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Testing Alternative Explanations for the Associations Between Parenting and Adolescent Suicidal Problems

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Although studies have established associations between parenting characteristics and adolescent suicidality, the strength of the evidence for these links remains unclear, largely because of methodological limitations, including lack of accounting for possible child effects on parenting. This study addresses these issues by using autoregressive cross-lag models with data on 802 adolescents and their parents across 5 years. Observed parenting behaviors predicted change in adolescent suicidal problems across 1-year intervals even after controlling for adolescents' effects on parenting. Nurturant-involved parenting continued to demonstrate salutary effects after controlling for adolescent and parent internalizing psychopathology: over time, observed nurturant-involved parenting reduced the likelihood of adolescent suicidal problems. This study increases the empirical support implicating parenting behaviors in the developmental course of adolescent suicidality.

Suicide currently represents the third leading cause of death for those between 10 and 19 years of age in the United States (Centers for Disease Control & Prevention, 2011) and therefore has gained recognition as an important public health concern. The experience of suicidal ideation, plans, and attempts during adolescence predicts completed suicide (Suokas & Lönnqvist, 1991), as well as adult psychiatric disorders and diminished adult functioning in the realms of work, education, and social relationships (Fergusson, Horwood, Ridder, & Beautrais, 2005; Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006). Such suicidal episodes are also the most common precipitant to psychiatric hospitalization and signify tremendous suffering for the individual, as well as substantial costs for society in terms of medical care and lost productivity (Institute of Medicine, [IOM], 2002). For these reasons, experiences of suicidal thoughts and behaviors rightfully garner attention from researchers and practitioners who seek to reduce the occurrence of these problems.

The present study builds on a significant history of research and theory that views social integration and attachment processes as central to risk of suicidality (King & Apter, 1996; Shneidman, 2001). An important component of this work has involved studies of the quality of parent–child relationships. Several aspects of parenting have been shown to broadly influence the physical and emotional health of children and adolescents, including the affective quality of parenting (i.e., warmth and support vs. hostility and rejection); the level of engagement with the child (i.e., parental involvement and monitoring); and the consistency and appropriateness of disciplinary practices (i.e.,

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harshness, indulgence, and use of contingencies) (for reviews, see Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Repetti, Taylor, & Seeman, 2002). These aspects of parenting appear to influence suicidality risk, specifically. Studies with clinical (Hollis, 1996; Kienhorst, de Wilde, Diekstra, & Wolters, 1992), at-risk (Garber, Little, Hilsman, & Weaver, 1998), and normative community-based (Connor & Rueter, 2006) and population-based samples (Fergusson, Woodward, & Horwood, 2000; Kidd et al., 2006; McGee, Williams, & Nada-Raja, 2005) have demonstrated consistently that parenting qualities such as hostility, warmth, supportiveness, and involvement influence the likelihood of adolescents' suicidal thinking and behavior. However, certain alternative explanations for the parenting–suicidality association have not been ruled out adequately, largely because of questions of temporal ordering in much of the relevant literature, reliance on single-informant reports (usually adolescent reports) across multiple study constructs, and, especially, lack of accounting for the effect of offspring behavior on parenting behaviors. The present study overcomes many of these limitations by examining parenting behaviors and adolescent suicidal thoughts and behavior over time, using multiple informants to assess study constructs, and including possible child effects in a series of structural equation models. The following review considers these issues in greater detail.

ALTERNATIVE EXPLANATIONS FOR THE PARENTING–SUICIDALITY ASSOCIATIONS

An important alternative explanation for the parenting–suicidality link posits that it arises because adolescent psychopathology (including, suicidal behavior) elicits negative parenting behaviors (see Wagner, 1997). Although it has not yet been tested, this view represents a serious challenge to the findings reported to date that demonstrate an association between parenting and adolescent suicidal thoughts and behaviors. Theory and research around the concept of evocative gene-environment correlations (Plomin, DeFries, & Loehlin, 1977; Reiss & Neiderhiser, 2000) has argued and demonstrated that children can inherit certain behavioral or temperamental proclivities from their parents, which then, in turn, elicit behavior from the parents which can influence later child adjustment. Failing to account for this type of evocative and bidirectional process between child behavior and parents' behavior (see Collins et al., 2000) can yield inflated estimates of parenting effects (Plomin et al., 1977; Reiss & Neiderhiser, 2000).

Many studies have shown that child externalizing problems can disrupt parenting and elicit negativity from parents (Ge et al., 1996; Patterson, Dishion, & Bank, 1984). The effect of adolescent internalizing psychopathology on parenting behaviors remains understudied, but the emerging literature suggests that withdrawal, anxiety, and depression on the part of children also can negatively influence their parents' behavior toward them, decreasing parental warmth toward the child (e.g., Hipwell et al., 2008; Reitz, Dekovic, & Meijer, 2006). The specific effects of suicidal problems (suicidal thoughts or suicide attempts) on parenting behaviors have not been systematically studied, and pertinent literature has argued for both the potentially disruptive, negative influence of adolescent suicidal episodes on parenting and the care- and comfort-inducing effects of such problems on parenting (Wagner, Aiken, Mullaley, & Tobin, 2000).

In addition to the lack of research on child effects, in their recent review of the literature on psychosocial and psychiatric family factors in adolescent suicide Wagner, Silverman, and Martin (2003) argue that one of the most important deficits in the research to date centers on the issue of temporal order of putative causes and effects. To increase confidence that parenting behaviors actually lead to adolescent suicidality, one must of course be careful of the temporal ordering of the parenting and adolescent outcomes, in addition to controlling for possible confounds (see Shadish, Cook, & Campbell, 2002). In light of this challenge, it is important to assess *relative changes* in suicidality over time—preferably, including information from across more than two measurement occasions —as a function of relevant predictors such as the quality of parenting. The present study therefore evaluates relative change in adolescent suicidal problems over 5 years assessed across three measurement waves.

Another methodological consideration involves how parenting is assessed. Adolescents' reports on their parents are by far the most common method of measuring parenting behaviors in studies of suicidality (Wagner et al., 2003). However, relying on the reports of adolescents who may be suffering from depression to evaluate the presence of nurturant-involved parenting in their lives could provide inaccurate estimates of parenting effects. Studies have indicated that depressed mood can bias reports of positive events and characteristics, in

particular (Brewin, Andrews, & Gotlib, 1993). Therefore, adolescents who are unhappy with their lives may see the behavior of their parents in an especially negative light (failing to register or report the positive aspects of their parents' behavior), thus increasing the association between the adolescents' negative emotions and their parents' behaviors. Using parents' reports of their own behavior falls prey to the same problem—depressed parents could potentially under-report their involvement and support, for example. Tests of parenting effects ideally should use other- or multiple-reporter parenting measures to avoid possible method variance biases. We address this methodological issue in the present study using trained observer ratings of parenting behavior during structured interaction tasks recorded in the homes of study participants.

Finally, a number of studies document robust associations between parental psychopathology and adolescent suicidality (Agerbo, Nordentoft, & Mortensen, 2002; Fergusson et al., 2000; Garber et al., 1998; Gould, Shaffer, Fisher, & Garfinkel, 1998), as well as a clustering of suicide and suicide-related problems within families (Brent, Bridge, Johnson, & Connolly, 1996; Brent et al., 1994). These findings suggest that parental psychopathology, rather than parenting behavior, may account for suicidal risk among children and adolescents. That is, parents with psychiatric problems may both demonstrate poor parenting and pass on risk of psychopathology to their children. A problem, however, is that earlier studies have generally assessed only parental psychopathology, not parenting behavior. And although studies investigating the effects of parenting on suicidality routinely control for adolescent psychopathology, either statistically or via control samples, far fewer have controlled for parental psychopathology. The emerging findings from the studies which have controlled for both parental and adolescent psychopathology (Fergusson & Lynskey, 1995; Fergusson et al., 2000; Garber et al., 1998; Johnson et al., 2002) suggest that parenting behavior still influences suicidality beyond the effects of parental mental health history. This conclusion is based on only a small number of studies, however, and needs further replication through additional research, as in the present investigation.

THE PRESENT STUDY

In the present study, we draw from longitudinal data involving 802 adolescents and their parents to evaluate the bidirectional associations between parenting and suicidal problems over 5 years and to test alternative explanations for these associations. An earlier study by Connor and Rueter (2006) used some of the same data to investigate whether mothers' and fathers' observed parenting behavior toward their adolescent would predict adolescents' suicidal thinking and behavior. The research questions in that study focused on this unidirectional association and did not investigate relative change in suicidal problems as a result of parenting; the study also did not control for various possible confounds of the putative influence of parenting. In the present study, we will extend the investigation of the link between parenting and suicidal problems in several major ways: First, we investigate the associations of interest as a bidirectional process across three time points. Second, we assess whether observed parenting predicts the likelihood of adolescent suicidal problems even after controlling for prior suicidal problems. Finally, we test alternative explanations for any parenting–suicidality link across years by introducing controls for the potential confounds discussed in the above sections. We focus on internalizing psychopathology in these analyses because of the particularly high risk of suicidal thinking and behavior that is associated with mood and anxiety disorders (see for example Kessler, Borges, & Walters, 1999).

We expected observed parenting to predict the likelihood of adolescent suicidal episodes at the first wave of assessment and to predict relative changes in reported episodes in subsequent waves, beyond the influence of prior suicidal episodes, with more positive parenting at one wave predicting lower likelihood of subsequent suicidal problems. Based on the little that is known regarding effects of adolescents' suicidal problems on their parents' behavior (King, Hovey, Brand, Wilson, & Ghaziuddin, 1997; Wagner et al., 2000), we expected that adolescents' experience of suicidal problems could influence parenting negatively across time. We hypothesized that parental history of internalizing problems and suicidal episodes would be positively related to adolescent suicidal problems, and we also expected adolescents' own psychopathology symptoms to predict their risk of suicidal episodes at each wave. We further expected that the adolescent internalizing problems would be negatively related to parenting quality at each wave. Finally, we expected that parenting effects on suicidal problems would remain even after introducing the control variables.

METHOD

Sample and Design

The present sample draws from target adolescents and close-aged siblings and their parents who constitute the Iowa Youth and Families Project (IYFP). The IYFP is a study of 451 rural, two-parent biological families, which began in 1989 (with yearly interviews from 1989 to 1992 and one additional interview in 1994). Note that in 1990, about 82% of U.S. family households among Whites (77% across all racial groups) were two-parent families with their own children living in the home (U.S. Census Bureau, 2012). Over 90% of the participants remained in the study from its inception to the 1994 assessment. More detailed information regarding the study can be found in Conger and Conger (2002).

The IYFP focused on families living in rural Iowa, and because almost no racial-ethnic minorities lived in rural Iowa at the inception of the project, the sample's racial-ethnic composition was limited to families of European descent. At study initiation, 54% of the families lived in a town of no more than 6,500 people, 34% lived on farms, and 12% lived in a rural area but not a farm. The parents had been in their marriages for an average of 18 years. Median family income in 1988 was $33,399, with an average family size of 4.95 in 1989.

For this study, we used all available information from the 407 of 451 families for whom we had complete information on the parents' covariates (age, education, history of anxiety or depression problems, and history of suicidal ideation, plans, or attempts). Of the 814 eligible adolescents from these families, all but 12 participated in the study for at least one of the relevant waves of data collection. Our final sample therefore included 407 mother–father pairs and 802 adolescents. The mean age of the parent pairs at the first wave of data used was 39.8 years (range: 31.5–56 years), and their mean education level at study onset was 13.4, or about 1 year of college (range: 10th grade—doctorate or professional degree). Mean age of the adolescents for the first wave of data used in this investigation was 15.3 years (range: 11–19). Data from the adolescents were included through age 19; as adolescents entered emerging adulthood and left home, we no longer included their data, given our focus on the effects of parenting. Forty-eight percent of the adolescents were boys.

Procedure

The IYFP target adolescents were recruited in 1989 via seventh-grade classes of 34 public and private schools in eight counties in central Iowa; the initial focus of this longitudinal study was to understand the impact of economic strain (the "farm crisis") on adolescent well-being. Families were eligible for the study if the target seventh-grader had a sibling within 4 years of his or her age, and she or he was living with both biological parents. Approximately 78% of eligible families agreed to participate in the first wave of data collection in 1989. Families completed two interviews (scheduled within 2 weeks of each other) with a trained interviewer during each year of data collection; each interview lasted for about 2 hr, and each participating family member was paid about $10 per hour for his or her time. During the first visit, each family member answered a set of questionnaires regarding demographics, own and family members' mental and physical health, and marital, family, and peer relationships. During the second interview, family members participated in four videotaped, structured tasks; interviewers left the room after setting up the video-recording equipment.

This study uses the data from family interaction and problem-solving tasks (Tasks 1 and 2) to assess parenting behaviors. These interaction tasks were repeated across five waves of data collection, in 1989, 1990, 1991, 1992, and 1994. Trained observational raters coded all the videotaped interaction tasks using the Iowa Family Interaction Rating Scales (Melby et al., 1989–1993). Observational raters completed 200 hr of training (20 hr per week for 10 weeks) and had to pass extensive written and viewing tests before rating videotapes.

The present study utilized suicide-related questionnaire data from the three waves (1991, 1992, and 1994) for which detailed information about adolescents' suicidal episodes was assessed. We also used observed parenting data from 1990 to 1992, questionnaire data on adolescent internalizing psychopathology from 1990 to 1994, and questionnaire data from parents on their internalizing problems and suicidal episodes from 1989 and 1991. Thirty-one IYFP families experienced parental separation or divorce sometime during the years of the study; given that this study focuses on processes in intact, two-parent families and the combined effects of mothers' and fathers' parenting behaviors on adolescent suicidal problems, data collected from families after the parents' separation or divorce were not included.

Measures

Demographics. We used adolescent sex and age as reported by mothers at study initiation, and the average of the mother–father pairs' age and education (in years of school completed) as reported by mothers and fathers at study onset.

Parent history of suicidal episodes. In 1991, parents responded to a series of questions adapted from the Youth Risk Behavior Survey (see Brener et al., 2004) that assessed their history of suicidal episodes. The series was framed by the statement, "Sometimes people become so unhappy with their lives that they consider suicide." A history of ideation was then probed via the question, "Have you ever seriously thought about committing suicide?"; a history of suicide plans was asked as, "Have you ever made a plan to commit suicide?"; and attempts as, "Have you ever attempted suicide?" The response category for each question ranged from 0 (*never*) to 3 (*three or more times*). To control for parental history of suicidal episodes in our analyses, we created a dichotomous variable with 0 meaning that neither parent reported any prior suicidality and 1 meaning at least one parent reported some kind of past suicidal episode.

Parent history of internalizing psychopathology. Parents' history of internalizing psychopathology was assessed at study onset (1989) by using the yes or no screening questions for depression and anxiety from the Diagnostic and Statistical Manual III-R: "Have you ever had a time in your life lasting two continuous weeks or more when you felt sad, blue, or depressed or when you lost all interest and pleasure in things you usually cared about or enjoyed?" and "Have you ever had a time in your life lasting 6 months or more when most of the time you felt worried, anxious, or afraid that something bad was going to happen to you or someone you cared about?" We created a dichotomous control variable to signify either no parental history of either probable depression or anxiety or at least one parent with a history of possible anxiety or depression.

Parenting. We followed the procedure outlined by Conger, Cui, Bryant, and Elder (2000) to create a latent measure that includes the related affective, monitoring and involvement, and disciplinary quality of parenting behavior (described as *nurturant-involved* vs. *harsh-uninvolved* parenting). Based on the high correspondence in parenting behavior between spouses (*r*s ranged from .55 to .80) and because spouses influence each other's parenting across time (Schofield et al., 2009), we used the average score of each couples' parenting at each wave. The first indicator for the nurturant-involved parenting construct was an average score of observer ratings of high warmth and support and low hostility and coercion from the parents to each of their adolescents. The high warmth and support items were drawn from Task 1, which was designed, in part, to give opportunity for expressions of positive sentiments toward each other. The five observer ratings for this part of the scale are positive communication, positive assertiveness, prosocial behavior, warmth-support, and listener responsiveness (higher scores indicate higher warmth-support). The low hostility and coercion (reverse scored) observer ratings come from Task 2, which was designed to elicit conflict and anger among family members. The score is the average of ratings for hostility, antisocial behavior toward the child, and angry coercion, with a higher score indicating lower hostility. The sum of these two scores (warmth-support and hostility-coercion) demonstrated high internal reliabilities, so it appears justified to use them as a measure of the same dimension. As mentioned above, we focus on combined assessment of mothers' and fathers' parenting behaviors, so we used the average of fathers' and mothers' scores on these eight items to serve as the indicator for positive affective quality of parent behavior (α for this indicator ranged from .870 to .878 across waves).

The second indicator tapped level of engagement with and monitoring of each adolescent from observer ratings of parental monitoring, positive reinforcement, parental influence, use of inductive reasoning, and quality time with the child during Task 1. The average of mother's and fathers' scores across these items served as the indicator (α ranged from .854 to .872). The third indicator assessed discipline style and included ratings of consistent discipline, encouragement of child independence, and reverse-scored harsh discipline and permissive-indulgent discipline (α for this indicator ranged from .705 to .827).

Adolescent suicidal episodes. Suicidal ideation, plans, and attempts during the past year were assessed for the adolescents using the same series of questions taken from the Youth Risk Behavior Survey (see Brener et al., 2004) as described above for the parents (but within the last 12 months rather than "ever"). These items were assessed in

1991, 1992, and 1994. For our analyses, we created an ordered, four-category variable for each year assessing the most serious type of suicidal episode reported. The categories therefore were no suicidality (0), ideation only (1), plan(s) but no attempt(s) (2), and attempt(s) (3). By operationalizing suicidal problems in this way, we are implicitly assuming that these categories of behaviors represent increasing levels of severity on a unidimensional continuum of suicidality, but do not impose any metric of severity.

Adolescent internalizing psychopathology. Internalizing psychopathology of the adolescents was assessed via a symptom count of all the items from the depression and anxiety subscales of the Symptom Checklist-90—Revised (SCL-90-R), which has demonstrated reliability and validity with both adolescents and adults (Derogatis & Melisaratos, 1983). The depression subscale asks how much participants were "distressed or bothered" during the past week by each of 10 items (such as crying easily, feelings of worthlessness, feeling no interest in things; an 11th item, on suicidal ideation, was omitted to avoid overlap with the outcome variables, and one other item on *loss of interest in sex* was omitted because it was not age-appropriate for young adolescents). The anxiety subscale asks 10 questions, including items such as "spells of terror or panic, feeling fearful, nervousness or shakiness inside." Items from both subscales were dichotomized and then summed (α ranged from .909 to .915 across waves). Because this sum score tapped symptoms in the past week, whereas our suicidality measure covered the past year, we lagged the internalizing measure by a year when controlling for adolescent internalizing problems.

Analyses

To test our hypotheses, we ran a set of autoregressive models. Our base model investigated the reciprocal associations between parenting behaviors and adolescent suicidal episodes across three waves, controlling for adolescent age, parent age, and parent education. We then conducted an overall model difference test between this base model and our full model, which added parental history of internalizing and suicidal problems, and adolescent internalizing symptoms, before investigating patterns of statistical significance among those individual associations. We modeled our data as a multiple-group comparison using adolescent sex as the grouping variable. We specified age (centered at 16) effects on suicidal outcomes as both linear and quadratic and allowed those effects to vary by sex, based on the findings of Boeninger, Masyn, Feldman, and Conger (2010).

We ran all analyses using the Mplus program (Muthén & Muthén, 1998–2007). Our primary outcome variable of interest, adolescent suicidal episodes, was ordinal, so we ran probit-based ordinal autoregressive models using a robust weighted least squares estimator (WLSMV) with theta parameterization. Ordinal regression provides the greatest statistical power for analyzing low base-rate data (relative to multinomial regression, for example); it also makes no assumptions regarding the distribution of the data (i.e., skewness is irrelevant for ordinal regression, although inadequate cell sizes may pose challenges; Agresti, 2007). We also employed a sandwich estimator to correct for the nonindependence of data between siblings clustered within families (see Muthén & Satorra, 1995). We were able to impose constraints on the latent parenting measures corresponding to strong factorial invariance (see Widaman & Reise, 1997) across groups (boys and girls) and waves to ensure a parenting construct consistent in measurement and meaning across time and group without compromising the resultant model fit. We held all thresholds of the outcome variables equal across boys and girls and across time. Finally, ordinal regression models assume parallel regression, or proportionality of covariate effects (Agresti, 2007). This is an especially important assumption to test for in our study, given questions about whether the risk of suicidal ideation and the risk of suicidal behavior (attempts) may have differential relationships with predictors (see for example Gould et al., 1998). We tested the parallel regression assumption and found it to be consistent with the data; placing ideation, plans, and attempts on a continuum of severity (via an ordinal regression approach) therefore appears justified in this case.

RESULTS

Table 1 shows the appropriate descriptive statistics by group (boys and girls) for all the psychopathology variables included in our models. As expected, suicide plans and attempts were rare, with less than 7% of the sample reporting plans and less than 6% of the sample reporting attempts at any wave; girls reported more suicidal problems of all types than boys did at all three waves.

TABLE 1
Descriptives for Parental and Adolescent Psychopathology Variables

	1990		1991		1992		1994	
Frequencies	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
No suicidality (YRB items)			84.8%	75.1%	84.7%	77.3%	81.8%	82.4%
Ideation only			8.6%	13.1%	8.2%	12.3%	9.5%	10.4%
Plan(s) no attempt(s)			5.8%	6.8%	4.9%	6.0%	6.3%	4.6%
Attempt(s)			0.8%	5.1%	2.2%	4.3%	2.3%	2.5%
No parent history of internalizing (diagnostic screening items)	33.9%	33.9%						
At least one parent w/history of internalizing	66.1%	66.1%						
No parent history of suicidal episode(s) (modified YRB items)	52.9%	59.6%						
At least one parent w/suicidal episode(s)	47.1%	40.4%						
Means								
Parental warmth, monitoring, discipline (observational coding; 0–1)	0.60, 0.56, 0.68	0.61, 0.54, 0.67	0.55, 0.55, 0.65	0.55, 0.52, 0.64	0.56, 0.50, 0.63	0.56, 0.49, 0.62		
Adolescent internalizing (SCL-90; 0–20)	5.4	6.7	5.6	6.9	4.7	7.0		

Note. Observed frequencies and means.

Autoregressive Models of Parenting and Adolescent Suicidal Problems

Base model. The cross-lagged autoregressive model investigating the interplay of parenting behaviors and adolescent suicidal thinking and behavior across a 5-year span provided a good fit to the data: $\chi^2(53) = 86.603$, $p < .01$; *CFI* = .96; *TLI* = .96; *RMSEA* = .04. These results suggest that a first-order autoregressive process is adequate to describe these relationships. Figure 1 illustrates our primary findings. As expected, parenting behaviors were highly stable from year to year (e.g., the standardized stability coefficient for both boys and girls was .76 from 1990 to 1991). Likewise, there was a strong positive association between suicidal episodes from 1 year to subsequent years, even across the 2-year period from 1992 to 1994. Consistent with our hypotheses, the quality of parenting in 1990 and 1991 predicted the likelihood of experiencing suicidal episodes in 1991 and 1992, even after accounting for the level of suicidal problems in 1991 when predicting suicidal problems in 1992. Parenting quality did not predict suicidal episodes in 1994. Nonetheless, parenting behaviors predicted both the likelihood of suicidal episodes in 1991 and *relative change* in the experience of suicidal episodes in 1992. We tested moderating effects of adolescent age on influence of parenting to assess whether parenting had differential effects based on age of the adolescent and found no such evidence (i.e., tests were nonsignificant). To test moderating effects by adolescent sex, we constrained sets of regression paths equal and compared the constrained models (via overall robust model difference tests) to the unconstrained model. These tests did not reveal any interactions with adolescent sex for any process; the association between parenting and suicidal problems (and those from suicidal problems to parenting) thus appeared the same between adolescent boys and girls. Note that in the absence of child effects on parenting, we found that we could constrain the cross-lagged paths from parenting to suicidal episodes equal for the 1-year lags (i.e., all model difference tests were nonsignificant); this improved model parsimony and statistical power. Also important, we found no evidence that adolescent suicidal episodes predicted later parenting behavior.

The R^2 for the suicidal outcomes can be interpreted as the proportion in the underlying latent response variable explained by the predictors in this base model. For suicidal problems at the first wave, the R^2 was .17 for the girls and .05 for boys; at the second wave, the R^2 was .50 for the girls and

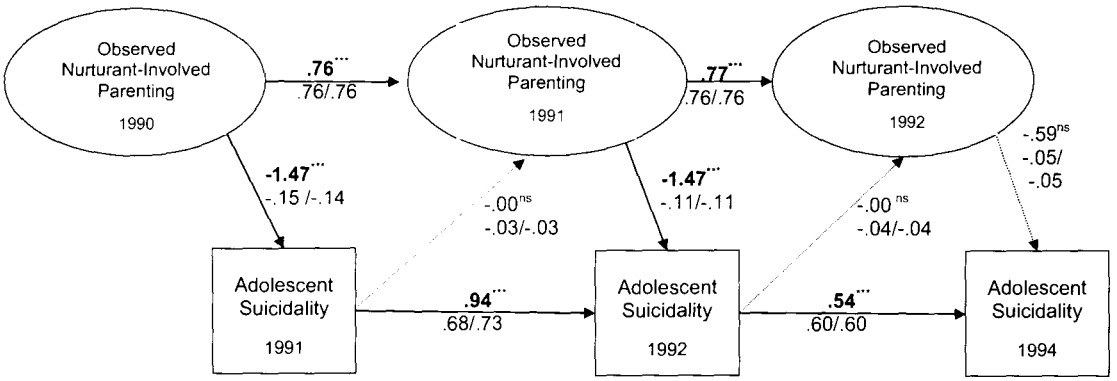

FIGURE 1 Observed parenting and adolescent suicidality (multiple-group by sex).
Note. Unstandardized coefficients above, standardized below (boys/girls). Analyses controlled for parent education and parent and adolescent age. N = 802 adolescents and 407 parent pairs.
$^{ns}p > .05$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p \leq .001$.

.49 for the boys; and at the third wave, it was .39 for the girls and .39 for the boys.

Extended model. Table 1 lists the descriptive statistics for the parent and adolescent psychopathology variables that we added to our base model to further test the question of whether the associations we found between parenting behaviors and adolescent suicidal problems were spurious. Girls reported somewhat more internalizing symptoms than did boys, but average levels were low for both, as expected for this community sample. About two-thirds of the parent pairs reported a history of probable depression or anxiety for at least one of the parents, and over 40% of the parent pairs reported a history of some kind of suicidal episode for at least one of the parents.

The overall model difference test between the base cross-lagged autoregressive model and the full model incorporating parental and adolescent psychopathology was significant ($\chi^2(8) = 249.43$, $p < .000$), indicating strong support for the addition of the psychopathology variables. Figure 2 details our primary findings for our final model, which

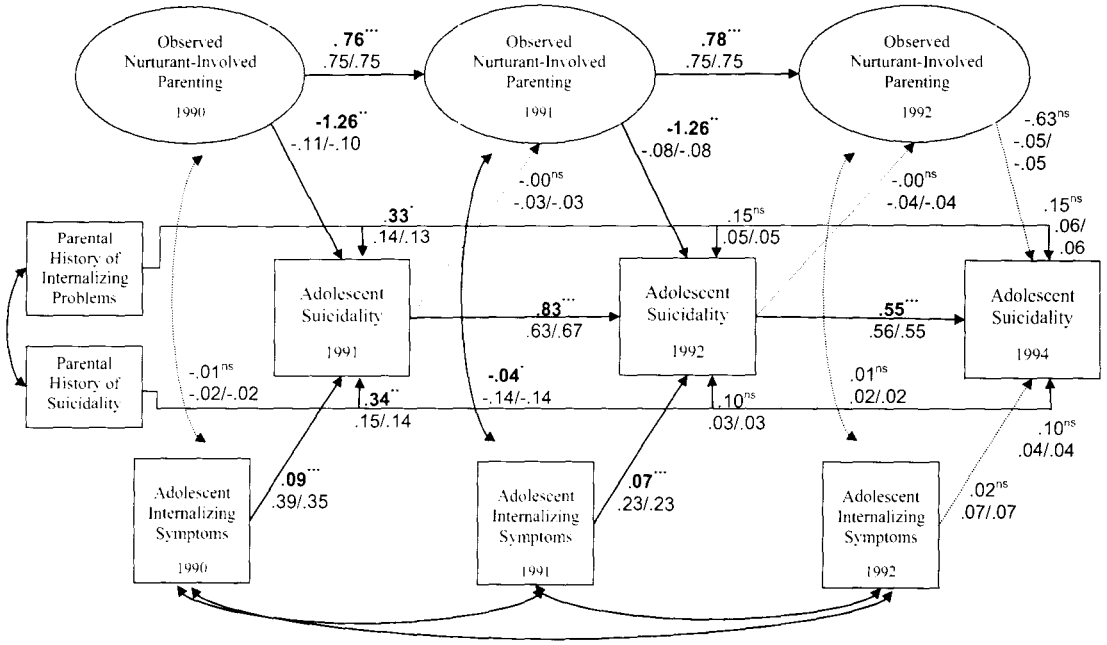

FIGURE 2 Extended model controlling for parent and adolescent psychopathology (multiple-group by adolescent sex).
Note. Unstandardized coefficients above, standardized below (boys/girls). Analyses controlled for parent education and parent and adolescent age. N = 802 adolescents and 407 parent pairs.
$^{ns}p > .05$; $^{*}p < .05$; $^{**}p \leq .01$; $^{***}p \leq .001$.

also provided an acceptable fit to the data: $\chi^2(89) = 138.619$, $p < .001$; $CFI = .96$; $TLI = .96$; $RMSEA = .04$. All the constraints across time and adolescent sex from our base model were re-tested to verify whether the addition of the covariates changed any of those relationships. Although the magnitude of the parenting effects was somewhat reduced, we found we could constrain our base model parameters in the same way for our full model, including holding the 1-year lags from parenting to suicidal episodes equal. (Note that in a post hoc analysis, we did run this final model separately for mothers and fathers, to ensure that the findings did not differ from each other in any notable way; both models had the same pattern of effects.) Parental history of internalizing problems (unstandardized coefficient = .331) and of suicidal episodes (unstandardized coefficient = .336) predicted adolescent thinking and behavior at the first wave, as expected, and could be held equal for boys and girls. Parental mental health history did not predict changes in adolescent suicidal problems, however. Adolescents' own internalizing symptoms in a given year predicted their suicidal problems in the year following. However, their self-reported symptomology did not predict suicidal episodes across 2 years (1992–1994). All these parameters appeared equal across boys and girls, as well. Contrary to our expectations, we found virtually no relationship between concurrent self-reported adolescent internalizing problems and the quality of observed parenting behaviors. We could constrain those covariances equal across adolescent sex, but not time (i.e., model difference tests were nonsignificant when constraining paths equal across sex, but significant for those across time).

The R^2 values for the suicidal outcomes are notably higher at the first wave and modestly higher at the second wave for this extended model compared to the base model. For suicidal problems at the first wave, the R^2 was .32 for the girls and .24 for boys; at the second wave, it was .56 for the girls and .56 for the boys; and at the third wave, it was .38 for the girls and .38 for the boys. For the parameters of greatest interest to this study regarding the influence of parenting behaviors on risk of adolescents' suicidal problems, final calculations of effects in terms of probabilities (i.e., translating the probits into probabilities) reveal that for each standard deviation increase in nurturant-involved parenting, likelihood of ideation is decreased by between 1.1 and 1.2 times. For each increase in positive parenting, the probability of having planned suicide is between 1.2 and 1.3 times less likely than having ideation or no suicidal thoughts, and the risk of having attempted suicide is between 1.3 and 1.4 times less likely than having planned, ideated, or having no suicidal thoughts.

DISCUSSION

This study tested the two primary alternative explanations for associations between parenting behaviors and adolescent suicidal problems: that (1) adolescents' problematic nature or psychopathology drives both their parents' behavior and their own suicidal thinking and behavior; and (2) parents' role is confined to the direct, presumed genetic, transmission of psychopathology or suicidality (i.e., parenting behavior itself is epiphenomenal). To investigate these competing claims thoroughly, the present study used data from 802 adolescents aged 11–19 and their parents across several waves of assessment to address the methodological issues of temporal ordering of putative causes and effects, observer-reported (rather than adolescent-reported) parenting behaviors, and statistical consideration of child effects on parenting.

We first used an autoregressive cross-lag model to predict adolescent suicidal problems while controlling for the potential effects of those problems on quality of parenting and on likelihood of future suicidal problems. As hypothesized, we found that observed parenting behaviors in 1990 predicted the level of adolescent suicidal thinking and behavior in 1991. Parenting in 1991 also predicted change in suicidal episodes between 1991 and 1992, even after considering prior suicidal problems and their possible effects on parenting. This is an important addition to the initial investigation by Connor and Rueter (2006) of whether parenting would predict subsequent suicidal problems (without assessing change in these problems, or bidirectional effects) and represents an important addition to the literature more generally, as far less is known regarding the influence of parenting on likelihood of suicidal problems when considering prior such problems. Future research could explore possible interaction effects between suicidal problems and subsequent parenting, to determine whether those adolescents with prior suicidal episodes become more sensitive to the nature of the parenting they experience.

We found that parenting in 1992 did not predict suicidal problems in 1994. The differential effect of parenting behaviors across the 1- versus 2-year lags may reflect the critical role of proximal factors, especially in the interpersonal domain, in eliciting

suicidal crises—as documented and described by researchers from across the subdisciplines of suicidology (Baechler, 2001; Rudd, 2000; Shneidman, 2001). On the other hand, it may be that, while lack of nurturant-involved parenting or the presence of hostile and harsh parenting creates vulnerability to developing suicidal feelings or behavior, at some point in the development of suicidal behavior, as described by Rudd (2000), the suicidal response to stress and psychic pain may become so ingrained and the threshold for experiencing suicidal episodes becomes so low that the experience of prior suicidal episodes eclipses other risk factors. Another possibility is that parenting behaviors of the types studied here simply have a diminishing influencing on the thoughts, behaviors, and emotions of adolescents as they approach adulthood. By 1994, many of these adolescents were seniors in high school and some had even completed high school. Note, however, that we did not find evidence for age effects consistent with this notion: no moderating effects of age on parental influence surfaced in our analyses. Clearly, further research is required to disentangle these different possible explanations for the null finding from 1992 to 1994.

Importantly, we found no effect of suicidal episodes of the adolescents on subsequent parenting quality at either wave tested. As reviewed above, child effects are regularly investigated in relation to other forms of psychopathology, but have not been explored for their possible role in suicidality. Although we did not find any compelling evidence for child effects in these processes, we must note that parents generally do not know about their adolescents' suicidal episodes, especially if they involve only ideation (Breton, Tousignant, Bergeron, & Berthiaume, 2002). Therefore, a stronger test of child effects would likely involve using parent-reported suicidal episodes of their adolescents, or even perhaps parents' reports of their adolescents having a difficult temperament or being "difficult" to raise. Further, we investigated these processes specifically including internalizing problems as controls. Externalizing problems also clearly increase the likelihood of suicidal thinking and behavior (Kessler et al., 1999), and externalizing psychopathology often elicits more negativity from parents (Patterson et al., 1984). Hopefully, future studies will explore these factors more, to guide effective intervention with these families.

We continued evaluating the competing explanations for the parenting effects by bringing into our analyses the history of parental internalizing psychopathology and suicidal episodes. We also modeled the effects of the adolescents' own reported internalizing psychopathology on their suicidal thinking and behavior, lagged by a year. Parental history of both internalizing and suicidal problems increased the likelihood of adolescent suicidal episodes at the first wave, apart from effects of parenting behaviors and adolescent internalizing psychopathology, highlighting the importance of parental mental health history in conveying vulnerability to their children. Interestingly, however, these risk factors (unlike parenting behaviors) did not predict change in the adolescents' suicidal problems. Adolescents' own internalizing psychopathology predicted likelihood of suicidal episodes in each of the years following reported internalizing problems, but internalizing problems in 1992 did not predict suicidal episodes in 1994. As with the same pattern for parenting effects, this difference in effects between 1- and 2-year lags may reflect the importance of more proximal adverse experiences and circumstances in the occurrence of suicidality.

Our primary question for these analyses, however, centered on whether the association between parenting and suicidal problems would remain after accounting for the psychopathology variables. We found that the same paths from parenting behaviors to suicidal thinking and behavior were significant in our final model as in our base model, and these parenting paths were only modestly reduced after controlling for child effects on parenting, adolescent psychopathology, and parental history of internalizing and suicidal problems. These findings indicate that nurturant-involved parenting reduces the likelihood of adolescent suicidal thinking and behavior across time, even after considering adolescents' prior suicidal problems, their internalizing psychopathology, and their parents' history of psychopathology and suicidal episodes. Neither parental transmission of suicidality risk, nor child effects on parenting behaviors appear to explain away the parenting–suicidality association. Moreover, using the same reporter for different measures, such as adolescent reports of both internalizing symptoms and suicidality, typically increases the magnitude of the association between the measures simply because of the common method employed. It is quite telling that parenting behaviors measured by outside observers remained predictive of suicidal problems even though it did not have this common method influence in generating the association. Specifically, estimated effects of parenting suggested that each standard deviation increase in nurturant-involved

parenting corresponded to a 10–20% lower relative likelihood of reporting ideation, 20–30% lower likelihood of reporting suicide plans, and between 30% and 40% lower relative likelihood of reporting suicide attempts.

To our knowledge, this is the first study to use repeated measures of parenting behaviors and adolescent suicidal thinking and behavior to explore the dynamics between nurturant-involved parenting and adolescent suicidal episodes across years. It appears this is also the first study of the association between parenting and adolescent suicidality that accounts for possible child effects on parenting behaviors. Nonetheless, a few methodological limitations of this study must be noted. First, this is a rural sample of European-American families during the early 1990s. The weight of influence from parental psychopathology and suicidality may vary across racial-ethnic groups, because the expression of, stigma around, and attitudes toward mental illness and suicide vary across cultures, including rural and urban settings (for review, see IOM, 2002). Further investigation of these family processes across diverse samples could reveal important sources of risk and protective factors that may vary by group or setting. The precise expression or form of support, monitoring, and discipline that constitutes nurturant-involved parenting likely differs across cultural groups and across historical time. However, although one's coding scheme should fit one's sample and therefore might differ across studies, one can still delineate the behavior of parents, whether in the 1990s or 2010s, in rural Iowa or in New York city, in terms of affective quality, nature of discipline, and level of engagement. All the data we have at this point across disciplines (including experimental data) consistently support the importance of these broad dimensions of parenting for the well-being of offspring (Baptiste et al., 2006; Boyle et al., 2010; Lacourse et al., 2002; Wolchik et al., 2002).

This study focused solely on intact, two-parent families. Evidence is mounting that adolescents in divorced families are at greater risk of suicide-related problems than those in intact two-parent families (Wagner et al., 2003), so understanding risk and resilience processes in these families is very important. The sample size of the present study does present a significant methodological challenge in light of the very low base rate of suicide plans and attempts, in particular. Our 802 adolescents comprised sibling pairs nested within the same family, so we had lower statistical power relative to having a sample of 802 independent observations. Our potential lack of statistical power is particularly relevant to our finding of no gender differences in the processes studied. Future research should explore possible gender differences in these processes.

Finally, our study treated the outcome variable in a relatively unique fashion by considering suicide ideation, plans, and attempts as forms of the same underlying kind of psychopathology, differing in terms of severity, and therefore modeled via ordinal regression rather than multinomial regression. Researchers and theorists disagree about whether thinking about or planning suicide and attempting suicide should be considered as falling along a spectrum of the same kind of pathology. A recent theoretical paper argued, for example, that the desire to engage in suicidal behavior should be viewed as separate (in kind and etiology) from the capacity to actually engage in such behavior (van Orden et al., 2010). Conceptually, we see no compelling evidence from the clinical and phenomenological literature on suicidality to consider different forms of suicidal episodes as fundamentally distinct types of psychopathology (see for example the selections and essays in Shneidman's 2001 book, *Comprehending Suicide*). Our empirical test of this conceptual assumption, described in the analyses section, was consistent with the data, thereby supporting the view that suicidal thinking and behavior can be described as falling on a spectrum of suicide-related problems.

In conclusion, the present study addressed critical questions regarding the nature of the link between parenting and adolescent suicidal thinking and behavior and found, on each count, evidence in support of the argument that parenting behavior plays a role in adolescent suicidality risk. This study was the first to investigate child effects as a possible alternative explanation for the association between parenting and adolescent suicidal problems, and did not find support for this argument. Our findings that observed nurturant-involved parenting reduces the likelihood of adolescent suicidal episodes even after accounting for parent and adolescent internalizing psychopathology and prior suicidal problems join the mounting evidence rejecting the notion that parents' contribution to adolescent suicidality risk can be explained by the direct, presumed genetic, transmission of psychopathology.

We hope our findings supporting the importance of positive parenting in reducing adolescents' vulnerability to suicidal problems will highlight parenting-based preventive interventions as possible

means of building resilience to suicidal thoughts and behaviors. More so, we hope that suicide prevention efforts will act on the increasing evidence that nurturant-involved parenting protects adolescents from experiencing suicidal episodes. Finally, we believe that incorporating a developmental perspective into treatment and prevention approaches to adolescent suicidality by strengthening parents' ability to become or to remain nurturant and involved with their adolescent may create notable reductions in youth suicidality.

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