Familial Antecedents of Young Adult Health Risk Behavior: A Longitudinal Study

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With a sample of 116, the authors asked how characteristics of the family, rated by adolescents, predicted health risk behavior at young adulthood 6 years later and whether adolescent and young adult personal and emotional functioning mediated these relationships. The authors also explored the consistency of relationships among these variables across 4 types of families: balanced, traditional, disconnected, and emotionally strained. The family variables significantly predicted young adult health risk behavior over time and functioning at adolescence and young adulthood did not serve as a mediator. The family model operated well in 3 of the 4 family contexts; it failed to operate among offspring from disconnected families. Characteristics of the family affect the display of health risk behavior when offspring come from families that have well-defined and coherent family structures.

Drinking, smoking, drug use, criminal behavior, violence, and unprotected sexual activity are behaviors that have major implications for health and development during adolescence and young adulthood. Considerable research has suggested that many of these behaviors co-occur to form a single behavioral style, variously termed general deviance, problem behavior, or risk behavior syndrome (Donovan & Jessor, 1985; Jessor, 1992; Osgood, Johnston, O'Malley, & Bachman, 1988). In addition to the immediate dangers that such behaviors create, Mechanic (1983) has suggested that health-related practices that develop during adolescence have long-term consequences for young adults and for adults as well. Attention to health issues, styles of managing stress, and patterns of

responding to environmental temptations developed during adolescence form the basis for how the individual responds to the demands of later developmental challenges and the extent to which the individual becomes a self-responsible adult in later years. Thus, health risk behaviors have implications not only for concurrent health and well-being but also for subsequent health-related behavioral styles that persist over time.

Considerable research has been directed at identifying the precursors of health-related problem behaviors (Dembo, Williams, Wothke, & Schmeidler, 1994; Millstein & Moscicki, 1995; Patterson & Bank, 1989; Terre, Drabman, Meydrech, & Hsu, 1992). The thrust of this research has been to identify specific personal, relational, and environmental factors that directly influence the display of later health risk behaviors (Arnett, 1992; Hernandez & DiClemente, 1992; McCord, 1990; Millstein & Igra, 1995).

Jessor (1992), however, proposed a more integrative approach. Drawing from the epidemiological evidence, he suggested the need to move beyond a one-size-fits-all philosophy, or the search for a single "magic bullet" that leads to problem behaviors, and to understand that behavioral outcomes are most likely influenced by multiple factors, all interacting over time. Thus, it is probably the case, according to Jessor, that so-called health risk behaviors displayed

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during young adulthood, for example, are strongly influenced by a host of contextual biogenetic, social environment, perceived environment, personality, and behavioral factors that have evolved together during the preceding years. Similar approaches have been suggested by Hawkins and Weis (1985), Botvin (1985), and Conger and Rueter (1996).

The family provides a potent and pervasive context for observing the operation of a host of cultural, relational, biological, and personal factors within an intimate, ongoing, and influential social setting. Indeed, some have argued that because of its emotional power and the consistency of its relational bonds, the family over time provides the context from which most other factors that influence health behavior can be observed (Fisher & Lieberman, 1996). A primary aim of this study was to identify characteristics of the family setting during adolescence that were predictive of health risk behavior during young adulthood.

The Family and Health Risk Behavior

Several related sets of family variables have been linked with adolescent risk behavior: parental conflict and inconsistency, absence of parental supervision, absent fathers, diffuse family relationships, coercive parent–child relationships, and parental drug and alcohol use (Amato, 1987; Biglan et al., 1990; Dembo, Grandon, LaVoie, Schmeidler, & Burgos, 1986; Donovan & Jessor, 1985; McCord, 1988, 1990; Metzler, Noell, Biglan, & Ary, 1994; Patterson, 1992; Rutter, 1978).

A growing literature also suggests the influence of the peer group on the display of adolescent risk behavior (Dolcini & Adler, 1994), especially because there are similar types and rates of expression of risk behaviors among members of the same peer group (Donovan, Jessor, & Jessor, 1983; Kandel & Andrews, 1987; Patterson & Dishion, 1985; Ried, Martinson, & Weaver, 1987). Although direct peer group influences cannot be discounted, there appears to be a link between the ways in which adolescents are susceptible to peer group influence and characteristics of the family setting. For example, several studies have demonstrated that the amount of adolescent interaction with parents is negatively related to peer group influence (Kandel & Andrews, 1987; Ried et al., 1987). It also has been shown that

parents have more influence on adolescent decisions to engage in risk behaviors than peers, whereas peers exert more influence than parents do by supporting the continuous display of risk behavior over time (Tremblay, Masse, Vitaro, & Dobkin, 1995). Furthermore, researchers at the Oregon Social Learning Center have suggested that coercive family interactions and poor parental monitoring permit adolescents to drift into associations with peer groups that engage in antisocial and other health risk behaviors (Dishion, Patterson, Stoolmiller, & Skinner, 1991; Patterson, 1992; Patterson & Bank, 1989), suggesting a sequence of influences with the family as the starting point. Thus, we focus on the family as the primary context from which to understand processes that lead to the display of health risk behavior in adolescents and young adults.

Personal and Emotional Functioning

What are the processes by which characteristics of the family affect health risk behavior? One possibility is that families influence the emotional functioning or personality of their offspring, and that these qualities are then carried by the individual into other settings over time. There is a large literature documenting the link between family variables and personal and emotional functioning. For example, Feldman and Brown (1993) showed that warm, accepting, and authoritative parenting was associated with high self-restraint in boys; Cumsille and Epstein (1994) found that family cohesion and adaptability were linked with adolescent symptoms of depression; and Ransom and Fisher (1995) reported that a profile of family variables assessed by parents was associated with adolescent perceived health and well-being (see a review by Kaslow, 1994).

Similarly, the link between personal and emotional factors and health risk behavior is well established. For example, depression has been linked with drug and alcohol use (Deykin, Levy, & Wells, 1987; Kandel & Davies, 1982; Scott & Cabral, 1988), poor impulse control with inability to assess riskiness accurately, and low self-esteem with infrequent use of contraceptives (Hayes, 1987). More specifically, Stiffman, Dore, Earls, and Cunningham (1992) showed that mental health symptoms were significantly correlated with risk behaviors among adolescents. Longitudinal data from this study also

indicated that changes in mental health symptoms between adolescence and young adulthood were significantly and positively correlated with changes in the number of risk behaviors during this time period. Likewise, other data have indicated that the presence of depressive or anxiety disorders among 18 to 30 year olds doubled the risk of corresponding drug abuse or dependence (Christies, Burke, Regier, & Rae, 1988). Several personality characteristics also have been implicated in the display of risk behaviors: decision-making perspective (Lavery, Siegel, Cousins, & Rubovits, 1993), feelings of personal control (Millstein & Moscicki, 1995), and impulsivity and disinhibition (Bates & Labouvie, 1995). Thus, there are clear indications that personal and emotional variables, such as self-esteem, anxiety, and depression, are linked to the display of health risk behaviors. They also may serve as mediators between family influences and behavioral outcomes.

The Present Study

Using these research findings, we asked four related questions. First, through which of several potential pathways did characteristics of family life and personal and emotional functioning during adolescence affect health risk behavior during young adulthood? Several potential routes are outlined in Figure 1. Derived from the above discussion, our basic conceptual model suggests that characteristics of the family system during adolescence have direct, independent effects on health risk behavior at young adulthood. Three mediated models also are proposed. First, *adolescent* personal and emotional functioning may mediate the relationship between characteristics of the family during adolescence and health risk behavior during young adulthood. Second, *young adult* personal and emotional functioning may mediate these relationships. Third, both *adolescent and young adult* personal and emotional functioning may serve as mediators between family characteristics and young adult health risk behavior. These models suggest that although family context may form the foundation for what Mechanic (1983) considered styles of stress and health management, the display of health risk behavior may be mediated by personal and emotional characteristics, including mental health, that operate over time.
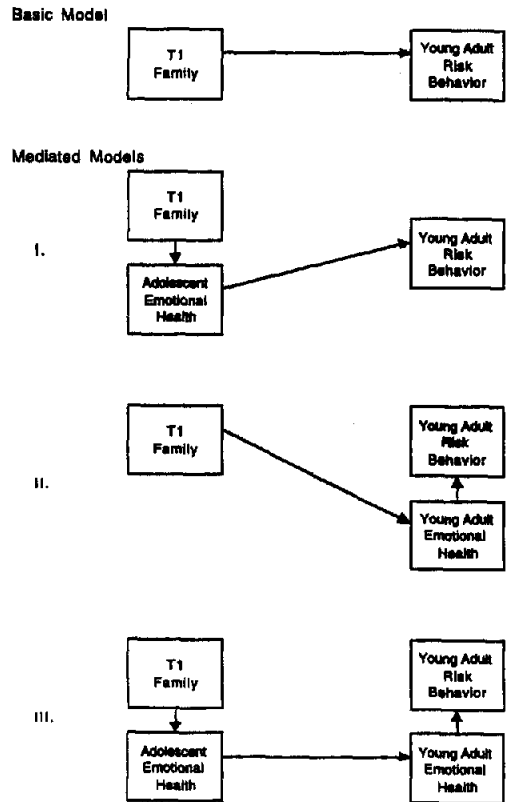

Figure 1. Predictions of young adult risk behavior. T1 = Time 1.

A second question posed by this research concerns gender. Given that health risk behavior is more prevalent among males than among females, and given that there are gender differences in the frequency of health risk behavior, we asked whether the direct and mediated models outlined in Figure 1 operated equally well for females and males.

Third, much research on the precursors of health risk behavior has yielded statistically significant findings, but the models used frequently account for only a small percentage of variance. This has led Dryfoos (1990) and Jessor (1992) to suggest that there may be more than one pathway to the display of health risk behavior. Therefore, we asked whether the paths identified as linking family processes to young adult health risk behavior operated equally well across all participants in our community sample or whether they held only for select subgroups. Thus, our aim was not only to identify significant pathways of influence but also to

identify for whom these pathways applied and for whom they did not.

Fourth, we asked whether the associations between family predictors and offspring health risk behavior operated over time. We used a longitudinal design with a time frame that spanned the transition between adolescence and young adulthood, a transition that is infrequently studied. The adolescent–young adult transition is particularly important because grown offspring spend less time at home than during any other prior stage of life, and their personalities, interpersonal styles, and mental and physical health are likely to show considerable coherence and stability. Thus, young adults are less likely to be contaminated by current relationships with their families than if we studied adolescents exclusively.

In summary, we conducted a longitudinal study to evaluate the impact of the direct and mediated effects of family processes, and personal and emotional functioning measured when offspring were adolescents, on health risk behavior measured when offspring were young adults. We also sought to identify those youths for whom the models successfully and unsuccessfully predicted health risk behavior over time.

Method

The data for this longitudinal study were part of a larger project to assess the relationship of characteristics of the family on the health and well-being of family members (Fisher, Ransom, Terry, Lipkin, & Weiss, 1992). We collected data at two time periods—Time 1 (T1) was between 1984 and 1987 when participants were adolescents (ages 13–18) and Time 2 (T2) between 1991 and 1992 when they were young adults (ages 19–25). The average T1–T2 interval was 5.8 years.

Sample

Recruitment. At T1, we used a random digit dial telephone screening technique to recruit a sample of 225 families from a semirural California county of 500,000, which had an urban core of 275,000 (for details, see Fisher, Ransom, Terry, Lipkin, & Weiss, 1992). Families were invited to participate in the study if a telephone screening interview indicated (a) there was a heterosexual couple who had cohabited in the home for at least 3 years, (b) there was at least one adolescent between 13 and 18 living in the home, (c) occupants were either non-Hispanic White or Hispanic, (d) the adults in the home were born in the United States or had migrated to the United States

before age 6, and (e) no family member had left or returned home in the previous 3 months. These criteria assured some degree of family continuity and stability of membership, relatively comparable family developmental level, restricted ethnicity, and common educational background. Families were offered $100 for their participation, which included a 1-hr home visit, 1.5 hr for completing questionnaires, a 3-hr visit to our laboratory for the entire family, and a 3-hr visit to our laboratory for the adult couple. A total of 746 eligible families were identified; of these, 225 agreed to a home visit, yielding an acceptance rate of 33.7%. This rate is comparable to other studies that required the intensive participation of community-based samples (Matarazzo et al., 1981).

We carried out three sets of comparisons between families who accepted and families who refused to participate at T1. First, a comparison of acceptors and refusers on data collected during a 10-min telephone screening interview found no differences in family size, social class, number and type of self-identified health problems, location of residence in the county, ethnicity, or place of birth. Most refusers declined because of the time commitment required and the difficulty of arranging family schedules. Second, we found no differences between acceptors' responses to the self-report scales used in this study (described in the next section) and published normative data on these scales in terms of means and scale ranges. Third, each of the family and health scales showed good score distributions that did not indicate a selective or restricted sample.

At T2, each family that had participated previously was sent a letter informing them about plans for a follow-up study, followed by a telephone call for recruitment. Young adults were defined as those former adolescent family members who had reached age 19 and were out of high school. Young adults, who were now geographically dispersed, were told that participation entailed completing questionnaires and that the task would require about 60 min of their time. Young adults were paid $15 for their participation at T2. A total of 172 eligible young adults (87 female, 85 male) agreed to participate at T2, and 53 either could not be contacted or refused to participate, yielding a 76% successful follow-up rate. Only 1 young adult per family was included in the analyses presented below. In families with more than 1 young adult, we selected randomly which offspring was to be included in the study. All of these factors, along with some missing data from T1, reduced the sample size for the analyses described below from 172 to 116 young adults.

Characteristics of the sample. The T1–T2 sample consisted of 116 adolescents (58 male, 58 female) from 116 families with two heterosexual adults, cohabiting for an average of 18 years ($SD = 7.2$),

who were not necessarily the biological parents of the children in the household. About 20% of the spouses had had prior marriages, 78% of adult women worked at least part-time outside the home, and the average family 1984–1986 income was $44,350. Among the adolescents, 82% identified themselves as non-Hispanic White, 8% as Hispanic, and the remainder did not identify their ethnicity. The adolescents, who were all attending high school at T1, were on average 15.3 years old, with 62% having either one or two siblings in the family.

The T2 sample had a mean age of 21.8 years, ranging from 19 to 26. Eighty-two percent were single and had never married, 14% were married, and 4% were either separated or divorced. Twenty-eight percent lived with a spouse or partner, 20% with friends, 44% with parents, and 8% alone. Fifty-three percent described themselves as primarily students, 8% as homemakers, and 39% as workers in the paid labor force. Income was less than $10,000 for 48% of the young adult sample, between $10,000 and $30,000 for 42%, and more than $30,000 for 10%.

We compared the 116 young adults who participated in the follow-up study with the 53 young adults who did not wish to participate at T2 or who could not be located. The groups were compared on 54 T1 demographic, family, and health scores for adolescents, mothers, and fathers. These variables are described in detail elsewhere (Fisher, Nakell, Terry, & Ransom, 1992; Fisher, Ransom, Terry, & Burge, 1992; Ransom, Fisher, & Terry, 1992; Ransom, Locke, Terry, & Fisher, 1992). There were no statistically significant differences between the two samples on 48 of the 54 comparisons. Differences between the two groups were noted only in demographic characteristics: Those who did not participate in the T2 study were, as adolescents, less successful in school, $t(167) = 2.65$, $p < .01$, more likely to come from poorer families, $t(167) = 2.30$, $p < .05$, and larger families, $\chi^2 (5, N = 53) = 13.4$, $p < .02$, to be Hispanic, $\chi^2 (1, N = 53) = 3.3$, $p < .05$, and to come from families where the mother or the father had been previously married, $\chi^2(3, N = 53) = 15.2$, $p < .01$, for mothers, and $\chi^2(1, N = 53) = 8.7$, $p < .05$, for fathers. Although these findings reflect a loss of participants from the lower end of score distributions, a sufficient range of variation of demographic characteristics justifies use of these data.

Procedures and Measures

Two kinds of adolescent data from T1 were used in the present research: questionnaires that assessed personal and emotional functioning and appraisals of the family environment. At T2, after an average of 5.8 years, the young adults completed a battery of questionnaires concerning, among other things, their personal and emotional functioning (same as at T1) and their engagement in health risk behavior.

Personal and emotional functioning (T1, T2). A standardized composite score of personal and emotional functioning was computed, based on the sum of four standardized scales: Self-Esteem, General Well-Being, Anxiety, and Depression. Inclusion of all four scales enabled us to define this variable broadly for this nonclinical, community-based sample.

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a widely used 10-item scale that assesses overall perceptions of self worth ($\alpha = .80$). Items include the following: "I am satisfied with myself"; "I wish I had more respect for myself." The remaining three scales included in the personal and emotional functioning composite were developed as part of the RAND Health Assessment Questionnaire (Ware, 1986; Ware et al., 1984). General Well-Being is an 11-item scale that assesses general perceptions of happiness and satisfaction in life ($\alpha = .90$). Items include the following: "The future seems hopeful and promising"; "I feel loved and wanted." Anxiety is a 10-item scale that assesses feelings of tenseness and restlessness ($\alpha = .87$). Items include the following: "I am able to relax without difficulty"; "I feel nervous and jumpy." Depression is an 11-item scale that assesses level of dysphoric mood ($\alpha = .90$). Items include the following: "I feel lonely"; "I feel down-hearted and blue."

Appraisals of the family (T1). We used the framework for family assessment in relation to health developed by Fisher, Ransom, Terry, Lipkin, and Weiss (1992) that included four domains or areas of family life: world view (family beliefs, values, sentiments); structure/organization (orderliness, closeness, boundaries); emotion management (emotional tone, expressiveness, avoidance); and problem solving (style, effectiveness, level of activity). In the present study, we used measures from three of these four domains and selected for inclusion those variables that demonstrated significant relationships with health in the earlier research (Fisher, Ransom, & Terry, 1993). Assessments were by either questionnaire scales, which used 5-point Likert scales, or by ratings based on observations of interactions.

From the structure/organization domain, we assessed two constructs. Family *organized cohesiveness* was assessed by a 26-item scale (Fisher, Ransom, Terry, & Burge, 1992) that assesses family cohesion, orderliness, and clarity of roles and rules ($\alpha = .89$). Items include the following: "Family members share interests and hobbies"; "Our family is well organized." *Autonomous problem solving* in the family was assessed by a 3-item scale developed by Fisher, Ransom, Terry, and Burge (1992) that assesses family support for independent problem resolution ($\alpha = .72$). Items include the following: "Family members solve problems on their own"; "Family members should handle things themselves."

From the world view domain, we assessed family *coherence,* using a scale developed by Ransom,

Fisher, and Terry (1992) based on the work of Antonovsky (1984). The 28-item scale assesses the adolescent's view of the family as supporting an optimistic belief that life is controllable and manageable ($\alpha = .88$). Items include the following: "Most things in life usually turn out well"; "When we get what we want, it is usually because of luck."

From the emotion management domain, we assessed *warm–connectedness* in the marital dyad, based on observer ratings of husband–wife interaction during a videotaped, revealed differences task that was included as part of the T1 family assessment (Fisher, Nakell, et al., 1992). During the second laboratory visit at T1, each parent was asked to list independently three topics of current disagreement with his or her spouse and to rate each on a 5-point scale on the degree to which the disagreement affected the current relationship with his or her spouse. Once both spouse's forms were completed, the experimenter privately selected one highly rated topic that appeared on both parents' forms. The adult couple was then asked to "discuss this disagreement for 10 min and come to a definite conclusion." The experimenter then left the room, and the subsequent 10 min of interaction was videotaped. Warm–connectedness displayed significant linkages with family member health and well-being at T1 (Fisher, Nakell, et al., 1992). It is a 4-point, anchored rating that reflects the display of a warm, positive emotional connection between the spouses, even within the context of a verbal discussion about a disagreement ($\rho = .72$).

Health risk behavior (T2). A composite measure of engagement in 11 risky behaviors in the past 6 months was created from the T2 questionnaire. Each behavior was scored "yes" or "no." There were 3 alcohol-related items (drink alone regularly, drive under the influence, high volume of consumption); 4 sex-related items (many sexual partners, unprotected sex, substance use during sex, presence of STDs); 1 tobacco-related item (frequency of smoking); 2 substance use items (use of mood-altering medications, use of recreational drugs); and 1 violence-related item (carry a weapon). The number of items the young adult responded to positively constituted the health risk score (potential range = 0–11). The mean risk score was 1.90 (range = 0–7, $SD = 1.25$). This skewed distribution of risk scores was expected, given the community-based, nonclinical sample.

Family typology (T1). We used family typological data to determine whether the longitudinal models operated equally in different types of families. We had available data from an empirically derived, four-group family typology based on 11 scores derived from parent questionnaires, ratings of adult couple interaction, and ratings of family interaction. The typology was used in previous research to describe qualitatively different kinds of family settings in relation to the health of adult and adolescent family members. Following their analysis of the T1 family and health data, Fisher and Ransom (1995) created a profile of those family variables and composite scores from all four family domains that had the strongest independent associations with parent health and well-being. Using cluster analysis, four coherent family types were identified that included 97% of the family sample. These four types also varied on 22 demographic, stress, other family, and adult health and well-being variables not included in the original profiles, thus demonstrating considerable external validity. The four family types, based primarily on parent data, also differentiated among the health and well-being scores of adolescent family members, who did not contribute data to the original family profiles (Ransom & Fisher, 1995). Thus, the resulting typology reflected the family as a whole and not just the status of the parent generation.

Mean scores for the 11 family composites were charted for each of the four family types and, combined with the findings from the 22 contrast variables, a set of family descriptions was created (Fisher & Ransom, 1995). Balanced families reflect a balanced focus between the interior of the family and the outside world. There is good intergenerational separation between the parents and the offspring generation and good interpersonal distance regulation; there is an active engagement in the world and a willingness to support moderate levels of risk taking. Traditional families, on the other hand, emphasize order and structure within the family, focus on family cohesiveness as a central organizing construct, and emphasize routine, ritual, religious affiliation, and sex role traditionalism. They are essentially internally focused. Disconnected families are characterized by low scores on orderliness, closeness, and traditionality. These families are externally focused, and family members turn to outsiders rather than to insiders for support, intimacy, and companionship. Emotionally strained families are tense and devote considerable energy to contain the expression of long-standing, volatile emotional issues. Hostility and tension lie close to the surface, yet these families appear "stuck" and unable to resolve their difficulties. They appear locked into repetitive cycles of emotional constraint and uncomfortable emotional release over time.

Data Analysis

Path analytic techniques, based on a regression procedure recommended by Asher (1983), were used to assess the pathways by which family predictors at T1 were related to young adult health risk behavior 6 years later. Family × Gender interaction terms assessed whether the family variables affected health risk behavior differently for males and females. Path analysis is particularly valuable when predictors are correlated, as is the case in the present study. They are preferred over structural equation modeling when the

sample is relatively small, the theoretical model is not completely specified, and the analyses are to be used inductively rather than for testing a fully articulated theory (Biddle & Marlin, 1987).

An analysis of residual scores from the multiple regression analysis of our primary model was used to determine for whom the model worked and for whom it did not. Each participant's residual score from the regression equation reflects the variance left over, or unaccounted for, by the equation and, hence, the model tested. The larger the absolute, standardized value of the residual score, the poorer the model predicted that participant's outcome score.

Results

The results are reported below in three sections. First, we explored the relationship of the key measures to demographic characteristics and to one another. Second, we examined the direct and mediated models by which family, and adolescent and young adult personal and emotional functioning predict T2 young adult health risk behavior. Third, we used the family typology to identify in which of the four family settings the model was operative and in which it was not.

Relationships Among the Key Measures

We examined correlations between young adult risk behavior and T1 demographic variables (age, gender, ethnicity, family income, parent education, blended family status). Young adult health risk behavior was more prevalent for males ($r = .27$, $p < .003$), those who came from blended families ($r = .24$, $p < .01$), and those whose fathers had relatively low levels of education ($r = .26$, $p < .004$).

Correlations among the primary study variables are presented in Table 1. As expected,

moderate correlations were found among the four family variables: organized cohesiveness, family coherence, and observer ratings of warm–connectedness were positively correlated with each other but negatively correlated with autonomous problem solving. Despite a moderate correlation between adolescent and young adult personal and emotional functioning over 6 years ($r = .41$, $p < .001$), the personal and emotional health of young adults (but not of adolescents) was correlated negatively with young adult health risk behavior.

Multiple Regression and Path Analyses

Evaluation of direct paths. The key question, based on our conceptual model (Figure 1), was the extent to which gender, the four T1 family variables, and the Gender × Family interactions predicted T2 young adult health risk behavior. We used a stepwise regression procedure with gender entered in Step I, the four family variables entered in Step II, and the four Gender × Family interaction terms entered in Step III. The overall regression model was significant, $F(9,106) = 3.9$, $p < .002$, and accounted for 25% of the variance (Table 2). The regression coefficients indicated that, as expected, gender ($\beta = .27$, $p < .01$) was a significant predictor of health risk behavior, with males displaying more health risk behavior than females. Of greater interest, however, was that several of the family predictors were also related to health risk behavior 6 years later. In particular, among the main effects, adolescent perceptions of family organized cohesiveness reached statistical significance ($\beta = -.27$, $p < .01$), serving an independent, protective

Table 1
Zero-Order Correlations Among Major Study Variables

Variable	1	2	3	4	5	6	7	8
1. Organized cohesiveness	—							
2. Coherence	.45	—						
3. Autonomous problem solving	−.50	−.39	—					
4. Warm–connectedness	.14	.27	−.17	—				
5. Gender	.03	.07	−.07	−.04	—			
6. Adolescent emotional health	.43	.28	−.34	.05	−.14	—		
7. Young adult emotional health	.24	.33	−.11	.14	.01	.41	—	
8. Young adult risk behavior	−.26	−.22	.05	−.18	−.27	−.05	−.20	—

Note. $N = 116$. Any r in the table between .16 and .23 is significant at .05; rs over .23 are significant at .01.

Table 2
*Betas From Stepwise Regression Analysis Predicting Young Adult Risk
Behavior From Gender and T1 Family Variables*

T1 predictors	Step I	Step II	Step III
Gender	−.27***	−.27****	−.27****
Organized cohesiveness		−.27***	−.22**
Warm–connectedness		−.15	−.13
Coherence		−.11	−.17*
Autonomous problem solving		−.17*	−.19**
Gender × Organized Cohesiveness			−.05
Gender × Warm–Connectedness			.08
Gender × Coherence			.23**
Gender × Autonomous Problem Solving			.20**
R	.27	.43	.50
ΔR^2	.07	.12	.06
Total R^2	.07	.19	.25

Note. $N = 116$. T1 = Time 1.
*$p < .10$. **$p < .05$. ***$p < .01$. ****$p < .001$.

function at T1 to reduce the probability of displaying health risk behavior at T2.

Two significant Family × Gender interactions also reached statistical significance: Gender × Autonomous Problem Solving ($\beta = .20$, $p < .05$) and Gender × Family Coherence ($\beta = .23$, $p < .03$). The findings indicated that in both cases the protective effects of these two family variables were significantly greater for males than for females.

Evaluation of mediated models. Our next question focused on whether adolescent and young adult personal and emotional functioning mediated the relationship between the family predictors at T1 and young adult health risk behavior at T2. We investigated the three mediated models outlined in Figure 1.

Baron and Kenny (1986) proposed three rigorous criteria for a variable to be considered a *candidate* for a mediator. Applying their ideas to the present research, personal and emotional functioning can be considered a candidate for a mediator only if all three criteria are met: on the basis of zero-order correlations (a) the family predictors are significantly correlated with the outcome, young adult health risk behavior; (b) the family predictors are significantly correlated with the mediator, personal and emotional functioning; and (c) the mediator, personal and emotional functioning, is significantly correlated with the outcome, young adult health risk behavior. If all of these criteria are met, we are

permitted to construct a regression model and use the standardized regression coefficients to test two additional criteria: (d) The relationship between the mediator (personal and emotional functioning) and the family predictors and between the mediator and the outcome (young adult health risk behavior) must continue to be significant in the regression model; and (e) the introduction of the mediator, personal and emotional functioning, into the model must reduce prior, significant, zero-order relationships between the family predictors and the outcome, young adult health risk behavior.

The findings are summarized in Table 3. A review of the zero-order correlations (Table 1) indicated that Model I failed to meet criterion (c). That is, the mediator, adolescent personal and emotional functioning, was not correlated significantly with the outcome, young adult health risk behavior ($r = −.05$, *ns*). A further review of the zero-order correlations, however, indicated that both Models II and III met all three of Baron and Kenny's (1986) criteria for a mediator candidate. We therefore carried out the appropriate simultaneous regression analyses to test criteria (d) and (e) for these two models and the results are summarized in Table 4.

Model II, which included young adult personal and emotional functioning as a possible mediator, failed to meet criterion (d): When the family predictors were included in the equation, the mediator, young adult personal and emo-

Table 3
Meeting Baron and Kenny's (1986) Criteria for a Mediated Model

	Findings		
Candidate/criteria	Model I	Model II	Model III
Candidate for a mediated model:			
a. Family variables correlated with outcome	yes	yes	yes
b. Family variables correlated with mediator	yes	yes	yes
c. Mediator variable correlated with outcome	no	yes	yes
Criteria for a mediated model:			
If a, b, and c occur, then:			
d. Family and mediator variables remain significantly associated with outcome when both are in the equation		no	no
e. Introduction of mediator variable into the equation reduces the relationship between family and outcome variables		no	no

tional functioning, was no longer significantly linked with the outcome, young adult risk behavior. The previously significant zero-order correlation of −.20 dropped to a nonsignificant partial correlation (β) of −.09. Also, the introduction of the mediator into the equation did not reduce the relationship between the family variables and young adult health risk behavior, which is criterion (e).

Model III, which included both adolescent and young adult personal and emotional functioning as possible mediators, also failed to be confirmed: The mediator, young adult personal and emotional functioning, was no longer significantly linked with the outcome, young adult health risk behavior ($\beta = -.12$, *ns*), thus failing criterion (d). Also, the inclusion of the two personal and emotional functioning variables in the model did not reduce the ability of the family variables to predict young adult health risk behaviors, criterion (e). The results of the entire path analysis for significant pathways is diagrammed in Figure 2.

In summary, the personal and emotional

Table 4
Three Regression Equations for Testing Model III

Predictors	Equation 1	Equation 2	Equation 3
Family coherence	.13	.28***	−.15
Organized cohesiveness	.28***	.02	−.20*
Autonomous problem solving	−.13	.15	−.20
Warm–connectedness	−.04	.07	−.15
Gender	−.19**	.04	−.22**
Gender × Family Coherence	.10	−.08	.24**
Gender × Organized Cohesiveness	.11	−.02	−.09
Gender × Autonomous Problem Solving	.11	−.08	.22**
Gender × Warm–Connectedness	.09	.11	.12
Adolescent emotional health	na	.38****	.10
Young adult emotional health	na	na	−.12
R	.52****	.50****	.52****
R^2	.27	.25	.27

Note. $N = 116$. Equation 1: Time 1 family variables as predictors and adolescent health as outcome. Equation 2: Time 1 family variables as predictors and young adult health as outcome. Equation 3: All variables predicting young adult risk behavior. na = not applicable (not in model).
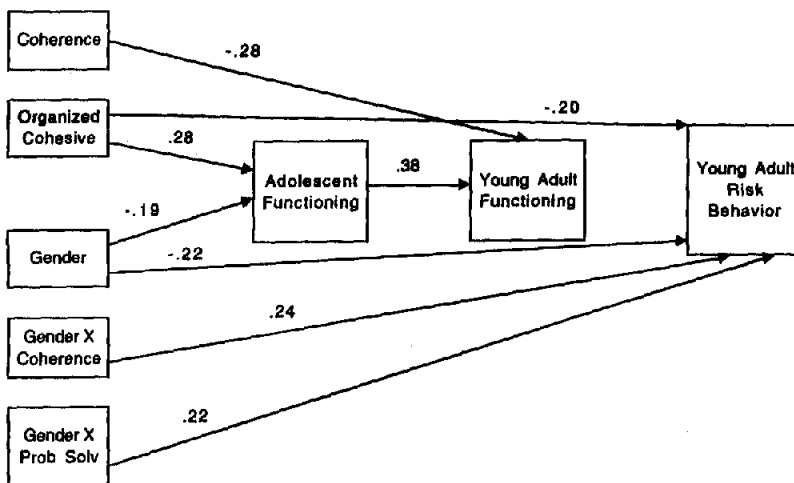*$p < .10$.   **$p < .05$.   ***$p < .01$.   ****$p < .001$.

Figure 2. Path analysis of family variables at Time 1 on young adult risk behavior at Time 2. Prob Solv = problem solving.

functioning of the adolescent and the young adult did not mediate the significant relationship between the family variables assessed during adolescence and young adult health risk behavior assessed 6 years later.

Where the Model Worked and Where It Did Not

Given the hypothesis that there are multiple routes to the display of health risk behaviors, we sought to identify a subgroup of the sample for which the significant family model was a good predictor and a subgroup for which it was not. Then, using the family typology data we had available, we sought to determine which kinds of family contexts emerged for these two groups of participants.

One useful way to identify subgroups of the sample for which the family model did and did not apply is to plot the residual scores derived from the multiple regression equation that assessed our basic family model. We elected to use the standardized residual score, converted into absolute values, because it was the easiest to interpret. The larger the absolute standardized residual score, the poorer the model predicted young adult risk behavior.

An extreme groups approach was selected, given that this was a community sample and a large number of young adults with high levels of health risk behavior was not expected. A review

of the plot of the standardized residual scores, converted into absolute values, indicated that clear shifts in the curve occurred at 1.0 and .5 standard deviations from the mean. Therefore, those participants whose absolute, standardized, residual scores fell at or below .5 standard deviations from the mean were considered "hits," where the family model worked; and those whose residual score fell at or above 1.0 standard deviations from the mean were considered "misses," where the family model did not work. To check our interpretation, we reran the basic family regression analysis and found it significant for the group classified as hits but not significant for the group classified as misses.

Eliminating the middle group of participants, whose residual scores were greater than .5 but less than 1.0 standard deviation units, reduced the sample size from 116 to 73 participants. A chi-square analysis was then run between the hit and miss groups on the one hand and the four family types identified previously on the other (Table 5). This analysis informs us whether the family predictors of health risk behavior operated equally for youths from the four different family constellations. A significant chi-square, $\chi^2(3, N = 73) = 10.3, p = .01$, indicated that the family variables in the model were significant predictors of health risk behaviors (hits) for participants from balanced, traditional, and emotionally strained family types, although somewhat less so for the emotionally strained

Table 5
Chi-Square Analysis of Hits and Misses by Family Type

Family type	No. (and %) of hits	No. (and %) of misses	Total
Balanced	21 (70)	9 (30)	30
Traditional	11 (78)	3 (22)	14
Disconnected	4 (27)	11 (73)	15
Emotionally strained	8 (57)	6 (43)	14
Total	44 (60)	29 (40)	73

Note. $\chi^2(3, N = 73) = 10.3, p = .01.$

than for the others. The pattern was notably reversed, however, for youths from disconnected families: The family variables in the model at adolescence were effective in predicting health risk behaviors (hits) for only 4 of the 15 participants (27%) from this family type. The average percentage of hits from the other three family types was 69%. Thus, family scores assessed during adolescence significantly predicted health risk behaviors in young adults when youths came from balanced, traditional, or emotionally strained families, but not when they came from disconnected families.

Discussion

Three groups of findings are worthy of note. First, one family variable appraised by adolescents at T1, family organized cohesiveness, significantly predicts young adult health risk behavior 6 years later for both males and females. This variable reflects the adolescent's perception of the family as emotionally close, orderly, and stable. This finding concurs with the growing body of research that suggests that consistent, emotionally positive, and supportive family relationships act as protective factors against offspring engagement in health risk behavior over time (Conger & Rueter, 1996; Metzler et al., 1994; Patterson, 1992; Quinn, Sutphen, Michaels, & Gale, 1994). Close and noncoercive family relationships also may maintain the family as a central, guiding factor in the adolescent's life and thus reduce the negative influences of some peer groups by reducing the adolescent's exposure to them (Dishion et al., 1991).

Both adolescent-perceived family autonomous problem solving and family coherence serve a significantly greater protective function

for males than for females. These adolescent appraisals contribute to a view of the family as supportive of autonomy (Hill & Holmbeck, 1986; Steinberg, 1990) and a view that life is predictable and manageable. These perceived family characteristics may enhance youth optimism for self-directedness and empowered behavior, characteristics that may have greater implications for men than for women, because of traditional sex role expectations. For example, there are considerable data to suggest that male more than female roles and role expectations accentuate emotional stability, foster action in contrast to introspection and rumination, and emphasize instrumentality as an approach to life (Anashensel & Pearlin, 1987; Nolen-Hoeksema, 1990; Verbrugge, 1985; Wood, Rhodes, & Whelan, 1989).

A second set of findings indicates that family predictors of young adult health risk behaviors over time are not mediated by personal and emotional functioning, including self-esteem and mental health, during adolescence or young adulthood. Although these findings do not preclude the role of other personality indicators, we take these findings to suggest that, given the setting and the set of health risk behaviors we used, family context may form the starting point from which an interactive chain of events leading to the display of health risk behaviors begins (Conger & Rueter, 1996; Patterson, 1992).

A third group of findings suggests the need to move beyond the hope that a single predictive model can meaningfully account for health risk behaviors among all adolescents and young adults. The family model predicts young adult risk behaviors for adolescents from three of four family types. It predicts well for adolescents from balanced and traditional families, some-

what less so for adolescents from emotionally strained families, and not at all for adolescents from disconnected families. Thus, adolescents from disengaged, externally focused families, such as the disconnecteds, may be more influenced by *both* positive and negative extrafamilial influences—such as school, peer group, other adults, and extended networks—than adolescents from the remaining three family types, all of which have well-defined boundaries, norms, roles, and rules. We find that characteristics of families that have a definable, internal coherence to them are predictive of adolescent and young adult behaviors, both positively and negatively; characteristics of families that are diffuse and externally focused, in this sense, are less influential vis-à-vis health risk behaviors. More frequently than other family types, they may expose their offspring to *both* the positive and negative influences of the extrafamilial world.

Several cautions need to be kept in mind when considering these findings. First, unlike many studies, ours is a community-based sample. The severity and frequency of risk behaviors displayed by these participants are, by and large, lower than if participants had been recruited from clinical settings, thus reducing somewhat the generalizability of the findings.

Second, because this is a community-based sample in which risk behavior is heterogeneous, we used a composite score index of 11 behaviors rather than a score reflecting a single behavior, such as sexual risk taking, substance use, or violence. Although there is only minimal data to suggest that specific risk behaviors are linked with specific antecedent conditions, it could be the case that the composite index we used clouded more subtle variations that would have been apparent had our sample been sufficiently large and varied to permit separate analysis by type of risk behavior.

Third, our sample is primarily non-Hispanic White. Although 18% self-identified as Hispanic, and no ethnic differences among the primary study variables were found in preliminary analyses, we did not explore the influence of other ethnic settings.

Fourth, we did not include health risk behavior at adolescence in the model because such data were unavailable. However, several studies cited earlier, plus another by Millstein,

Petersen, and Nightengale (1993), suggested strong relationships between adolescent health risk behavior and measures of adolescent anxiety and depression, as reflected by our adolescent personal and emotional functioning variable. Therefore, we believe that the inclusion of adolescent health risk behavior in the model would not have significantly altered our findings.

This research indicates that family factors are significant predictors of young adult health risk behavior over time in a community-based sample, and that even when adolescent and young adult personal and emotional functioning are included in the model, the family variables continue to account for significant independent variance. Furthermore, the data suggest that no single predictive model operates well for all participants. Moving away from a single explanatory model to explain health risk behavior in all participants to a strategy that includes the possibility of multiple routes to the same outcome will enable us to make more accurate predictions and to gain a better understanding of the effects of specific setting, timing, age, gender, and ethnic influences that no single model can account for.

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