SD = 1.34), with the majority (92.8%) between the ages of 13 and 16, and most were in grades 8, 9, and 10 (20%, 25.7%, and 26.4%, respectively). Most were White (70.6%, n=108). Twenty-one (13.7%) of the adolescents classified themselves as being from mixed ethnicities, 4.6% (n = 7) were Hispanic, 4.6% (n = 7) were Native American, and less than 2% classified themselves as African American or Asian. Five percent were missing ethnicity data.

Data on household composition available for 145 participants indicated that most (n = 102 or 70%) of the adolescents lived in a two-parent home: 49 (32%) with two

biological parents and 44 (30.3%) with their biological mother and a step- or adoptive-father. Forty-three (29.7%) adolescents lived in a single parent home and, of these, 33 lived with their biological mother. The average annual income for the sample was between $30,000 and $45,000. Less than 5% had incomes under $12,000 (n = 6) and approximately 14 percent (n = 19) earned greater than $70,000 per year.

Parent report indicated that 19 adolescents were in part- or all-day special education, 22 had an ADHD diagnosis, 8 had a learning disability diagnosis, one had speech or language problems, and none had a history of mental retardation or brain injury. Ten parents reported "other" as a diagnosis (some wrote in "depression)

Measures

Four separate questionnaires were used to make up the relevant scales: (1) the *Functional Impairment Scale for Children and Adolescents* – Self Report (FISCA-SR), (2) the *Youth on the Fringe Survey* (YOFS), (3) the *Child Health and Illness Profile: Adolescent Edition* (CHIP-AE), and (4) the *Social History Questionnaire*. All questionnaires were chosen for their good psychometric properties, broad application, and relevance to the area of study.

The Functional Impairment Scale for Children and Adolescents- Self Report (FISCA-SR) has 172 items, identical in content to the parent report FISCA (Frank & Paul, 1995; Frank, VanEgeren, Fortier, & Chase, 2000a; Frank, Paul, Marks, & Van Egeren, 2000b), and geared to a sixth grade reading level. Frank et al. (2000a) reported adequate internal reliability for seven of eight impairment domains assessed by this instrument (i.e., Delinquency, Undercontrolled Aggression, Self-Harm, Emotional Impairment, School, Thinking, and Alcohol and Drug Problems; the Home scale is the

exception). A recent study assessing agreement between parent and self-report forms of the FISCA, showed that a hypothesized three-factor model of child functional impairment fit the data for both sources. The model distinguishes among (a) undercontrolled (i.e., overt) aggression, (b) social role violations (covert deviances), and (c) self-focused impairment (i.e., emotional dysfunction and self-harm; Frank et al., 2000a; Frank et al., 2000b). Correlations between parents' and adolescents' functional impairment scores (ranging from .25 to .59) as well as paired comparisons of means, generally identified stronger agreement in "public" (e.g., school) than "private" (e.g., thinking) domains. Overall, Frank et al. (2000a) also found that parent-adolescent agreement coefficients for more than half of the FISCA domains exceeded the magnitude of association typically reported in the literature (Achanbach, McConaughy, & Howell, 1987). Because measures (especially youth-report) are relatively new, validity data are somewhat sparse. However, recent studies lend support to FISCA predictive validity in both inpatient and normal samples (Frank et al., 1998; Frank et al., 2002). Items from the FISCA-SR use several different formats (true-false, multiple choice, Likert scales); therefore, scales combining selected items from this and other measures, were translated into z-scores.

The Child Health and Illness Profile – Adolescent Edition (CHIP-AE; Starfield et al., 1995; Starfield et al., 1999) is a general measure of health status, which consists of 6 domains (Discomfort, Disorders, Satisfaction with Health, Achievement, Risks, and Resilience) and 20 subdomains. This instrument assesses not only manifestations of ill health and current health, but characteristics likely to be related to health in the future, including health risk behaviors. In a school sample, Starfield and colleagues

(1995) showed that internal consistency reliability for the individual risk subdomains ranged from .77 to .87 with satisfactory test-retest reliability over a 3-month period (Pearson's r= .87). Their research suggests that the CHIP-AE is suitable for the assessment of adolescent health status and it may be used to assess changes over time as well as in response to health services interventions.

The Youth on the Fringe Survey (YOF) was developed by Frank and Schettini (2001) for an earlier study and is a compilation of various measures with sound psychometric properties (e.g., Cheung, 1997; Leffert et al., 1998; Offer, Ostrov, & Howard, 1989; Stutman & Lich, 1985). This adolescent self-report questionnaire has 94 items associated with a total of 14 different domains (including, mutuality, conflictual dependency, supervision, peer deviance, peer approval of deviance). Items for the various YOF scales, for the most part, were extracted from other instruments, including the *Offer Self-Image Questionnaire* (OSIQ; Offer at al., 1998) the *Parental Separation Inventory* (PSI; Hoffman, 1984), *Parental Relationship Inventory* (PRI; 44), the *Children's Report of Parental Behavior Inventory* (CRPBI-30; Schaefer, 1965; Schluderman & Schluderman, 1970), and *Peer Support for Deviance Scale* (Cheung, 1997).

The Social History Questionnaire was developed by Susan J. Frank, Ph.D. as part of an intake procedure at a local adolescent inpatient facility. In addition to demographic information, questions on this form ask about supervision and biological family history and psychopathology.

For the most part, items for individual scales associated with each of the four construct domains assessed in this study (adolescent-parent relationships, peer factors,

adolescent health risk behavior, and general health status) were extracted from the larger pool of items based on conceptual relevance. In a few instances, an already-established measure, included as a subscale in one of the larger questionnaires, was used in its entirety. For example, the YOF included a 7-item already-established scale assessing "conflictual dependency." In every instance, the initial group of scale items identified as associated with each target construct was subjected to confirmatory factor analysis procedures to ensure the structural integrity of the scale while minimizing overlap among scales.

Table 1 summarizes the scales associated with each of the construct domains as well as the source questionnaire for each scale. The table reports the original number of items selected for each scale. Note that the 27 items for the peer factor scales that were extracted from the FISCA-SR were modified to ask about peer, rather than respondent's, behavior; for example, by asking "in the last three months, have your friends threatened to hurt someone" rather than "in the last three months have you threatened to hurt someone." Originally, the study also intended to examine peer sensation seeking (similar to the one included in the adolescent health risk behavior construct); however because of

Table 1

Constructs and Source of Initially Selected Scale Items

Construct Domain	Scale and Number of Original Items	Source Questionnaire
Parent-Adolescent Relationships		
	Mutuality, 9 items	YOF
	Conflictual Dependency, 7 items	YOF
	Psychological Control, 3 items	YOF
	Behavioral Control: parent, 4 items	Social History
	Behavioral Control: child, 4 items	YOF
Adolescent Health Risk Behavior		
	Alcohol and Drug Use, 7 items	FISCA-SR
	Aggression, 16 items	FISCA-SR
	Sexual Risk Taking, 4 items	FISCA-SR
	Sensation Seeking, 7 items	CHIP-AE
Peer Factors		
Peer Health Risk Behavior		
	Alcohol and Drug Use, 12 items	CHIP-AE, FISCA-SR (m)
	Aggression, 10 items	FISCA-SR (m)
	Sexual Risk Taking, 5 items	CHIP-AE, YOF, FISCA-SR (m)
Peer Acceptance of Deviance, 5 items		YOF
Adolescent Health Status		
	Health Satisfaction, 7 items	CHIP-AE
	Discomfort, 32 items	CHIP-AE
	Health Risk Consequence, 27 items	CHIP-AE

Note. (m) indicates "modified" to ask about peer rather than respondent behavior.

a clerical error, this 7-item scale was not available. The number of items for each scale is the number of items originally selected. These original items are in Appendix (Table C). The actual number of items for each scale changed considerably as a result of CFA analyses; therefore, final items for each scale are reported in the Results section. In addition, scales for the three health status constructs, were completely revamped, again based on results of the CFA procedures.

A Family History Variable

A final scale was developed from the Social History questionnaire to assess family history of health risk behavior; this was a proxy measure of genetic transmission of health risk behavior. There has been ongoing debate and consideration regarding the role of genetic factors in antisocial and deviant behavior (DeLalla & Gottesman, 1989; Rodgers, Muster, & Rowe, 2001; Rowe, 1994). Arguments suggesting biological risk for adolescent health risk behavior suggest that genetic factors may account for many identified associations between adolescent-parent relationships and adolescent health risk taking behavior. For example, genetic contributions to parent drinking may produce negative parent-adolescent interactions and adolescent risk for alcohol abuse. Although a detailed discussion of this potential confound is beyond the scope of this study, a scale assessing family history of health risk taking behavior was developed as a proxy measure of genetic transmission. In particular, six items were used to tap adolescents' family histories of engaging in risk taking behaviors: family history of alcohol use, drug use, criminal behavior, time spent in prison, extreme aggression, and spousal abuse. Each item was scored as "1" if one or more biological relatives (i.e., grandparents, aunts, uncles, cousins, nieces/nephews) was family history positive for

the item and "0" if no relative was family history negative for the item. The six items were summed to derive a single score ranging from 0 to 6.

Procedures

Participant recruitment for this study began after a determination was made regarding the dispensation of the adolescent's case, i.e., warning and dismissal, consent probation, formal probation, or referral for a formal hearing. The Hearing Officer asked the family to speak with one of the research assistants from this study. Because dispensation was already determined, youth and parents could be reassured that their decision to participate (or not) would not affect the court's response to the juvenile's offense (also stated in the information form). Other assurances of confidentiality, as required by the university human subjects review board, were also provided. Youth and parents were informed of their opportunity to participate in this study and received monetary compensation for their time. After obtaining written consent from the parent and written assent from the adolescent, the family indicated whether they preferred to complete the measures: (1) immediately following the hearing, (2) at a later date at the court facility, or (3) at a later date in their home or some other facility (i.e., the study office). Those who were unsure of their availability, provided a phone number where they could be reached to set up a later appointment. Those without a telephone were asked to give the phone number of a friend or relative as well as to call the project offices at the university to set up a time to come to the courts to complete the testing. All participants (or their contact person) not tested at the court the day of their hearing, were called and reminded the night before their appointment. The various testing options combined with the reminder call reduced the possibility of losing hesitant,

situationally stressed, or forgetful families who might not otherwise keep a scheduled appointment. Out of all eligible adolescents coming through the juvenile court, a total of 76 adolescents (57 boys and 19 girls) ranging in age from 11 years, 5 months to 16 years, 4 months (M = 14.54, SD = 1.27) chose not to participate in this study. Most were White (n=53, 71.1%). Two of the adolescents classified themselves as being from mixed ethnicities, 3 were Hispanic, 1 was Native American, and 1 was African American. Approximately 20 percent (n = 15) were missing ethnicity data.

RESULTS

Measurement Models

Confirmatory factor analysis procedures were used to establish the structural integrity and support distinctions among measures of four components of the parent-adolescent relationship: conflictual dependency, mutuality, psychological control, and behavioral control. Each construct was examined in a separate, rather than a single, multifactorial CFA analysis procedure because of constraints imposed by the size of the present sample. Loehlin (1992) conducted a monte carlo simulation study using confirmatory factory analysis models and concluded that for a model with two to four factors, investigators should have 200 subjects. Others have argued that 15 cases per predictor is a good rule of thumb (Stevens, 1996). Testing a multi-factorial measurement model in smaller samples may lead to inaccurate parameter estimates and standard errors.

The Parent-Adolescent Relationship

The 7-item measurement model for conflictual dependency held up well statistically ($X^2 = 21.39$, df = 14, p = .09; alpha = .74, GFI = .97, Tucker-Lewis Index = .94, RMSEA = .06, SRMR = .05 see Table 2, below). However, the 9 items for the mutuality scale did not cohere. Three items with low, statistically insignificant regression weights were eliminated, along with an additional item judged to be a conceptual outlier ("Most of the time, my parents are happy with me"). A follow-up CFA procedure on the remaining 5 items resulted in an adequate fit with the observed data (see Table 2; $X^2 = 8.63$, df = 5, p = .12, alpha=.71, GFI=.98, Tucker-Lewis Index=.95, RMSEA=.07).

Table 2

Parent-Adolescent Relationship Items and Standardized Regression Weights

Items	Standardized Regression Weights*
Conflictual Dependency	
My parents are ashamed of me.	.50[c]
If I talk things over with my parents, I'm just asking for trouble.	.62[c]
My mother expects too much of me.	.52[c]
My parents make me angry.	.64[c]
My father expects too much of me.	.41[c]
I have been angry with my parents for years.	.61[c]
Usually I feel that I am a bother at home.	.46[c]
Mutuality	
I feel that I have a part in making family decisions.	.45[c]
I usually go along with my parents advice.	.33[c]
My parents respect my desire to be an independent person.	.83[c]
My parents accept my need for privacy.	.77[c]
It is all right with my parents if I disagree with them.	.46[c]
Psychological Control	
My parents are people who are less friendly with me if I don't see things their way.	**
My parents are people who avoid looking at me when I have disappointed them.	**
If I've hurt my parents' feelings, they stop talking to me until I please them again.	**
Behavioral Control: Child Report Items	
During all or most school weeks, I'm supervised by a parent or adult over age 19..	.94[c]
During the weekend, I am supervised by a parent or another adult over age 19..	.60[c]
My parents know where I am when I am not home.	.35[c]
Behavioral Control: Parent Report Items	
Adults in the home did not know the whereabouts of the child.	.82[c]
Child was poorly supervised outside the home.	.83[c]
Adults had to leave the child at home during the day without a responsible adult to supervise.	.50[c]
Adults had to leave the child at home at night without a responsible adult to supervise.	.21[a]

[a] $p < .05$, [b] $p < .01$, [c] $p < .001$. **Note. A confirmatory factor analysis could not be conducted on this scale because it only has 3 items; standardized regression weight estimates could not be calculated.

Statistical constraints associated with the CFA procedure made it impossible to examine the three-item psychological control scale by itself. Therefore, the psychological integrity of the psychological control scale as well as the distinctions among the conflictual dependency, mutuality, and psychological control constructs (all of which describe emotionally laden aspects of the adolescent-parent relationship) were assessed in a single CFA analysis. This results indicated a good fit with the observed and predicted model ($X^2 = 104.96$, df = 87, p = .09, RMSEA = .04, Tucker-Lewis Index = .95, SRMR = .07, GFI = .92).

Correlations among the eight items initially selected to measure behavioral control (4 based on parent report and 4 based on child report) showed stronger associations within, as compared to between, reporters (see Table 3).

Table 3

Correlations for Parent-Report and Child-Report Behavioral Control Items

	Child 1	Child 2	Child 3	Parent 1	Parent 2	Parent 3	Parent 4
Child 1	1	.57[b]	.20[a]	.33[b]	.26[b]	.15	.14
Child 2		1	.23[b]	.17[a]	.04	.03	.02
Child 3			1	.13	.01	- .01	.05
Parent 1				1	.68[b]	.37[b]	.15
Parent 2					1	.43[b]	.14
Parent 3						1	.34[b]
Parent 4							1

[a] p < .05, [b] p < .01. Note. Individual items can be seen on page 40.

Seemingly, children's and parent's subjective experiences of monitoring and supervision were independent of one another. A CFA analysis testing a 2-construct (parent and child) model of monitoring led to the removal of one insignificant child-report item. The final model based on a 3-item child and a 4-item parent behavioral control scale provided a fairly adequate fit to the data (Table 2). Although the chi square for the observed versus the hypothesized model was significant ($X^2 = 22.634$, df = 13, p = .05), other indices of model fit were respectable (GFI = .96, Tucker-Lewis Index = .93, and RMSEA = .07; parent supervision scale alpha = .70; child supervision scale alpha = .65). In addition, the two behavioral control factors were distinct from (a) psychological control ($X^2 = 42.51$, df = 32, p = .10; Tucker-Lewis Index = .96; RMSEA = .05; GFI = .95); (b) mutuality ($X^2 = 88.73$, df = 51, p = .05; Tucker-Lewis Index = .95; RMSEA = .05; GFI = .94); and (c) conflictual dependency ($X^2 = 77.41$, df = 62, p = .09; Tucker-Lewis Index = .95; RMSEA = .04; GFI = .94). Moreover, as can be seen from Table 4, correlations among the unit-weight scales for each variable are fairly low, supporting distinctions among these conceptually related constructs.

Table 4

Correlations Among the Five Parent-Adolescent Relationship Factors

	1	2	3	4	5
1. Mutuality	1	-.14	-.35[b]	.25[b]	.10
2. Psychological Control	-	1	.41[b]	-.04	-.11
3. Conflictual Dependency			1	-.06	-.21[a]
4. Behavioral Control: Child				1	.17[a]
5. Behavioral Control: Parent					1

Adolescent Health Risk Behavior

Confirmatory factor analysis was used to examine the integrity and independence of the four adolescent health risk behavior scales. As a first step, items selected as indicators of each of the four adolescent health risk behavior variables were subjected to confirmatory fact analysis procedures. Final scales for each construct are shown along with their regression weights in Table 5.

The original seven items defining sensation seeking did not cohere together as a scale, but after dropping one non-significant item, a six-item scale proved adequate. Later results indicated that one of the six items loaded highly on another risk taking construct. Therefore, a confirmatory factor analysis was conducted on a 5-item construct which not only met stringent criteria for fit ($X^2 = 3.72$, df = 5, p = .59; alpha = .70; Tucker-Lewis Index = 1.02; RMSEA = .00; GFI = .99) but also proved to be statistically superior to the 6-item construct (X^2 difference = 10.99, df change = 4, $p < .05$). Of the 16 items originally selected as indicators of aggression, 6 were dropped because of inadequate variability. These items generally measured very severe acts of aggression (i.e., "During the past three months, how often did you kill someone?"). A CFA procedure on the remaining 10 items indicated an inadequate fit. After eliminating non-significant indicators, a follow-up confirmatory factor analysis supported the structural integrity of a 5-item scale ($X^2 = 3.58$, df = 6, p = .61; alpha = .74; Tucker-Lewis Index = 1.02; RMSEA = .00; GFI = .99).

Table 5

Adolescent Health Risk Behavior Items and Standardized Regression Weights

Items	Standardized Regression Weights*
Aggression	
During the past 3 months, how often did you...argue or fight with other kids?	.57
bully, threaten, or shove other kids?	.67
tease, ridicule, or pick on other kids?	.73
Annoy others on purpose, or damage other people's things on purpose?	.41
say really mean or cruel things to others?	.62
Sensation Seeking	
During the past 3 months, how often did you...race on a bike?	.45
do something risky?	.78
Break a rule for the thrill of it?	.51
steal or shoplift?	.47
slip out at night when your parents thought you were still asleep?	.63
Alcohol Use	
During the past 3 months, how often did you drink alcohol?	.94
During the past 3 months, how often did you drink enough alcohol to get intoxicated or drunk?	.97
Drug Use	
During the past 3 months, how often did you use drugs or inhalants?	.97
During the past 3 months, how often did you use enough drugs or inhalants to get high?	.96
During the past 3 months, how often did you sell drugs?	.68
Sexual Risk Taking	
During the past 3 months, how often have you had sex with a lot of different people, or have had unprotected sex?	--
Latent Constructs	
Adolescent Health Risk Behavior I	
Aggression	.22
Sensation Seeking	.98
Adolescent Health Risk Behavior II	
Alcohol Use	.57
Drug Use	.77
Sexual Risk Taking	.50

*Note. All standardized regression weights $p < .001$

Seven items targeting alcohol and drug use also did not provide a good fit to the data. However, previous research suggests that alcohol and drug use during adolescence have different correlates and might best be captured as two distinct constructs (Kandel & Yamaguchi, 1993). Therefore, CFA procedures were used to assess the integrity and independence of separate drug and alcohol scales (2 and 3 items, respectively). For these procedures, two items that did not distinguish between alcohol and drug use were eliminated, (e.g., "in the last three months, did you drink alcohol or use drugs before driving?"). Correlations among items targeting the same substance were higher (r's ranged from .66 to .91) than items targeting different substances (r's ranged from .30 to .46; see Table 6). A confirmatory factor analysis supported the structural integrity of the 2-construct model ($X^2 = 5.83$, df = 4, p = .21; Tucker-Lewis Index = .99; RMSEA = .06; GFI = .99; alpha for the alcohol scale = .95, alpha for the drug scale = .85). Finally, among the four items originally selected to measure sexual risk taking only one item had adequate variability, "I have sex with a lot of different people or have unprotected sex." Therefore, this construct was measured by the single item.

Table 6

Correlations Among Alcohol Use and Drug Use (Adolescent Health Risk Behavior)

	Alcohol 1	Alcohol 2	Drug 1	Drug 2	Drug 3
Alcohol 1	1	.91 [a]	.46 [a]	.44 [a]	.30 [a]
Alcohol 2	-	1	.46 [a]	.47 [a]	.31
Drug 1			1	.93 [a]	.66 [a]
Drug 2				1	.66 [a]
Drug 3					1

[a] $p < .01$. Note. Individual items can be seen on page 40.

Table 7 shows the correlations among the final sensation seeking, aggression, alcohol use, drug use, and sexual risk taking scales. Although sensation seeking and aggression, like alcohol and drug use, were fairly highly correlated, a CFA analysis supported the distinction between the sensation seeking and aggression constructs ($X^2 = 41.47$, $df = 34$, $p = .18$; Tucker-Lewis Index = .91; RMSEA = .06; GFI = .93).

Table 7

Correlations Among the Five Adolescent Health Risk Behavior Scales.

	SS*	Aggression	Alcohol	Drug	Sexual Risk*
SS	1	.45 [a]	.10	.25 [a]	.12
Aggression	-	1	.06	.21 [a]	.12
Alcohol Use			1	.44 [a]	.30 [a]
Drug Use				1	.37 [a]
Sexual Risk					1

[a] $p < .01$. *Note. SS indicates sensation seeking and sexual risk indicates sexual risk taking.

Nonetheless, when the overall pattern of correlations was considered as a whole, it suggested that relationships among the adolescent health risk behavior variables might be best summarized by a two-factor model: with aggression and sensation seeking as indicators of one latent factor and sexual risk-taking and substance (alcohol and drug) use as indicators of another. Results of a follow up confirmatory factor analysis supported the two factor model (the relationship between the two factors was constrained to .001 to conserve degrees of freedom; $X^2 = 8.07$, df = 5, p = .15; Tucker-Lewis Index = .94; RMSEA = .06; GFI = .98). Regression estimates for items associated with each factor are shown in Table 5.

Peer Acceptance of Deviance and Peer Health Risk Behavior

The procedure for developing scales measuring peer acceptance of deviance, peer alcohol and drug use, peer sexual risk taking, and peer aggression were essentially the same as those used to develop scales for the adolescent health risk behavior variables. A CFA on the 5 items selected to measure peer acceptance of deviance resulted in an adequate fit ($X^2 = 7.72$, df = 5, p = .172; alpha = .884; Tucker-Lewis Index = .99; RMSEA = .06; GFI = .98; see Table 8 for items). As stated previously, these items assessed the degree of embarrassment the respondents experience when peers observe them engaging in health risk behavior (low embarrassment suggests high peer acceptance). As might be expected given the findings for the adolescent health risk behavior variables, peer substance use was best defined by two separate alcohol and drug use constructs (a CFA using all items resulted in a poor fit). Correlations indicated that marijuana use was more strongly associated with the alcohol as compared to the "hard" drug use variables (although related to both). However, the marijuana item was

dropped because the distinction between latent constructs describing alcohol (and marijuana) versus (other) drug use was less clear when it was included in the analysis. CFA analysis assessing the structural integrity of a 3-item alcohol use scale and an 3 item hard drug use scale (see Table 8) generally supported the assumption of two correlated but distinct constructs even though the correlation between the two was quite high (r = .80; X^2 = 17.07, df = 8, p = .03; Tucker-Lewis Index = .98; RMSEA = .08; GFI = .96). The two factor model was significantly superior to a one-factor model for substance use (X^2 difference = 37.39, df difference = 1, $p < .01$).

The original 5-item peer sexual risk taking scale was reduced to 4 items (see Table 8) because one item had very little variance ("...how often did a peer sexually abuse or molest someone?"). A confirmatory factor analysis on the 4-item peer sexual risk taking scale supported its structural integrity (X^2 = 4.87, df = 2, p = .09; Tucker-Lewis Index = .92; RMSEA = .09; GFI = .99). The original 10 items defining peer aggression did not cohere together in a confirmatory factor analysis. Hence, items that were poor indicators of the latent construct or later proved to cross-load on other peer health risk behavior factors were deleted from the next analysis. Fit statistics for a 6-item, 5-item, and 4-item aggression scale were all adequate; however, the 4-item scale (see Table 8) provided the best fit when evaluated in combination with the other peer health risk behavior scales (X^2 = 1.10, df = 2, p = .58; alpha = .81; Tucker-Lewis Index = 1.01; RMSEA = .00; GFI = .99).

Table 8

Peer Relationship Items and Standardized Regression Weights

Items	Standardized Regression Weights*
Peer Aggression	
As far as you know, have your friends done the following in the past three months...argued or fought with someone.	.62
lie, con, manipulate, or take advantage of others.	.78
annoy others on purpose.	.82
threaten to hurt someone.	.68
Peer Sexual Risk Behavior	
have sexual intercourse.	.53
act inappropriately seductive, or do unusual or inappropriate things of a sexual nature in public.	.84
act sexually promiscuous or loose, engage in high risk sexual behaviors or have unprotected sex.	.32
have any of your friends ever been pregnant (girls) or gotten someone pregnant (boys).	.66
Peer Alcohol Use	
drank beer or wine.	.94
drank hard alcohol or mixed drinks.	.98
had five or more drinks in a row.	.91
Peer Drug Use	
cocaine, ice, or crack.	.71
injected other drugs.	.62
carry or sell drugs.	.84
Peer Acceptance of Deviance	
If your peers saw you smoking cigarettes, how embarrassed would you be?	.86
If your peers saw you getting drunk, how embarrassed would you be?	.94
If your peers saw you destroying other people's things, how embarrassed would you be?	.65
If your peers heard you swearing, how embarrassed would you be?	.78
If your peers saw you or heard about you having sex, how embarrassed would you be?	.68
Latent Peer Health Risk Behavior Scale	
Peer Aggression	.72
Peer Sexual Risk Behavior	.80
Peer Alcohol Use	.85
Peer Drug Use	.80

*Note. All standardized regression weights $p < .01$.

Correlations among the peer health risk behavior scales, shown in Table 9, suggested a high degree of overlap among the four scales describing peer health risk behavior. These findings suggested a simpler 2-factor model, with one latent factor identified by peer health risk behavior and a second, by perceptions of peer acceptance of deviance. Findings from a confirmatory factor analysis were consistent with the notion of a single "peer health risk behavior" construct ($X^2 = .48$, df = 2, p = .79; Tucker-Lewis Index = 1.02; RMSEA = .00; GFI = .99; see Table 8 for each item's weighting on the latent construct) and a follow-up analysis supported the distinction between the peer health risk behavior construct and the peer acceptance of deviance construct ($X^2 = .31.87$, df = 26, p = .20; Tucker-Lewis Index = .99; RMSEA = .04; GFI = .96).

Table 9

Correlations Among the Five Peer Factor Scales (Health Risk Behavior and Acceptance of Deviance)*

	Aggression	Alcohol Use	Drug Use	Sexual Risk	Acceptance of Deviance
Aggression	1	.61[a]	.57[a]	.69[a]	.31[a]
Alcohol Use		1	.68[a]	.68[a]	.41[a]
Drug Use			1	.63[a]	.37[a]
Sexual Risk *				1	.41
Accept. Deviance					1

[a] p < .01. *Note. All scales in table refer to peer behavior. Sexual risk refers to sexual risk taking and accept. deviance indicates acceptance of deviance.

Adolescent Health Status

Three scales from the CHIP-AE purportedly assessing Satisfaction with Health, Health Discomfort, and Health Disorders initially were selected as indicators of the three adolescent's health status variables included in the predicted models (health consequences, satisfaction, and discomfort). However, confirmatory factor analyses assessing the integrity of each of these scales resulted in a poor fit between the observed and predicted measurement models. In fact, closer inspection of the items associated with each of the dimensions suggested that several items, at face value, were unrelated to the constructs of interest to the present study. Moreover, a number of items in the Health Discomfort scale overlapped conceptually with the Health Disorders scale, with the Health Discomfort items describing the direct consequences of items in the Health Disorders scale (e.g. "having a cough," a health discomfort item and "having bronchitis," a health disorder item). Therefore, a subgroup of items from the three CHIP-AE dimensions that, at face value, appeared to measure each of three (presumably) distinct constructs of interest to this study, i.e., *health satisfaction*, *health discomfort*, and *health risk consequences*, were selected from the larger pool of CHIP-AE items. Both conceptual relevance and statistical significance (based on CFA procedures) were used to select the final sets of items that best captured each of these three constructs (see Table 10).

Table 10

Health Items and Standardized Regression Weights

Items	Standardized Regression Weights*
Health Satisfaction	
I feel full of energy.	.62
I resist illness well.	.74
I recover quickly from illness.	.73
I am happy with my health in general.	.53
Health Discomfort	
In the past month, how often did you have .....stomach aches?	.56
Pain that really bothered you?	.49
aches, pains or soreness in your muscles or joints?	.57
a headache?	.46
trouble eating or have a poor appetite?	.27
tire easily or feel like you had no energy?	.30
feel really sick?	.38
Risk Consequence	
In the past 12 months, ...	.24
did you have any of the following injuries....bad cut or scrape?	
bad sprain or torn ligament?	.27
broken bone?	.07
bad head injury or concussion?	.07
gun shot wound or stab wound?	.07
bite from another person or animal?	.33
bad burn?	.20
did anyone physically hurt you on purpose?	.25

* Note. All standardized regression weights $p < .01$.

A confirmatory factor analysis supported the structural integrity of a 4-item health satisfaction scale ($X^2 = 5.32$, df = 2, p = .07; Tucker-Lewis Index = .94; RMSEA = .08; GFI = .98) and a similar procedure also pointed to the structural integrity of a 7-item health discomfort scale ($X^2 = 16.85$, df = 14, p = .26; Tucker-Lewis Index = .99; RMSEA = .04; GFI = .97). Additionally, a confirmatory factor analysis indicated respectable structural integrity for an 8-item health consequences scale ($X^2 = 22.94$, df = 20, p = .29; Tucker-Lewis Index = .95; RMSEA = .03; GFI = .96). As can be seen in Table 11,

correlations among the three health constructs do not exceed .29, supporting the uniqueness of each variable.

Table 11

Correlations Among the Three Health Constructs

	Health Discomfort	Health Satisfaction	Risk Consequence
Health Discomfort	1	.25 [a]	.29 [a]
Health Satisfaction		1	.08
Risk Consequence			1

[a] $p < .01$

Tests of the Predicted Models

Ruling Out Possible Confounds

Before testing the three predicted models (Model A, Model B, and Model C), correlational analyses were used to rule out the potential confounds of demographic variables and family history of deviant behavior (with family history "standing in" for possible genetic influences). Correlations examined the relationships between family income and a composite variable for family history of health risk behavior (i.e. family history of alcohol use, drug use, criminal behavior, time spent in prison, extreme aggression, and spousal abuse) on the one hand and parent-adolescent relationships, peer health risk behavior, adolescent health risk behavior, and health status on the other hand. Household income was associated with only one of the parent-adolescent variables (i.e., mutuality, $r = .32$, $p < .01$). However, income also correlated with peer health risk behavior ($r = .20$, $p < .05$), adolescent substance use/sexual risk taking ($r = .18$, $p < .05$), and adolescent health discomfort ($r = .25$, $p < .01$). However, later analysis showed that

these associations could not explain significant relationships among the variables of interest to this study. None of the correlations for family history of health risk behavior correlated with parent-adolescent relationships, peer health risk behavior/acceptance of deviance, adolescent substance use and sexual risk taking, adolescent aggression/sensation seeking, or health status. To further rule out any significant associations, family history was converted to a simple yes (1) or no (0) scale, indicating whether or not there was a family history for one or more of any of the six variables. With the exception of health risk consequences ($r = -.16$, $p < .05$), family history scored as a dichotomous variable did not correlate significantly with any of the variables in this study, ruling out the possibility of confounds with this variable.

Tests of the Full Mediation (Model A) and Partial Mediation (Model B)

As stated previously, two alternative models (Model A and Model B) proposed in this research describe adolescent health risk behavior as mediating the effects of peer health risk behavior and perceived relationships with parents on adolescent health status. Model A assumes that peer health risk behavior and peer acceptance of deviance mediate the effects of parent-adolescent relationships on adolescent health risk behavior and that adolescent health risk behavior mediates the effects of the peer variables on health outcomes. Alternatively, Model B assumes that in addition to the proposed relationships in Model A, the parent-adolescent relationship variables can be expected to directly predicted adolescent health risk behavior and health status. Only the direct paths from the peer variables to the adolescent health status variables are expected to be insignificant.

Because of the complexity of the two models and in particular, the large number of indicators and factors, manifest as opposed to latent variables were used to test

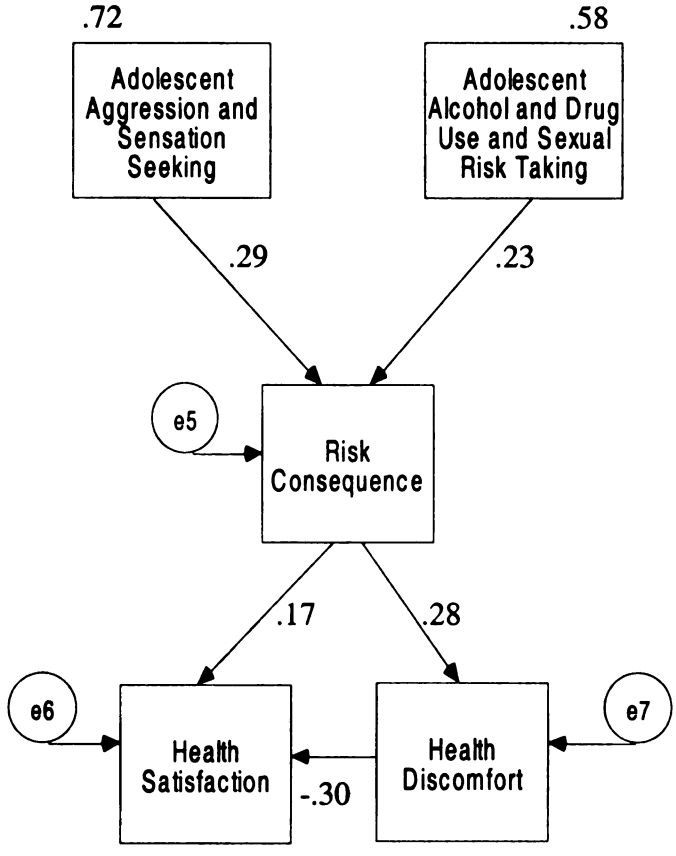
predicted relationships. Scales were computed and standardized for each latent construct using the items identified in the measurement models derived from the CFA's. Because of constraints associated with sample size, predicted relationships within each component of the overall model were tested first: specifically, relationships. between (a) adolescent health risk behavior and adolescent health status, (b) peer acceptance of deviance/peer health risk behavior and adolescent health risk behavior and (c) parent-adolescent relationships and adolescent health risk behavior). These procedures were followed by a final test of the overall model which included significant pathways identified in the simpler analyses.

Relationships Between Adolescent Health Risk Behavior and Adolescent Health Status. Both Model A and Model B propose that adolescent health risk behavior is directly related to adolescent health risk consequences, which in turn are linked to health satisfaction. This model provided an adequate fit to the data ($X^2 = 8.86$, df = 5, p = .115; Tucker-Lewis Index = .86; RMSEA = .07; GFI = .98, see Figure 4). In contrast, a "Full Model" in which adolescent health risk behavior directly as well as indirectly predicted each of the three health outcomes did not provide an adequate fit ($X^2 = 7.59$, df = 1, p = .006; Tucker-Lewis Index = .23; RMSEA = .21; GFI = .98).

Relationship Between Peer and Adolescent Health Risk Behavior. Figure 5 shows direct relationships between the peer and adolescent health risk behavior constructs predicted in Model A and Model B. A confirmatory factor analysis indicated

Figure 4

Adolescent Health Risk Behavior Implications on Health*

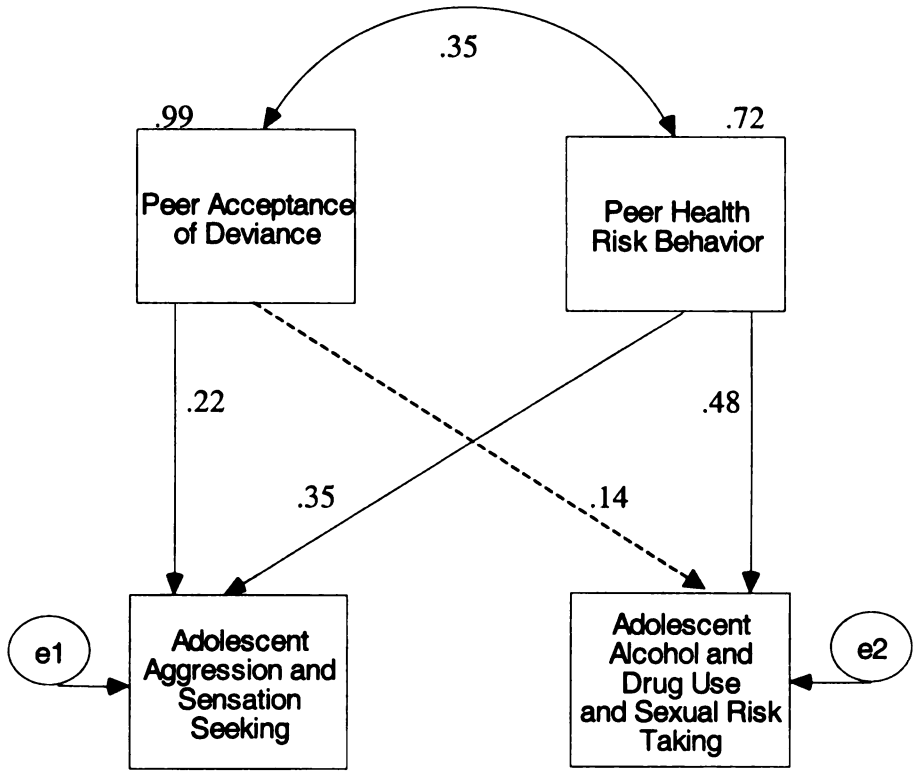


*Note. All beta weights are significant $p < .01$, except, risk consequence to health satisfaction: $p < .05$.

good model fit ($X^2 = .77$, df = 1, p = .382; Tucker-Lewis Index = 1.02; RMSEA = .00; GFI = .99). Three of the four predicted pathways were significant ($p < .001$). The path from peer acceptance of deviance to adolescent substance use/sexual risk taking was the notable exception. A follow-up CFA was conducted on a model that included only the significant pathways, yielding a model with good statistical fit ($X^2 = .4.33$, df = 2, p = .12; Tucker-Lewis Index = .95; RMSEA = .08; GFI = .98).

Figure 5

Peer Implications for Adolescent Health Risk Behaviors*



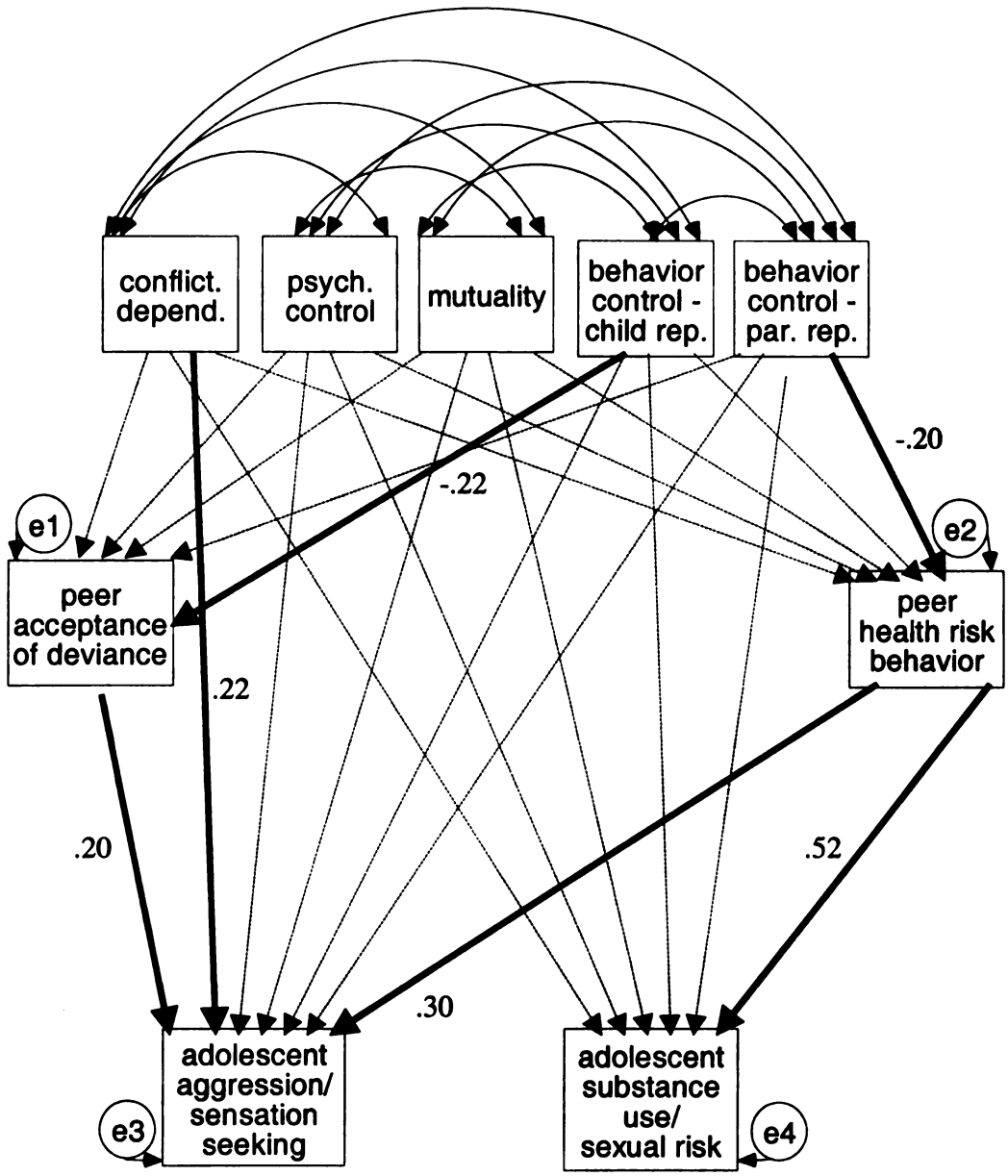
*Note. With the exception of the insignificant path (dotted line), all beta weights are significant $p < .01$.

Relationship Between the Parent-Adolescent Relationship Factors and Adolescent Health Risk Behavior. Separate chi square analyses tested fully mediated relationships (i.e., Model A) and partially mediated relationships (Model B) from the parent-adolescent relationship variables to adolescent health risk behavior. Predicted associations between the peer and adolescent health risk behavior variables were modeled on the basis of the previous findings. Results for Model A resulted in a significant chi square ($X^2 = 26.15$, $df = 12$, $p = .01$) with other indices also suggesting a poor fit to the data (Tucker-Lewis Index = .80; RMSEA = .09; GFI = .96). In contrast, a test of Model B (the partially

mediated model) resulted in an adequate fit (X^2 = 4.47, df = 2, p = .11; Tucker-Lewis Index = .89; RMSEA = .09; GFI = .99; see Figure 6; see Table 12 for regression weights and relevant correlations for Model B), with Model A providing a significantly worse fit than Model B (X^2 difference = 21.68, df difference = 6, p < .01). However, as can be seen in Figure 6, not all predicted paths were statistically significant. A follow-up CFA analysis tested a "trimmed" model in which several non-significant paths in Model B from the parent-adolescent relationship variables to the peer and adolescent health risk behavior variables were eliminated from the model. This trimmed model provided a respectable fit (X^2 = 27.91, df = 19, p = .09; Tucker-Lewis Index = .93; RMSEA = .07; GFI = .96). As was seen in Figure 6, child and parent reports of parent behavioral control were linked to adolescent health risk behavior via peer factors, a finding consistent with Model A. Consistent with Model B, conflictual dependency had direct implications for adolescent health risk behavior, specifically with regards to aggression/sensation seeking.

Figure 6

Partially Mediated Model for Parent-adolescent Relationship Factors Predicting Peer Factors Predicting Adolescent Health Risk Behavior



*Note. Trimmed model is indicated by solid lines, beta weights are significant at $p < .05$. Insignificant paths are shown by dotted lines. Because of the complexity of the model, the path between e2 and e3 was not drawn; error terms for the peer variables were predicted and significantly correlated ($r = .44$, $p < .01$).

Table 12

Standardized Regression Weights and Relevant Correlations for the Partial Mediation Model: Parent-Adolescent Relationship, Peer Relationships, and Adolescent Health Risk Behavior

Predictor Variable	Outcome Variable	Standardized Regression Weight
Parent-Adolescent Relationships Predicting Peer Variables		
Conflictual Dependency	Peer Acceptance of Deviance	-.11
Psychological Control	Peer Acceptance of Deviance	-.07
Mutuality	Peer Acceptance of Deviance	-.13
Behavioral control – parent	Peer Acceptance of Deviance	-.11
Behavioral control – child	Peer Acceptance of Deviance	-.18[a]
Conflictual Dependency	Peer Health Risk Behavior	.07
Psychological Control	Peer Health Risk Behavior	.03
Mutuality	Peer Health Risk Behavior	-.14
Behavioral control – parent	Peer Health Risk Behavior	-.20[b]
Behavioral control – child	Peer Health Risk Behavior	-.01
Parent-Adolescent Relationships Predicting Adolescent Health Risk Behavior		
Conflictual Dependency	Aggression/ Sensation Seeking *	.13
Psychological Control	Aggression/ Sensation Seeking	.16[a]
Mutuality	Aggression/ Sensation Seeking	-.03
Behavioral control – parent	Aggression/ Sensation Seeking	-.08
Behavioral control – child	Aggression/ Sensation Seeking	-.01
Conflictual Dependency	Substance Use/Sexual Risk Taking*	.05
Psychological Control	Substance Use/Sexual Risk Taking	.03
Mutuality	Substance Use/Sexual Risk Taking	.05
Behavioral control – parent	Substance Use/Sexual Risk Taking	-.09
Behavioral control – child	Substance Use/Sexual Risk Taking	-.11
Peer Variables Predicting Adolescent Health Risk Behavior		
Variables		
Peer Acceptance of Dev.	Aggression/ Sensation Seeking	.20[b]
Peer Health Risk Behavior	Aggression/ Sensation Seeking	.30[c]
Peer Health Risk Behavior	Substance Use/Sexual Risk Taking	.52[c]

Correlations Among Parent-Adolescent Relationship Variables

	Confl. Dep.	Psych. Cntl.	Mutuality	BC: Child	BC: Parent
CD	1	.41[c]	-.35[c]	-.06	-.21[a]
PC		1	-.14	-.04	-.11
Mutuality			1	.25[b]	.10
BC – child				1	.17[a]
BC - parent					1

Error Terms: Peer Acceptance of Deviance and Peer Health Risk Behavior = .42[c]

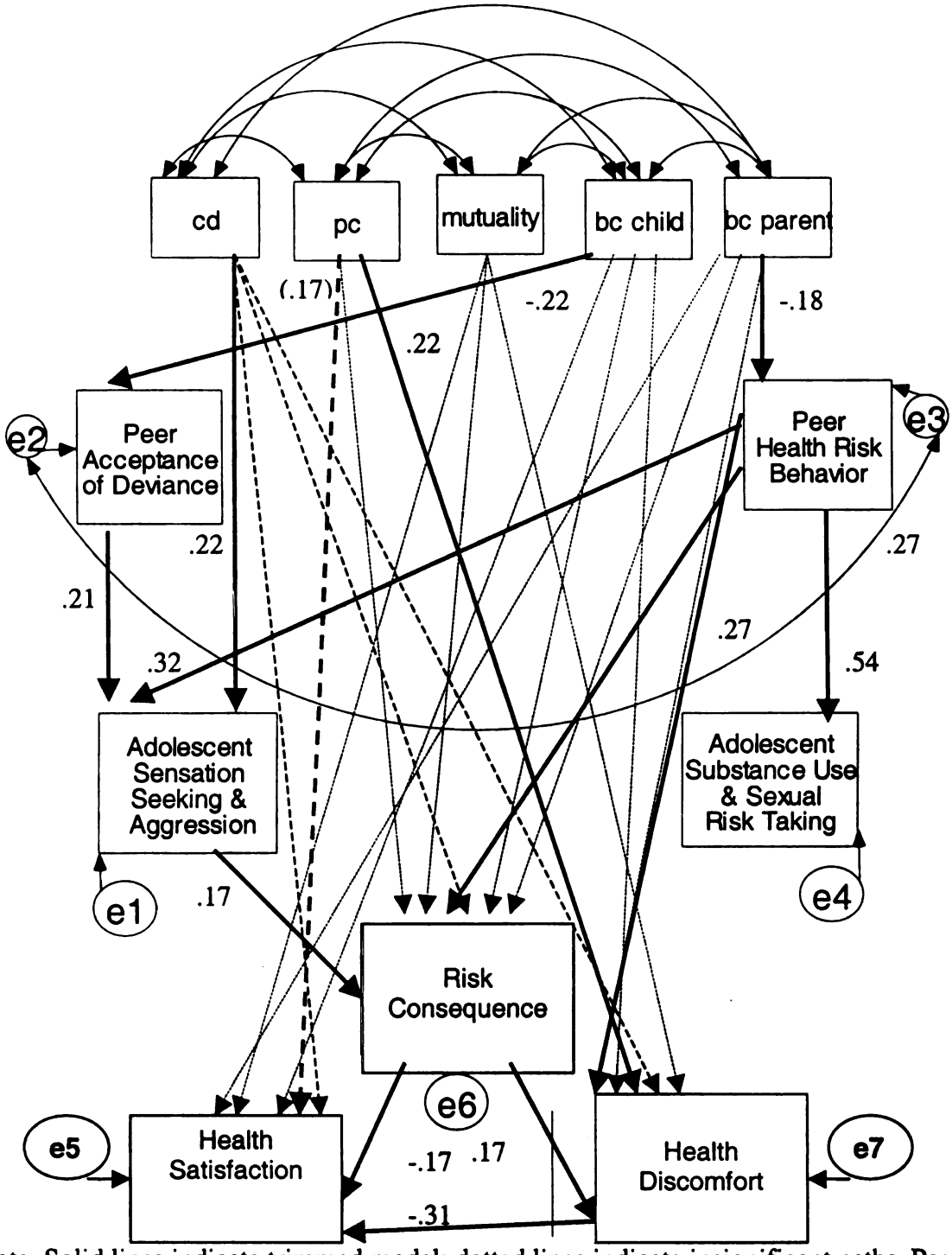
[a] $p < .05$; [b] $p < .01$; [c] $p < .001$. * Note. Variables in this section refer to adolescent aggression/sensation seeking and adolescent substance use/sexual risk taking behavior.

Combined Effects of the Parent-Adolescent Relationship and Peer and Adolescent Health Risk Behavior on Adolescent Health Status. A CFA analysis tested a fully mediated model in which the effects of the parent-adolescent relationship on adolescent health status were mediate\d by peer and adolescent health risk behavior (Model A). This model included all significant pathways identified in prior analyses consistent with Model A as well as direct paths from the two adolescent health risk behavior variables to adolescent health risk consequence. Indicators for Model A were inconsistent (X^2 = 77.22, df = 44, p = .001; Tucker-Lewis Index = .83; RMSEA = .07; GFI = .92), suggesting a poor fit to the data.

A second CFA tested Model B arguing for direct as well as indirect relationships between the parent-adolescent factors and adolescent health status. In addition to paths included in the test of Model A, this model postulated direct pathways from each of the parent-adolescent relationship variables to adolescent health consequence. Direct paths to the other two health status variables also were included in an exploratory fashion along with the two unpredicted pathways from peer acceptance of deviance and peer health risk behavior to the three health status variables. In contrast to Model A, this model, shown in Figure 7, adequately fit to the data (X^2 = 28.64, df = 23, p = .19; Tucker-Lewis Index = .94; RMSEA=.05; GFI=.97). Model A was significantly worse than the fully mediated model (X^2 difference = 48.58, df difference = 21, p < .01). Standardized regression weights for all predicted paths can be seen in Table 13. A follow-up CFA analysis tested a "trimmed" model in which all non-significant pathways from the prior analysis were dropped from the model. Analyses indicated that this "trimmed" model had respectable fit (X^2 = 52.05, df = 40, p = .10; Tucker-Lewis Index=.93; RMSEA=.04; GFI=.95).

Figure 7

Final Predicted Partial Mediation Model



*Note. Solid lines indicate trimmed model; dotted lines indicate insignificant paths. Peer error terms were significantly correlated ($r = .44$, $p < .01$). Health satisfaction refers to health dissatisfaction for certain relationships, see table 13 for clarification.

Table 13

Standardized Regression Weights for the Full Partial Mediation Model

Predictor Variable	Outcome Variable	Weight
Predictors of Peer Variables		
Behavioral control – parent	Peer Health Risk Behavior	-.18[a]
Behavioral control – child report	Peer Acceptance of Deviance	-.22[b]
Predictors of Adolescent Health Risk Behavior		
Conflictual Dependency	Aggress./Sensation Seeking	.22[b]
Peer Acceptance of Deviance	Aggress./Sensation Seeking	.21[b]
Peer Health Risk Behavior	Aggress./Sensation Seeking	.32[b]
Peer Health Risk Behavior	Substance Use/Sexual Risk	.54[c]
Predictors of Risk Consequence		
Conflictual Dependency	Risk Consequence	.03
Psychological Control	Risk Consequence	.05
Mutuality	Risk Consequence	-.07
Behavioral Control – Child	Risk Consequence	.05
Behavioral Control – Parent	Risk Consequence	.11
Peer Acceptance of Deviance	Risk Consequence	.04
Peer Health Risk Behavior	Risk Consequence	.27[b]
Adol. Aggress/Sensation Seeking	Risk Consequence	.17[a]
Adol. Substance Use/Sexual Risk	Risk Consequence	.11
Predictors of Risk Health Discomfort		
Conflictual Dependency	Health Discomfort	.22[b]
Psychological Control	Health Discomfort	.03
Mutuality	Health Discomfort	.01
Behavioral Control – Child	Health Discomfort	.14
Behavioral Control – Parent	Health Discomfort	.08
Peer Acceptance of Deviance	Health Discomfort	-.11
Peer Health Risk Behavior	Health Discomfort	.27[b]
Risk Consequence	Health Discomfort	.17[a]
Predictors of Risk Health Satisfaction		
Conflictual Dependency	Health Satisfaction (low)	.15
Psychological Control*	Health Satisfaction (low)	.17[a]
Mutuality	Health Satisfaction (high)	.09
Behavioral Control – Child	Health Satisfaction (high)	.01
Behavioral Control – Parent	Health Satisfaction (high)	.07
Peer Acceptance of Deviance	Health Satisfaction (low)	-.17[a]
Peer Health Risk Behavior	Health Satisfaction (low)	.15
Risk Consequence	Health Satisfaction (low)	.17[a]
Health Discomfort	Health Satisfaction (high)	-.31[c]

[a] $p < .05$; [b] $p < .01$; [c] $p < .001$ *Note. This regression weight is no longer significant in the "trimmed model." Parent-Adolescent Relationship correlations are shown in Table 12. Peer variable error terms, $r = .44$, $p < .01$.

As was seen in Figure 7, the two peer factors each had unanticipated direct implications for health status, with peer accept of deviance negatively predicting health satisfaction and peer health risk behavior predicting health discomfort and health risk consequence. (Notably, an additional analysis in which family income was included as a predictor of adolescent health status, showed that the direct effects of the peer factors on the health status variables remained even after controlling for income.)

Several other significant relationships shown in Figure 7 were predicted a priori in Model A and/or Model B. Conflictual dependency had both direct and indirect implications for the adolescent's health status: directly linked to health discomfort and indirectly linked to health risk consequences through its relationship with adolescent aggression/sensation seeking. In addition, parent psychological control was directly and negatively related to adolescent health satisfaction, although in the trimmed model, the coefficient for this path was no longer statistically significant (reduced from .17 to .10, critical ration = 1.33). As predicted by Model A, parent report of behavioral control also had (indirect) implications for adolescent health risk consequences as well as health discomfort although these influences unexpectedly were mediated by peer health risk behavior as well as more distally through adolescent aggression/sensation seeking. Similarly, child report of behavioral control had indirect implications for health risk consequences as well as health dissatisfaction via its relationship to peer acceptance of deviance and more distally, adolescent aggression/sensation seeking. The final model did not differ for boys and girls. Total direct and indirect effects can be seen in Table 14.

Table 14

Standardized Direct, Indirect, and Total Effects for the "Trimmed" Partial Mediation Model

	Peer Acceptance of Deviance	Peer Health Risk Behavior	Adolescent Aggression /Sensation Seeking	Adolescent Substance Use/Sexual Risk Taking	Adolescent Health Risk Consequence	Adolescent Health Satisfaction	Adolescent Health Discomfort
Conflictual Dependency							
Direct	0	0	.22[c]	0	0	0	.18[b]
Indirect	0	0	0	0	.04[b]	-.05[a]	.001[b]
Total	0	0	.22[c]	0	.04[b]	-.05[a]	.19[b]
Psychological Control							
Direct	0	0	0	0	0	.10	0
Indirect	0	0	0	0	0	0	0
Total	0	0	0	0	0	.10	0
Mutuality (total effects = 0)							
Direct	0	0	0	0	0	0	0
Indirect	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Behavioral Control, Parent							
Direct	0	-.18[b]	0	0	0	0	0
Indirect	0	0	-.06[b]	-.10[b]	-.07[b]	.0008	-.05[b]
Total	0	-.18[b]	-.06[b]	-.10[b]	-.07[b]	.001	-.05[b]
Behavioral Control, Child							
Direct	-.22[b]	0	0	0	0	0	0
Indirect	0	0	-.04[b]	0	-.01[b]	.03[a]	-.001
Total	-.22[b]	0	-.04[b]	0	-.01[b]	.03[a]	-.001
Peer Health Risk Behavior							
Direct	0	0	.32[c]	.54[c]	.33[b]	0	.20[b]
Indirect	0	0	0	0	.06[b]	-.005	.07
Total	0	0	.32[b]	.54[b]	.39[b]	-.005	.27[b]

Table 14 cont'd

	Peer Acceptance of Deviance	Peer Health Risk Behavior	Adolescent Aggression /Sensation Seeking	Adolescent Substance Use/Sexual Risk Taking	Adolescent Health Risk Consequence	Adolescent Health Satisfaction	Adolescent Health Discomfort
Peer Acceptance of Deviance							
Direct	0	0	.21 [b]	0	0	-.16	0
Indirect	0	0	0	0	.04 [b]	.005 [b]	.007
Total	0	0	.21 [a]	0	.04 [b]	-.15	.007
Adolescent Aggression/Sensation Seeking							
Direct	0	0	0	0	.18 [b]	0	0
Indirect	0	0	0	0	0	.03 [b]	.03 [b]
Total	0	0	0	0	.18 [b]	.03 [b]	.03 [b]
Adolescent Substance Use/Sexual Risk Taking							
Direct	0	0	0	0	0	0	0
Indirect	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Health Risk Consequence							
Direct	0	0	0	0	0	.21 [b]	.18
Indirect	0	0	0	0	0	-.05 [b]	0
Total	0	0	0	0	0	.16 [b]	.18
Health Discomfort							
Direct	0	0	0	0	0	0	-.30 [c]
Indirect	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	-.30 [c]

[a] < .10, [b] < .05, [c] < .01

Test of the Interaction Model (Model C)

Model C proposed interactions between the adolescent-parent relationship variables and the peer health risk behavior variables in predicting (a) adolescent health behavior and (b) adolescent health status. Interaction terms were computed as cross products. For each analysis, both the interaction term and the main effects were included in the models.

CFA analyses assessed whether each of 10 possible interactions accounted for significant additional variance in adolescent health risk behavior or adolescent health status beyond that explained by predictors in the revised ("trimmed") model seen in Figure 7. In all, these analyses examined ten different interactions: (1) behavioral control – parent report by peer health risk behavior, (2) behavioral control –child report by peer health risk behavior, (3) conflictual dependency by peer health risk behavior, (4) mutuality by peer health risk behavior, (5) psychological control by peer health risk behavior, (6) behavioral control - parent report by peer acceptance of deviance, (7) behavioral control –child report by peer acceptance of deviance, (8) conflictual dependency by peer acceptance of deviance, (9) mutuality by peer acceptance deviance, and (10) psychological control by peer acceptance of deviance. Given the large number of tested interaction effects, alphas were set at .01 in order to reduce chances of erroneously rejecting the null hypothesis.

Only one of the ten interaction terms tested by these procedures was statistically significant (i.e., the interaction between child reported behavioral control and peer health risk behavior on adolescent aggression/sensation seeking, beta = - 2.89, $p < .01$).

However, a chi square difference test showed that including this interaction term in the model, did not provide a better fit to the data than the simpler direct and indirect effects model (X^2 difference = 27.38, df difference = 23, p = .24). In sum, the partially mediated model (Model B) best captured the observed relationships between parent-adolescent relationships, peer health risk behavior/acceptance of deviance, adolescent health risk behavior, and health status.

DISCUSSION

Results of this research generally supported a partially mediated model describing associations between aspects of the parent-adolescent relationship, peer health risk factors, adolescent health risk behavior, and adolescent health status. There were several parts to this study. Initially analyses attempted to validate and distinguish among the various constructs in each of three predicted models. It was only after articulating the measurement models for each of these constructs that it was possible to test predicted relationships among the study variables. This discussion will begin by examining the various measurement models. It then will turn to a discussion of the results associated with tests of the three predicted models.

Item Selection

Initially items for each of the variables in the predicted models were selected based on face validity from four published questionnaires. For several variables, the selected items proved to be adequate indicators of the construct in question. In particular, the various items making up the four parent-adolescent relationship variables generally held up well statistically. However, correlational and CFA analyses suggested that behavioral control was better defined as two, rather than a single construct. One behavioral control factor was defined by parent report and the other by child report of parental supervision.

For other constructs, several of the original items were not included in the final scales. The original items targeting adolescent and peer aggression did not make up coherent scales mostly because of inadequate variability for items describing severe, potentially lethal forms of aggression, for example, firing a gun at someone, using a knife

on someone, or physically attacking an individual with or without a weapon as well as gang related activities. These sorts of severe aggressive behaviors were not likely to be prevalent in a sample such as this, recruited from among adolescents involved in an informal juvenile court hearing. In the county from which these adolescents were recruited, adolescents arrested for potentially lethal behavior, for the most part, did not appear at an informal hearing, but rather were handled by the county's prosecutor's office.

For different reasons, final items in measures of adolescent and peer substance use differed in structure as well as content from those initially selected. Correlational and CFA analyses indicated that substance use was best defined by two distinct factors: alcohol use on the one hand and "harder" drug use on the other hand, rather than a combination of the two. Notably, the items related to marijuana use were dropped from the scales because the distinction between the constructs describing alcohol versus "other" drug use was less clear when marijuana was included in the analysis. This finding is not too surprising given past work by researchers such as Kandel and colleagues (1975, 1993) who have examined the developmental patterns of adolescent drug and alcohol use. More specifically, their research has found that there are four main stages in the sequence of involvement with drugs: (1) beer, wine, or both (2) hard liquor, (3) marijuana, and (4) other illicit drugs. Cigarette use was originally considered to be part of the second stage but gender differences and new patterns of behavior make this less clear, possibly explaining why the items tapping cigarette smoking and tobacco use were also dropped from this study's scales. Kandel's work showed that involvement with "legal" drugs (stages 1 and 2) are necessary intermediates between nonuse versus marijuana and harder

use. In one study, they found that whereas 27% of the subjects who smoked or drank progressed to marijuana within a 5- to 6-month follow-up period, only 2% of those who had not used any of the legal substances did so. In addition, while 26% of marijuana users progressed to harder drugs (i.e., LSD, amphetamines, or heroin) only 1% of non-marijuana users progressed to use of harder drugs (Kandel & Yamaguchi, 1993). They concluded that marijuana, in turn, was a crucial step on the way to other illicit drugs. In studies with large samples, it might even be prudent to measure three, rather than two, distinct aspects of adolescent substance use in order to identify differential implications for adolescent outcomes.

Two of the three original scales assessing health status (health discomfort and health disorder/risk consequence) selected in their entirety from the CHIP-AE in the final analysis did not adequately describe the three health-related outcomes associated with the research predictions. Whereas the original satisfaction with health dimension remained relatively intact, confirmatory factor analyses pointed to a lack of statistical integrity for the health discomfort and health disorders scales. Closer inspection suggested that several items at face value were unrelated to the constructs of interest to the present study. In particular, a number of items in the health discomfort scale either tapped constructs unrelated to the study or overlapped with those in the health disorders dimension. Irrelevant items tapped aspects of psychological well-being, for example depression, whereas others were sports-related. These items were dropped from the health discomfort scale as were items that were direct consequences of items in the health disorders scale, e.g., "having a cough," a health discomfort item and "having bronchitis," a health disorder item). Finally, items in the health disorder scale included in the CHIP-

AE did not cohere together; only a subset of items that were best described as health risk consequences (e.g., having a broken bone, bad sprain, torn ligament, or bad burn) had adequate structural integrity. The constructs measured by these items were named satisfaction with health, health discomfort, and health risk consequence.

Individual Measurement Models for the Four Constructs

Once scales for each construct were established, confirmatory factor analysis procedures were used to distinguish among the variables within each of the four concept domains: parent-adolescent relationships, peer factors, adolescent health risk behavior, and health status. Importantly, these data supported distinctions among the four aspects of the parent-adolescent relationship. Specifically, analyses confirmed findings reported by Frank, et al. (2002) showing that conflictual dependency and mutuality were distinct (but related) constructs. Additionally, conflictual dependency proved to be distinct from psychological control; in fact, all three defined unique aspects of the parent-adolescent relationship. Whereas psychological control and conflictual dependency are both linked to feelings of anger and shame in the adolescent, *parental attempts* (as perceived by the adolescent) to dominate his/her psychological and emotional development were distinct from the *adolescent's feelings* of shame and anger *resulting from* an inability to live up to (perceived) parental expectations. Moreover, mutuality, conflictual dependency, and psychological control all could be distinguished from adolescent and parent perceptions of parent behavioral control.

Although analyses confirmed distinctions among the peer health risk behavior variables, relatively strong relationships among adolescent reports of peer aggression, sexual risk taking, and alcohol and drug use suggested the heuristic value of combining

these measures into a single construct. Conceivably, high correlations among the peer health risk behavior variables was due to the fact that all were based on the target adolescents' reports, rather than reports from peers themselves. However, an interesting addition to this study, often overlooked by other investigators was the measurement of the second peer factor defined as *peer acceptance of deviance*. This study examined not only peer influence through actual peer behavior but also internalization or lack thereof of peer values (i.e., acceptance, shame, and embarrassment).

Likewise, although the variables defining adolescent health risk behavior could be viewed as separate constructs, their intercorrelations suggested a more parsimonious two-factor model, with one factor defined by adolescent aggression and sensation seeking and the other by adolescent substance use and sexual risk taking. The link between aggression and sensation seeking is not entirely clear, although aggression certainly involves the anticipation of counter-aggression. Alternatively, the literature suggests that intoxication plays an important role in adolescent sexual risk taking, with sexual behavior far more likely to occur when inhibitions are diminished by the use of alcohol (Cooper, 2002).

Relationships Between Constructs

This study generally supported a partially mediated model (Model B) to explain the relationships among the variables, pointing to both direct and indirect associations between parent-adolescent relationships, peer factors, adolescent health risk behavior, and health status.

Parent-Adolescent Relationships Predicting Peer Factors, Adolescent Health Risk Behavior, and Health Status

Conflictual dependency, but not mutuality, proved to have more heuristic value than either mutuality or psychological control in predicting both adolescent health risk behavior and health status. First, conflictual dependency had direct implications for adolescent health risk behavior, and particularly adolescent involvement in aggression and sensation seeking (supporting a partial mediation model). Adolescents who viewed themselves as a disappointment to their parents or felt a lot of anger or shame in relation to their parents were more likely to be aggressive sensation seekers. This finding suggests the possibility that adolescents who feel anger and shame because of the inability to meet parental expectations turn this anger outward, taking out their angry feelings on others. It is also possible that these adolescents attempt to individuate and express their autonomy by finding activities that make them feel powerful and daring.

As predicted by the partially mediated model, parent-adolescent relationships had direct and indirect influences on health status. As might be expected, adolescent involvement in health risk behavior (specifically, aggression and sensation seeking) was linked to risk consequences, which in turn, influenced both health discomfort and satisfaction. More interestingly, conflictual dependency was directly linked to health discomfort. This suggests that negative parent-adolescent relationships can be significantly stressful for the adolescent, which, in turn can directly compromise the adolescent's health. It is possible that the (negative) emotional aspects of the parent-child relationship (in this case, conflictual dependency) are most likely to affect the emotional aspects of one's health status (e.g., discomfort).

Whereas conflictual dependency did, mutuality did not, contribute to variability in either adolescent or peer health risk behavior nor adolescent health status. In general, the findings reported here not only lend additional support to the distinction between mutuality and conflictual dependency but also underscore the need to measure multiple aspects of the parent-adolescent relationship. Many researchers in the past have pointed to the considerable role mutuality has in adolescent adjustment without considering and controlling for the role of other conceptually similar and potentially related aspects of the parent-adolescent relationship. Steinberg (1987, 1990) was among the first to simultaneously examine relationships among and effects of several parent-adolescent relationship variables. In particular, he assessed the combined implications of mutuality, psychological control, and behavioral control for adolescent outcomes. His findings suggest that mutuality plays a considerable role in adolescent adjustment, but particularly with regards to positive adjustment, whereas behavioral control and psychological control are more clearly linked to negative adjustment. This study added a fourth aspect of the parent-child relationship – conflictual dependency, which may have further minimized the role of mutuality in negative outcomes (i.e., involvement with deviant peers and in health risk behavior).

Notably, psychological control in this study, as opposed to Steinberg's research, along with mutuality, for the most part failed to relate to most study variables. Past research suggested that conflictual dependency is highly related to both mutuality as well as psychological control. Given these relationships, it would be feasible to assume that when conflictual dependency is included in the prediction analyses, it would diminish the predictive power of mutuality and psychological control. However, this study found that

conflictual dependency and mutuality (even more-so than psychological control) were not that strongly correlated, suggesting that these assumptions are not telling the whole story. In the relationships examined here, conflictual dependency plays a role above and beyond mutuality.

An alternative explanation as to why mutuality did not relate significantly to any of the study factors may be that the relationship between mutuality and adjustment is mediated by personality – a factor not measured in this study. Frank, et al. (2002) studied early adolescents in grades 4 to 8 and found that mutuality and conflictual dependency both had independent and somewhat different effects on personality adjustment and behavioral outcome. Path analysis findings were mostly consistent with a mediated model predicting personality from both conflictual dependency and mutuality and behavioral problems from personality. Nonetheless, even in their study, findings suggested that conflictual dependency had stronger and more consistent implications for adolescent personality and behavioral difficulties than mutuality.

A final possible explanation for the lack of predictive power for both mutuality and psychological control in this study has to do with the relationship to the other parent-adolescent variables. Conceivably, a lack of mutuality may trigger high levels of conflictual dependency, with conflictual dependency mediating the relationship between mutuality and various outcomes. Similarly, Holmbeck, Shapera, and Hommeyer (2002) suggests that psychological control (along with overprotectiveness) undermines the child's ability to make independent decisions and to individuate from parents; arguing that psychological control can lead to low levels of mutuality. It is possible that, psychological control exerts its influences through mutuality and that the implications of

mutuality, as discussed above, are mediated through personality and/or conflictual dependency.

The fourth parent-adolescent variable studied here, behavioral control, was indirectly linked to adolescent involvement in health risk behavior via peer relationships, consistent with predictions. Notably, parent and adolescent report of parental monitoring were not only distinct from one another but they also had different implications for peer factors as well as sizeable total effects on other variables examined in the models. Parent's perceptions of their own behavioral control efforts were linked directly to peer health risk behavior whereas the adolescent's perceptions of their parent's behavioral control were linked to their peer's acceptance of deviance. In general, it is evident that different subjective experiences of the same phenomenon can have distinct implications. More specifically, the findings not only suggest that when parents exert high levels of behavioral control, adolescents are less likely to hang out with peers who are involved in health risk behavior but also that when adolescents recognize high monitoring by their parents, they are more likely to be ashamed to engage in health risk behavior in front of their peers. Presumably, these adolescents have internalized parental expectations, reinforced by parent's efforts to make sure that they are realized. Research indicates that adolescents select peers with values consistent with those of the adolescent's parents (Brown et al., 1995). Hence, it is likely that adolescents who (a) are made aware of parental expectations via parent monitoring and (b) feel ashamed when peers who hold similar expectations see them violating parental standards.

Peer Factors Predicting Adolescent Health Risk Behavior and Health Status

As predicted, and consistent with Model B (a mediation model), peer factors were directly linked to adolescent involvement in health risk behavior. More specifically, adolescents who reported having peers who engaged in substance use, sexual risk taking and aggressive behaviors were also more likely themselves to engage in aggressive behavior and sensation seeking on the one hand, and substance use and sexual risk taking, on the other hand. However, if adolescents reported being embarrassed in front of their peers when engaging in a variety of risk behaviors, they were less likely to be aggressive and sensation seeking, but there was no relationship between embarrassment and substance use or sexual behavior. It is possible, and would be interesting to examine in future research, that sensation seekers and aggressive adolescents are less likely to feel embarrassment in general. Furthermore, peer factors were indirectly related to health status via their relationship with adolescent health risk behavior, and particularly, adolescent aggression and sensation seeking.

Unexpectedly, the peer factors also had direct implications for all three health status variables as well. In fact, the two peer factors accounted for the greatest amount of influence on health status. Peer involvement in health risk behavior was directly linked with both health discomfort and health satisfaction while peer acceptance of deviance had direct implications for health satisfaction. The reasons for such findings are unclear. However, one possible explanation is that involvement with deviant peers is significantly stressful to the adolescent, which can be linked directly to health consequences (similarly to negative parent-adolescent relationships as discussed above). Some adolescents look to their peers for personal and instrumental support and guidance. However, as Shulman et

al. (1995) explains, when adolescents seek autonomy experiences from their deviant peers, they are often disappointed. It is possible that when adolescents associated with deviant peers begin to realize that beyond the transitory sense of their "we-ness," these peers are unable to provide them with what they are seeking, they are intensely disillusioned and disappointed. This, in turn, can ultimately lead to rejection, loneliness, and despair, increasing feelings of distress, which potentially compromises adolescents overall health status. Another possible reason for such findings is that peers get the adolescent caught up in situations risky for the adolescent's health, without the adolescent choosing to participate in such acts. For example, an adolescent passenger gets harmed in a car accident because of his peer's reckless driving or a peer starts a fight and an innocent adolescent bystander is struck. It is also possible that adolescents who are embarrassed to engage in health risk behaviors in front of their friends value and are more concerned with their overall health and well-being and therefore take pride in maintaining a healthy lifestyle.

Additionally, this study found that peers had the most sizeable effects on the outcomes variables examined. While research consistently demonstrates the influential nature of peers during adolescence, this finding may be even more true of this sample because of their "marginally deviant" nature. Recent work by Dodge (2003) indicates that peers who are *marginally deviant* (e.g., those who are involved in deviance but at a lower level) are more likely to be influenced by their peers than those who are not deviant at all or those who are highly deviant. Given that over 50% of the current study's sample would fall into the *marginally deviant* category, this would likely explain why peers had such sizeable effects for many of the outcome variables.

Adolescent Health Risk Behavior Predicting Health Status

As discussed above, several associations between parent-adolescent relationships and peer factors on the one hand and health status on the other hand were mediated by adolescent involvement in health risk behavior, and particularly by adolescent aggression and sensation seeking. As predicted, adolescent aggression and sensation seeking were directly related to health risk consequence, which was directly linked to health discomfort and health satisfaction. However, in contrast to what was predicted, adolescent substance use and sexual risk taking was unrelated to health status. The reasons for this unexpected finding is unclear; however, there are several possible explanations. First, many of the adolescents seem to be engaging in substance use and sexual risk taking; however, they tended to engage in such behaviors at relatively low levels. In contrast, the adolescents in this sample engaged in relatively high levels of sensation seeking and aggression, which is not too surprising given that children in rural samples are more often involved in sensation-seeking types of activities. In fact, approximately, 78% of all unintentional injuries among youth are attributable to motor vehicle accidents and, interestingly, almost all motor vehicle deaths in youth ages 15 to 24 have been in rural areas (National Safety Council, 1993). Another possibility is that most adolescents expect to experience nausea, feel sick, or experience other hangover-types of symptoms following drinking and therefore do not consider or report these types of symptoms as part of health status. Yet another potential reason for this finding is that substance use and sexual risk taking are not closely related to the risk consequence construct as measured in this study. A review of the items suggests that the risk consequence items would be more likely a result of involvement in aggressive acts or sensation seeking types of activities (e.g., broken bone,

bad scrape, gun shot wound), more-so than alcohol use, drug use, or sex. A final possibility for the finding is that the effects of substance use and sexual risk taking may be more long-term and therefore are not yet an issue in this sample.

In general, this study found that a partially mediated model best accounted for the relationships among the variables in this study. In order to more clearly understand adolescent involvement in health risk behavior, it was (and is) essential to examine the combined influences of relationships with parents and peers on this behavior as well as subsequent health status. Nonetheless, although these data did not support a moderating model of relationships, this possibility cannot be entirely ruled out. It is possible that this sample (unlike that of Brown & Huang, 1995) was not sufficiently large enough to detect such relationships. Likewise, in no way can the role of family history (or genetics) be ruled out. The proxy measure of genetic transmission used in this study was not sufficiently sensitive or reliable to thoroughly examine the role of family history of health risk behavior.

Linking Current Study Findings to Past Research Findings

The findings of the present study are consistent with a large body of research suggesting that peers place adolescents at heightened risk for involvement in deviant behavior (Brook et al., 1986; Dishion et al., 1988; Dishion et al., 1996; Klein et al., 1994). However, the present study is also consistent with findings of researchers such as Galambos & Ehrenberg (1997) who argued that peers were not merely a substitute for parental influences during adolescence, but rather that parents remained significantly influential during this time as well. In the current study, this was especially true for those adolescents' whose intrapsychic experiences of their parents were negative. These

adolescents were more likely to be aggressive, sensation seekers. In addition, and consistent with work by Hawkins et al. (1992), the present study also found that the risk of deviance and drug abuse increased, in part, by poor monitoring of adolescent behavior. Surprisingly, and inconsistent with the ideas of Fuglini & Eccles (1993), Smetana (1995), and Allen et al. (1998; to name a few) this study did not find a negative association between higher levels of mutuality and lower levels of involvement with antisocial peers. Nonetheless, it is likely that increasing adolescents' opportunities to exercise their developing competencies within a supportive family is linked to a wide range of other problems as well as competencies not examined here.

Overall, this study supported the notion that the influence of parents and peers is complex, with more than just direct influences on adolescent behavior. As others have indicated, family and peer relationships are not two separate dimensions but rather that there is a continuity and overlap between functions of the two (Bukowski, Newcomb, & Hartup, 1998; Cooper & Ayers-Lopez, 1985). For example, consistent with work by Patterson and Stouthamer-Loeber (1984) as well as Steinberg (1987), the current study also found that inadequate parental monitoring further promoted involvement with deviant peers, leading to greater adolescent involvement in health risk behavior. Similar to work by Dishion et al. (1995), lack of parental monitoring was related to adolescent substance use as well as sexual risk taking, aggression and sensation seeking not only directly, but indirectly as well via its influence on associations with deviant peers.

Implications

Although health risk behaviors like those measured here are considered to be somewhat normative (to a certain extent), this study points to the importance of not

overlooking other potential factors, namely constraining interactions with parents as well as involvement with deviant peers. It is evident that (contrary to what a few have claimed (Kandel & Andrews, 1987; see Kerr, Stattin, Biesecker, & Ferrer, 2003 for review) parents are not merely in the backdrop of adolescent development; they are highly important and influential (directly and indirectly) in adolescent behavior. Peer relationships, as expected, were also found to be highly related to level of adolescent involvement in health risk behavior. More importantly, this study finds that parents and peers together impact adolescent behavior and neither should be examined in isolation. Importantly, this study also clearly points out that these factors have direct and indirect ramifications for health status. It is obvious that some implications for health are much more long term (i.e., liver damage associated with alcohol use); nonetheless, the short-term implications (as seen here) are important to consider as well.

Limitations and Conclusions

Several limitations of this study need to be considered. The sample size was relatively small; a larger sample may have lead to additional study findings, for example, interaction models may adequately describe the data if a larger sample was use. However, this sample not only provided a way to capitalize on examining a range of health risk behaviors, but did so among a relatively unexamined group of adolescents – those involved in the court system at an informal level. Nonetheless, given that the sample consisted of adolescents involved in the courts, the results may not generalize to other adolescents. Measurement at a single point in time made it impossible to unravel cause from effect (for example, adolescent involvement in health risk behavior can also potentially influence relationships with parents). However, one-year follow-up data have

been collected on this sample and will be examined in a future study. As was shown here, parents and adolescents may have very different subjective experiences of similar events and these differences, in turn, may lead to distinct outcomes. Therefore, future studies should consider measuring all aspects from multiple perspectives. Moreover, q-sort procedures or other more direct methods of measuring peer factors could be informative, as well as examining the implications of various aspects of parent-child relationships combined with both positive and negative aspects of peer relationships. Further, many larger social context factors were not considered in this research (e.g., culture, social advantage/disadvantage, stressful life events) nor were individual factors (e.g., temperament, negative affectivity, etc.), but may contribute significantly to the relationships examined here. Therefore, the importance of such factors must not be discounted.

Regardless of these limitations, this study contributes to the literature by adding conceptual clarity to many constructs as well as relationships between and among the constructs. Furthermore, findings such as these not only inform society as to how relationships with parents and peers influence behavior, but also have the ability to inform interventions aimed at decreasing the likelihood of adolescent involvement in health risk behavior. For example, therapists working with adolescents who engage in health risk behaviors may need to combine behavioral approaches that address clients' feelings of shame in relationships with parents, while also finding a way to target specific aspects of or types of peer networks.

APPENDIX

Table A

Lower Versus Higher Offenses

Category Type	
Lower Offenses	Higher Offenses
Minor in Possession:	Breaking and Entering
Tobacco, Alcohol, Marijuana, Intoxication	Malicious Destruction of Property
Drug Paraphernalia	Assault (aggravated and non-aggravated)
Littering	Assault and Battery
Curfew Violation	Personal Protection Order
Truancy	Domestic Violence
Run Away	Larceny
Disturbing the Peace	Resist and Obstruct an Officer
Indecent Exposure	Receiving and Concealing Stolen Goods
Fire Starter	Home Invasion
Fireworks	Violation Probation
Retail Fraud	Operating Vehicle While Intoxicated
Uttering and Publishing	Possession of Controlled Substance
Fighting	Carrying a Concealed Weapon
Motor Vehicle Violation:	Embezzlement
Traffic Violation, Operating Vehicle	Felonious Driving
Without License, Off-road Vehicle on	Having Multiple Offenses
Road, Passing Bus with Flashing Lights	

Table B

Breakdown of Offenses Into Six Categories*

Substance Use	Minor in Possession: Tobacco, Alcohol, Marijuana; Operating Vehicle While Intoxicated; Possession of a Controlled Substance
Aggressive – Other	Assault, Assault and Battery, Domestic Violence, Personal Protection Order, Fighting, Carrying a Concealed Weapon, Other Weapons Charge, Fighting
Aggressive – Property	Malicious Destruction of Property, Breaking and Entering, Home Invasion, Arson
Non-Aggressive – Other	Resisting and Obstructing an Officer, Disturbing the Peace, Indecent Exposure
Non-Aggressive – Property	Embezzlement, Receiving and Concealing Stolen Goods, Larceny, Littering, Uttering and Publishing
Sensation Seeking	Retail Fraud, Traffic Violation, Operating Vehicle Without a License, Off-road Vehicle on Roadway, Passing School Bus with Flashing Lights, Curfew Violation, Truancy, Run Away, Fireworks, Fire Starter, Violation Probation,, Felonious Driving
Multiple	Having more than one violation

*Note. Participants with more than one crime were put into multiple categories according to the violations.

Table C

Original Items Selected for Scales

Original Parent-Adolescent Relationship Items

Conflictual Dependency

My parents are ashamed of me. *
If I talk things over with my parents, I'm just asking for trouble. *
My mother expects too much of me. *
My parents make me angry. *
My father expects too much of me. *
I have been angry with my parents for years. *
Usually I feel that I am a bother at home. *

Mutuality

I feel that I have a part in making family decisions. *
I usually go along with my parents advice. *
My parents respect my desire to be an independent person. *
My parents accept my need for privacy. *
It is all right with my parents if I disagree with them. *
Most of the time my parents are happy with me.
Most of the time my parents are happy with how I am doing
My mother listens when I need someone to talk to.
My parents often insist on making me see things their way.

Psychological Control

My parents are people who are less friendly with me if I do not see things their way. *
My parents are people who will avoid looking at me when I have disappointed them. *
If I have hurt my parents' feelings, they stop talking to me until I please them again. *

Behavioral Control: Child Report Items

During all or most school weeks, I am supervised by a parent or another adult over age 19...*
During the weekend, I am supervised by a parent or another adult over age 19.. *
My parents know where I am when I am not home. *
My parents know where I am when I leave the house.

Behavioral Control: Parent Report Items

Adults in the home did not know the whereabouts of the child. *
Child was poorly supervised outside the home. *
Adults had to leave the child at home during the day without a responsible adult to supervise. *
Adults had to leave the child at home at night without a responsible adult to supervise.*

Original Adolescent Health Risk Behavior Items

Aggression

During the past 3 months, how often did you...argue or fight with other kids? *
bully, threaten, or shove other kids? *
tease, ridicule, or pick on other kids? *
annoy others on purpose, or damage other people's things on purpose? *
say really mean or cruel things to others? *

Table C cont'd

act so out of control that someone filed a complaint?
get into trouble by hanging out with a gang?
participate in gang activities that included harassing or bullying others?
bite or throw things at others?
have trouble getting along with adults?
physically attack or really try to hurt another child, a parent or some other adult living in the child's home?
physically attack or really try to hurt some other child or adult NOT living in the child's home?
threaten someone with a weapon?
bring a gun or weapon to school
Fire a gun or use a knife on someone, or severely beat or club someone?
intentionally kill or murder someone?

Sensation Seeking

During the past 3 months, how often did you...race on a bike? *
do something risky? *
break a rule for the thrill of it? *
steal or shoplift? *
slip out at night when your parents thought you were still asleep? *
willingly ride in car with someone you knew would drive dangerously?
go joy riding in a car without permission

Alcohol and Drug Use

During the past 3 months, how often did you drink alcohol?*
During the past 3 months, how often did you drink enough alcohol to get intoxicated or drunk?*
During the past 3 months, how often did you use drugs or inhalants? *
During the past 3 months, how often did you use enough drugs or inhalants to get high? *
During the past 3 months, how often did you sell drugs? *
During the past 3 months, how often did you drink alcohol or use drugs before driving?
During the past 3 months, did you buy or sell alcohol or drugs?

Sexual Risk Taking

During the past 3 months, how often have you had sex with a lot of different people, or have had unprotected sex?*
Sexually abuse or molest someone, or sexually assault someone of the same or opposite sex (including date rape)?
Act inappropriately seductive, or do unusual or inappropriate things of a sexual nature in public?
Act sexually promiscuous or loose, engage in high risk sexual behaviors or have unprotected sex?

Table C cont'd

Original Peer Items

Peer Aggression

As far as you know, have your friends done the following in the past three months...argued or fought with someone. *
lie, con, manipulate, or take advantage of others. *
annoy others on purpose. *
threaten to hurt someone. *
carry a weapon.
have trouble getting along with adults.
physically attack someone.
belong to a gang.
act so out of control that a compliant was filed.
act very cruel to animals.

Peer Sexual Risk Behavior

As far as you know, have your friends done the following in the past three months...have sexual intercourse. *
act inappropriately seductive, or do unusual or inappropriate things of a sexual nature in public. *
act sexually promiscuous or loose, engage in high risk sexual behaviors or have unprotected sex. *
have any of your friends ever been pregnant (girls) or gotten someone pregnant (boys). *
sexually abuse or molest someone, or sexually assault someone of the same or opposite sex (including date rape). *

Peer Alcohol and Drug Use

drank beer or wine.*
drank hard alcohol or mixed drinks.*
had five or more drinks in a row.*
cocaine, ice, or crack.*
injected other drugs.*
carry or sell drugs.*
inject steroids.
used inhalants.
smoked cigarettes.
chewed or dipped tobacco.
get drunk.
smoke marijuana.

Sensation Seeking

As far as you know, have your friends done the following in the past three months...Do something risky or dangerous on a dare.
Break a rule that his/her parents set just for the thrill of seeing whether you could get away with it.

Table C cont'd

Steal or shoplift.
Slip out at night when his/her parents thought he/she were asleep.
Willingly ride a car with someone you knew would drive dangerously.
Get a ticket or citation for a moving violation.
Go joy riding in a car without permission.

Peer Acceptance of Deviance

If your peers saw you smoking cigarettes, how embarrassed would you be? *
If your peers saw you getting drunk, how embarrassed would you be? *
If your peers saw you destroying other people's things, how embarrassed would you be? *
If your peers heard you swearing, how embarrassed would you be? *
If your peers saw you or heard about you having sex, how embarrassed would you be? *

Original Health Status Items

Health Satisfaction

I feel full of energy. *
I resist illness well. *
I recover quickly from illness. *
I am happy with my health in general. *
I have good muscle strength.
I am well coordinated.

Health Discomfort

In the past month, how often did you have .....stomach aches? *
pain that really bothered you? *
aches, pains or soreness in your muscles or joints? *
a headache? *
trouble eating or have a poor appetite? *
tire easily or feel like you had no energy? *
feel really sick? *
wake up feeling tired?
watery or itchy eyes?
skin problems?
a cough?
fever or chills?
feel dizzy?
wheezing or trouble breathing?
chest pain?
feel like vomiting?
unusual discharge from your sexual organs?
trouble peeing or burning when urinating?
diarrhea or loose bowel movements?
constipation or hard bowel?

Table C cont'd

depressed or blue?
menstrual problems?
free of pain?
feel really healthy?
lost weight without trying?
miss more than half day of school or work?
stay in bed more than half a day?
cut down on others things but did not miss school or work?
have trouble walking?
have trouble running?
have trouble bending, lifting, stooping, or reaching?
have trouble using your hands or fingers?

Risk Consequence

In the past 12 months, did you have any of the following injuries....bad cut or scrape? *
bad sprain or torn ligament? *
broken bone? *
bad head injury or concussion? *
gun shot wound or stab wound? *
bite from another person or animal? *
bad burn? *
During the past 12 months, did anyone physically hurt you on purpose? *
In the past twelve months, how many times did you have...a skin infection?
a cold or flu?
sinus trouble?
sore throat?
ear infection?
upset stomach with vomit or diarrhea or fever?
bronchitis?
mononucleosis (mono)?
pneumonia?
bladder infection?
fungal diseases?
Has a doctor ever said you had... serious acne, eczema, other allergic rashes?
gum disease?
asthma?
hepatitis?
migraine headaches?
hay fever or allergies?
Pelvic Inflammatory Disease? (for girls only)
an STD or venereal disease like gonorrhea (clap), syphilis, Chlamydia, genital warts, or genital herpes?

* Note. Items with * indicate items that are included in the final scales.

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