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Intergenerational Transmission of Externalizing Behavior

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Abstract

This prospective longitudinal investigation examined the predictors of generation 2 (G2) parental substance use as related to their generation 3 (G3) offspring's externalizing behavior. The sample comprised 281 mother- or father- child (G2/G3) pairs. The results indicated that the G1/G2 (generations 1 and 2) parent-child relationship during G2's adolescence predicted externalizing behavior in the G2 young adults which correlated with G2 parental substance use. G2 parental substance use was related to subsequent G2 substance use disorders (SUDS), and to the G2/G3 parent-child relationship. The G2/G3 parent-child relationship and G2's SUDS each predicted G3 externalizing behavior. The results highlight the significance of breaking the chain of transmission of externalizing behavior across generations. Implications for policy and programs addressing the etiology of externalizing behavior in the offspring are discussed within a developmental framework.

Keywords

Child externalizing behavior; Longitudinal three-generation study; Structural equation model; Substance use and abuse; Family relationships

Introduction

The significance of parental substance use in their offspring's externalizing behavior has given rise to a body of research focused on identifying the consequences of parental substance use for their offspring. Parental substance use has been found to be related to the parent-child relationship (Brook, Balka, Fei, & Whiteman, 2006a) and to their offspring's externalizing behavior (Marmorstein, Iacono, & McGue, 2009). Few studies have examined how associations of parental substance use and externalizing behavior play out in the context of earlier family relations. Few studies have assessed the role of a distant parent-child relationship in adolescence in relation to: a) later externalizing behavior in their offspring in emerging adulthood, and b) to substance use in their late twenties and early thirties. Research designed to examine the link between parental substance use disorders (SUDS), parent-early adolescent relations, and the third generation's externalizing behavior is greatly

needed. Studies of these associations will enhance prevention and treatment efforts targeting early adolescent externalizing behavior.

Family Interactional Theory (FIT), developed by Judith Brook and her colleagues, outlines a developmental approach to the relationship of parenting to externalizing behavior and drug use (Brook, Brook, Gordon, Whiteman, & Cohen, 1990). FIT maintains that several psychosocial domains both directly and indirectly are associated with externalizing behavior, including the child's relationship with the parent, the parents' and adolescents' personality, association with peers, and contextual factors such as neighborhood and cultural influences. FIT maintains that the parent-child relationship is relatively stable over the course of development. From early in the child's life, the personalities and behavior of the parent and child directly and indirectly influence the quality of the relationship between the parent and the child (Brook, Brook, Balka, & Rosenberg, 2006b). Optimally, parents reinforce conventional societal norms and have a close and supportive marital relationship and create a conflict-free environment for the child. The child then identifies with parental norms and behaviors and internalizes norms leading to less externalizing behavior. In contrast, when parents do not model conventionality, do not have a positive marital relationship, and/or create a conflictual environment for their children, the children are more likely to exhibit externalizing behavior (Brook et al., 2006b).

FIT also hypothesizes that adolescence and emerging adulthood are developmental periods during which a person may try out different roles (Brook et al., 1990). A parent-adolescent relationship characterized by a lack of warmth and conflict predicts adolescent and emerging adult externalizing behavior. Some studies have shown that low parental responsiveness and low parental warmth correlate with maladaptive outcomes (e.g., externalizing behavior) in their offspring (Davidov & Grusec, 2006; Kerns, Klepac, & Cole, 1996). Externalizing behavior includes delinquency, rebelliousness, and aggression (Fergusson & Boden, 2008). Externalizing behaviors are associated with substance use in early adulthood (Brook et al., 1990; McGue, Iacono, Legrand, & Elkins, 2001).

Several studies have found that aspects of a distant parent-child relationship are associated with externalizing behavior, which in turn, is related to substance use (Deater-Deckard, Dodge, Bates, & Pettit, 1998; Deklyen, Bierbaum, Speltz, & Greenberg, 1998; Kochanska & Kim, 2012). Both behavioral undercontrol and antisocial behavior have been associated with substance use (Englund, Egeland, Oliva, & Collins, 2008; McGue, et al., 2001; Serbin & Karp, 2004). Bornstein, Hahn, and Haynes (2011) also reported that maladaptive personal attributes predicted SUDs.

Adult substance use may lead to poor functioning in several areas, e.g., poor health, poor social functioning, lower levels of education, and difficulty in the parent-child relationship (Fergusson & Boden, 2008). Previous research has examined the association of parental substance use and the adverse parent-child relationship with externalizing behavior in their children. This research has found that parental substance use, lifetime substance use disorders (SUDs), and lower levels of parental support are related to child externalizing problems (Marmorstein, et al., 2009). Several studies have reported that parental SUDs are also related to low parental support, parental rejection, (Locke & Newcomb, 2004) as well

as externalizing behavior in their offspring (Brook, Rubenstone, Zhang, Brook, & Rosenberg, 2011). Parenting practices may also mediate the relation of parental substance use to externalizing behavior in children (Brook, Lee, Finch, & Brown, 2012).

There is also data indicating that dimensions of the parent-adolescent relationship are transmitted intergenerationally (Kovan, Chung, & Sroufe, 2009; Neppl, Conger, Scaramella, & Ontai, 2009). For example, Belsky, Jaffee, Sligo, Woodward, and Silva (2005) reported that parenting by one generation relates to parenting by their children. Intergenerational continuity in externalizing behavior has also been reported in a study that focused on trans-generational transmission of aggressive parental behavior (Hops, Davis, Leve, and Sheeber, 2003). Moreover, Smith and Farrington (2004) found that externalizing behavior was transmitted across generations.

The present study was designed to test the following hypotheses: (1) The generation 1 (G1)/generation 2 (G2) parent-adolescent relationship is negatively related to the G2's externalizing behavior in emerging adulthood, and ultimately, to substance use in their late 20's and early 30's. (2) Substance use is negatively associated with their parent-child relationship [G2/generation 3 (G3)] and positively related to their SUDs. (3) The adverse G2/G3 relationship and G2's SUDs are each associated with externalizing behavior in their offspring (G3). (4) The parent-child relationship in one generation (G1/G2) is related to the parent-child relationship in the next generation (G2/G3) via G2's externalizing behavior in emerging adulthood and later substance use. Externalizing behavior is transmitted across generations. Thus, this investigation adds to previous research in several ways. First, we examine the precursors of G2's substance use, such as their relationship with their mothers (G1) during adolescence and their (G2) externalizing behavior during emerging adulthood. Second, we examine the relation of the G2 participants' substance use when they were in their late twenties and early thirties and SUDs when they were in their late thirties to externalizing behavior in their (G3) children when the latter were early adolescents. Third, we examine the association of parent-child relations and externalizing behavior in their children in two generations (G1/G2 and G2/G3). Fourth, we examine the mediators between the G1/G2 parent-child relationship and the G2/G3 parent-child relationship.

Method

Participants

The second generation parents (G2) were members of a community sample residing in one of two upstate New York counties when the sample was selected in 1975, Time 1 (T1). At that time, only their mothers (G1), this study's grandmothers, were interviewed. Interviews of both the grandmothers-as-mothers (G1) and the parents-as-youths and later as adults (G2) were conducted in 1983, Time 2 (T2, N=756), 1985-1986, Time 3 (T3, N=739), and in 1992, Time 4 (T4, N=750). Three more interviews of only G2 were conducted in 1997, Time 5 (T5, N=749), in 2002, Time 6 (T6, N=673), and in 2005-2006, Time 7 (T7, N=607). The mean age (S.D.) of the G2 sample in this study was 14.6 (S.D.=2.8) at T2, 16.8 (S.D.=2.9) at T3, 22.3 (S.D.=2.8) at T4, 27.2 (S.D.=2.9) at T5, 32.1 (S.D.=2.8) at T6, and 36.6 (S.D.=2.8) at T7. Some of the participants who were not interviewed at some of the earlier time waves were interviewed at later waves. The retention rate was over 89% until

T7. The 1983 T2 sample is the base from which the current sample was drawn. Ninety-three percent of the originally sampled families were Caucasian. These families were generally representative of the population of families in Albany and Saratoga counties, with respect to gender, family intactness, family income, and education. There was a close match of the participants on family income, maternal education, and family structure with the 1980 U.S. Census Bureau survey. For example at T2, 75% of the G2 children lived with married parents, and 19% lived with a mother who was not currently married; the comparable census figures were 79% and 17%, respectively.

In the T7 sample, 66.7% or 405 of the G2 parents had children. (Only the G2 parent who had participated in our longitudinal study was interviewed). The analyses for this study were based on those participants (39.5% male; 60.5% female) whose oldest or only children at T7 were between 5-18 years old ($N=281$), the age range for which the externalizing measure was appropriate (Achenbach, 1991). At T7, the parents in this study had a mean (SD) age of 37.0 (2.7) years. Their mean level of education was the completion of the freshman or sophomore year of college. At the interview, 68.3% of these participants were married. With regard to the third generation children (G3), the sample was 53.7% female and 46.3% male. These children had a mean (SD) age of 11.6 (3.8) years at T7.

Procedure

Extensively trained and supervised lay interviewers administered the interviews in private. Written informed consent was obtained from the G1 and G2 participants at every wave of data collection in which they participated. The Institutional Review Boards of the Mount Sinai School of Medicine, New York Medical College, and the New York University School of Medicine approved the study's procedures. For more details about the sampling procedures, the original sample, and interviewer training see Cohen and Cohen (1996).

Measures

Grandmothers' Parent-Child Relationship at T2-T3—A latent variable (consisting of four scales) of the G1 grandmothers' parent-child relationship at T2-T3 (when the G2 participants were adolescents) was hypothesized. Data were obtained from the G1 grandmother and the G2 adolescent. At each point in time, a multi-item scale of child non-resistance to maternal control was created based on 5 items reported by the G1 grandmother [$\alpha=0.88$ (T2) and $\alpha=0.90$ (T3)], e.g., "Does what you tell him/her to do" (Schaefer & Finkelstein, 1975). The answer options ranged from (1) "Not at all like the child" to (4) "Very much like the child". At each point in time, three multi-item scales based on the G2 adolescent's report were included: (1) Identification with mother included 14 items [$\alpha=0.91$ (T2) and $\alpha=0.91$ (T3)], e.g., "You admire your mother in her role as a mother." The answer options ranged from (1) "Not at all" to (4) "In every way" (Brook et al., 1990). (2) Maternal child-centeredness included 5 items [$\alpha=0.79$ (T2) and $\alpha=0.80$ (T3)], e.g., "She likes to talk with me and be with me much of the time" (Schaefer, 1965). (1) "Not at all like my mother" to (4) "Very much like my mother." (3) Maternal affection included 4 items [$\alpha=0.72$ (T2) and $\alpha=0.72$ (T3)], e.g., "She frequently shows her love for me" (Schaefer, 1965). The answer options ranged from (1) "Not at all like my mother" to (4) "Very much like my mother."

G2 Participants' Externalizing Behavior at T4—A latent variable of the G2 participant's externalizing behavior at T4 was hypothesized. Three multi-item scales were included: (A) rebellion [8 items, $\alpha=0.75$ (T4)], e.g., "When rules get in my way, I sometimes ignore them" (Smith & Fogg, 1979). The answer options ranged from (1) "False" to (4) "True." (B) aggression [3 items, $\alpha=0.55$ (T4)], e.g., "I often quarrel with others" (Jackson, 1974). The answer options ranged from (1) "False" to (4) "True." (C) delinquency [5 items, $\alpha=0.76$ (T4)], e.g., "How often have you gotten into a serious fight at school or work?" (Jackson, 1974). The answer options ranged from (1) "Never" to (5) "Five or more times."

G2 Participants' Substance Use at T5-T6—We hypothesized one latent variable of the G2 parents' substance use at T5-T6. At each time point, the questions asked about the frequency of the parents' cigarette smoking, use of beer or wine, use of hard liquor, marijuana use, and other illicit drug use during the past five years prior to T4 and prior to T5 (original). The answer options for cigarette smoking were: none (0); less than daily (1); 1-5 cigarettes a day (2); about half a pack a day (3); about a pack a day (4); and about 1.5 packs a day or more (5). The measure of alcohol use (beer or wine, or hard liquor) at each point in time had a scale coded as none (0), 3 times a month or less (1), once a week or several times a week (2), 1 or two drinks every day (3), and 3 or more drinks every day (4). The marijuana use and other illicit drug measures at each point in time had a scale coded as none (0), a few times a year or less (1), once a month (2), several times a month (3), once a week (4), several times a week (5), and daily (6).

G2 Parents' Substance Use Disorder at T7—At T7, substance use disorder was defined as nicotine dependence, alcohol dependence or abuse, or illicit substance dependence or abuse (marijuana or other illicit drugs, e.g., cocaine/crack, heroin, LSD, ecstasy, and amphetamines). Eighteen percent of the sample reported using illegal drugs other than marijuana. Each participant's substance dependence or abuse was assessed with the University of Michigan Composite International Diagnostic Interview (UM-CIDI) substance use disorder measure (Wittchen & Kessler, 1994). We adapted this measure to make it consistent with the criteria used in DSM-IV (American Psychiatric Association, 1994). We ascertained substance dependence by the presence of three or more of the following criteria for each substance used during the 12-month period before the T7 interviews. (1) use of more of the substance than usual to get the same effect, or the same amount had less of an effect than before; (2) the presence of withdrawal symptoms or the use of the substance to avoid withdrawal symptoms; (3) the use of much larger amounts of the substance than intended, or use for a longer period of time than intended; (4) the presence of such a strong desire or urge to use the substance that the person could not resist using it; (5) a period of a month or more in which the person spent a great deal of time using the substance or getting over its effects; (6) the person gave up activities because of use of the substance; or, (7) emotional or psychological problems resulting from using the substance such as feeling uninterested in things, feeling depressed, suspicious of people, paranoid, or having strange ideas. If a participant did not meet the criteria for substance dependence, substance abuse was ascertained by the presence of at least one of the following four criteria during the same 12-month period: (1) being under the effects of the substance or

suffering its after-effects while at work or school or while taking care of children; (2) being under the effects of the substance or feeling its after-effects in a situation which increased the user's chances of getting hurt – e.g., when driving a car or boat, using knives or guns or machinery, or crossing against traffic; (3) having legal problems because of using the substance; or (4) having problems getting along with other people because of using the substance.

G2 Parent-Child Relationships at T7—A latent variable of the parent-child relationship at T7 was hypothesized. This construct was measured by four scales based on the G2 parent's report: (1) Affection toward the child included 4 items ($\alpha=0.88$), e.g., "I frequently show my love for my child" (Schaefer, 1965). The answer options ranged from (1) "Not at all like me" to (5) "Extremely like me." (2) Acceptance included 3 items ($\alpha=0.65$), e.g., "I accept my child if he/she does something I do not like" (Schaefer, 1965). The answer options ranged from (1) "Never" to (5) "Often." (3) Child parental identification included 3 items ($\alpha=0.81$), e.g., "How much does your child admire you" (Brook et al., 1990) The answer options ranged from (1) "Not at all" to (5) "In every way." (4) Child non-resistance to parental control included 4 items ($\alpha=0.83$), e.g., "Your child often does what you want (him/her) to do" (Schaefer, 1965). The answer options ranged from (1) "Not at all like my child" to (4) "Very much like my child."

Children's Externalizing Behavior at T7—A manifest variable of children's externalizing behavior was measured at T7. The measure used an adaptation of Achenbach's (1991) Child Behavior Checklist (CBCL). The CBCL is a rating scale for parents to complete that assesses behavioral and emotional problems in 5-18 year-old children. (10 items; $\alpha=0.79$, e.g. "How true is it that your child lies or cheats?"). The answer options ranged from (1) "Not true" to (3) "Very true or often true."

Control variables—We included the following control variables in the analyses: G2 parents' age, gender, and T6 educational level ['8th Grade or below' (1)-'Graduate student' (11)] and G3 children's age and gender. The measures used in the current study have predicted externalizing behavior in prior studies (Brook, Lee, Finch, & Brown, 2012; Brook, Rubenstone, Zhang, Brook, & Rosenberg, 2011).

Data Analyses

We used a latent variable structural equation model (SEM) to examine the empirical validity of the hypothesized pathways. To account for the influences of G2 parent age, gender, and T6 educational level and G3 child age and gender on these pathways, we created residual variables by statistically partialing out the effects of these control variables on each of the manifest variables. We then used the residual variables in the Mplus software (Muthén & Muthén, 2010) to estimate the proposed model. We used the full information maximum likelihood (FIML) option in Mplus (Muthén & Muthén, 2010) to impute any missing data. The advantage of FIML is that the imputed values are less likely to be biased even if the data are not missing completely at random (Muthén, Kaplan, & Hollis, 1987). We chose three fit indices to assess the fit of the model: (1) the root mean square error of approximation (RMSEA), (2) Bentler's comparative fit index (CFI) (Bentler, 1990) and (3)

the standardized root mean square residual (SRMR). Values between 0.90 and 1.0 on Bentler's CFI indicate that the model provides a good fit to the data (Kelloway, 1998). Values for the RMSEA and the SRMR below 0.10 indicate a good fit. In order to test for mediational effects (Baron, & Kenny, 1986; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), we calculated the standardized total effects and total indirect effects by using the Model Indirect command in Mplus. The standardized total effect equals the sum of the direct and the indirect effects of each earlier latent variable (as estimated in the analysis) on G3 externalizing behavior. The total indirect effect of a latent construct on G3 externalizing behavior is the mediated effect via the intermediate variables that are depicted in the model (see Figure 1).

Results

Supplementary Table 1 presents the means and standard deviations of the dependent and independent variables. With regard to the measurement model, Supplementary Table 2 presents the standardized factor loadings (with z-test results in parentheses) for each manifest variable within its latent construct. All factor loadings were significant ($p < .05$), showing that the manifest variables were satisfactory measures of the latent constructs. The RMSEA was 0.048; Bentler's comparative fit index was 0.91; and the SRMR was 0.063. These results reflect a satisfactory model fit. The obtained path diagram along with the standardized regression coefficients and z-statistics are depicted in Figure 1.

As noted in Figure 1, our findings were: (1) grandmother/parent as adolescent (G1/G2) relationships were inversely related to G2 externalizing behaviors in young adulthood ($\beta = -0.39$, $z = -4.45$), which in turn were related to G2 substance use in their late 20s and early 30s ($\beta = 0.50$, $z = 6.00$). (2) G2 parental substance use in the late 20s and early 30s was inversely related to the quality of parent-child relationships (G2/G3) ($\beta = -0.26$, $z = -2.31$), which was ultimately inversely related to the G3 children's externalizing behavior ($\beta = -0.82$, $z = -13.43$); (3) The G2 participants' substance use in the late 20s and early 30s was positively associated with G2 SUDs in the late 30s ($\beta = 0.52$, $z = 5.26$), which was ultimately (positively) related to the G3 children's externalizing behavior ($\beta = 0.13$, $z = 2.55$). We also tested two alternative paths. The one from the G2 participants' SUDs to the G2/G3 parent-child relationships was not statistically significant (data not shown, $p > 0.05$). The second path from G2 substance use at T5-T6 to G3 externalizing behavior at T7 was also not significant ($p > 0.05$).

Table 1 presents the results of the total effect analyses. Each earlier latent construct had a significant total effect on the G3 children's externalizing behavior ($p < 0.05$). Among them, the G2/G3 parent-child relationship ($\beta = -0.82$, $z = -13.43$) had the greatest total effect on the G3 children's externalizing behavior. The G2 parents' substance use in their late 20s and early 30s ($\beta = 0.28$, $z = 3.34$) had the greatest indirect effect (via the G2/G3 parent-child relationship and also via the G2 parents' SUDs in their late 30s) on the G3 children's externalizing behavior. Also of interest was that G2's externalizing behavior was indirectly associated with G3's externalizing behavior ($\beta = 0.14$, $z = 2.59$) via the G2 parents' substance use, SUDs, and the G2/G3 parent-child relationship. However, there was only a trend

($z=1.85$, $p<.10$) in the association of the G1/G2 parent-child relationship with the G2/G3 parent-child relationship.

Discussion

Parental (G2) substance use and, to a lesser extent their externalizing behaviors are the mediating variables between their relationships with their mothers (G1/G2) and externalizing behavior in their offspring (G3). The findings support our hypotheses. In accord with FIT, a maladaptive parent-child relationship is associated with externalizing behavior (e.g., aggression, delinquency, rebellion) in emerging adulthood, which in turn is related to later substance use. These findings are consistent with those of Epstein, Hill, Bailey, & Hawkins (2013) who reported that early general adverse family functioning predicted comorbid problem behaviors at age 33. Externalizing behavior in adolescence and emerging adulthood has been found to predict substance use in early adulthood (Brook et al., 1990). In the present study, substance use in early adulthood predicted SUDs later in adulthood. Adult substance use disorder in the parents and a maladaptive parent-child relationship, in turn, predicted externalizing behavior in their offspring (G3).

Externalizing behavior in the parents in emerging adulthood was not directly related to their offspring's externalizing behavior. Rather, parental externalizing behavior during adolescence and adulthood was indirectly related to their offspring's externalizing behavior via three mechanisms that included substance use during early adulthood as the mediator to the parent-child relationship and to SUDs during adulthood. Our findings extend the results of previous studies that focused on the mediators of vulnerability and resilience in the intergenerational transfer of psychosocial risk factors (Serbin & Karp, 2004).

The present research also focused on the relationship between parental substance use during early adulthood and the parent-offspring relationship (G2/G3) and externalizing behavior in the early adolescent children (G3). In accord with FIT (Brook et al., 1990), and as hypothesized, the G2 parents' substance use in early adulthood was associated with subsequent difficulty in their relationship with their children, which in turn, was associated with externalizing behavior in these offspring. In support of this pathway, several investigators have found that parenting difficulties predict adjustment problems in childhood (Bandura, 1986; Lam, Wechsberg, & Zule, 2004; Lengua & Kovacs, 2005; Stanger, Dumenci, Kamon, & Burstein, 2004). Moreover, parental substance use disorder in adulthood was directly associated with their children's externalizing behavior.

Based on the current data, the impact of earlier parental substance use on the parent-child relationship is more important than parental substance use disorder in adulthood. From a developmental perspective, it is critical to examine the developmental stages of both the parent and the child. It is possible that the parental effects may differ depending on the developmental stages of the parent and of the child. Indeed, our findings are consistent with those of Hussong and colleagues (Hussong, Huang, Curran, Chassin, & Zucker, 2010). In their study, parental alcoholism was positively related to their children's externalizing symptoms. They noted that it is important to take into consideration the severity and timing of the parents' alcohol use.

As mentioned above, our results indicate that earlier parental substance use predicts later SUDs, which in turn is associated with externalizing behavior in the offspring. Parents having SUDs may model more deviant behavior than parents who do not have SUDs. Their children may identify with this behavior and thus manifest externalizing characteristics (Brook, Brook, Balka, & Rosenberg, 2006b). It is important to note that our results are conservative in that we controlled for the G2 parents' age, gender, educational level and the age and gender of the G3 child in examining the relationship of parental SUDs and their children's externalizing behavior.

The association of the grandparent-parent (G1/G2) relationship in the parents' adolescence and the G3 children's externalizing behavior was mediated by four variables including the parents' externalizing behavior in emerging adulthood and the parent-offspring relationship (G2/G3) later in the parents' adulthood. As indicated above, several investigators have found a relationship between parenting and children's adjustment problems (Lengua & Kovacs, 2005). We extend this prior research by demonstrating that the association of the parent-child relationship with children's externalizing behavior is transmitted across generations.

Consistent with FIT and developmental-ecological theories, the findings provided some support for the intergenerational transmission of the parent-child relationship (Bronfenbrenner, 1986; Brook et al., 1990). Using prospective data, several studies have shown continuity in parenting behavior across generations (Conger, Neppl, Kim, & Scaramella, 2003; Kovan et al., 2009; Thornberry, Freeman-Gallant, Lizotte, Krohn, & Smith, 2003). Our findings suggest that externalizing behavior and substance use are two of the possible mechanisms that play a role in the intergenerational transmission of the maladaptive relationship. In support of FIT, there also was discontinuity across generations. Future research should focus on other mechanisms involved in studying both continuity and discontinuity of the parent-child relationship. Moreover, examination of the extent to which the partner of the G2 parent influences the intergenerational transmission of the parent-offspring relationship is necessary.

Externalizing behavior also showed intergenerational continuity. Externalizing behavior in the parents (G2) was associated with externalizing behavior in their children (G3). Two mechanisms that intervene between externalizing behavior in the parent and in the child are the parent-offspring relationship and parental substance use and SUDs. These findings are consistent with FIT and results from prior research (Thornberry et al., 2003). More longitudinal studies covering two or more generations are needed to determine the extent to which there is intergenerational transmission of externalizing behavior. Moreover, future multigenerational studies might assess the extent to which moderators may buffer the transmission of externalizing behavior across generations.

Limitations

The present research has limitations that should be taken into account. To begin with, except for one scale reported by the G1 grandmothers, G2 parents reported about their own externalizing behavior and about the G3 children. Future research should include both the parents and children's reports of the children's externalizing behavior. In addition, this study

could not control for the G3 children's externalizing behavior prior to T7 because the data was not available for most of the G3 sample. Future research that includes such controls would be more rigorous. Several investigators have found that cultural factors may be important in affecting parenting behavior (Kagan, 2010) and children's adaptation (Feldman & Masalha, 2007). Consequently, the findings of this research may not be generalizable to parents and children from other ethnic backgrounds. Future research should examine the ways in which cultural values and practices may moderate the associations found in this research. Moreover, our study did not use a genetically informed design. Genetic mechanisms may play a role in the transmission of externalizing behavior across generations.

Strengths of the Study

Despite the limitations of this research, this study contributes to our understanding of the predictors of externalizing behavior in children in a number of important ways. One strength is the use of a large community sample that was representative of upstate New York at the initial data collection. Second, the similarity of our findings to those of other cross-sectional and short term longitudinal studies argues for the generalizability of this study's results. Another strength of this study is the 23-year time span it covers. Furthermore, we included reports about two parent-offspring relationships (G1/G2 and G2/G3) as related to externalizing behavior in their offspring (both G2 and G3). Finally, given that these issues cannot be studied using experimental designs, the longitudinal relations provide some confidence in the temporal sequence of the relationships.

Conclusions

The present results suggest that substance use in early adulthood may affect the parent-offspring relationship and ultimately externalizing behavior in the offspring. Parental substance use disorders in adulthood may also have an effect on externalizing behavior on their offspring. Parental substance use is not the only predictor of externalizing behavior; other factors are also operative. Models linking parents' substance use and externalizing behavior in their children need to incorporate ratings of the parents' externalizing behavior and of the parent-child bond from several sources. A developmental model of these data for multiple generations will enhance our understanding of the etiology of externalizing behavior in children. Incorporating the grandmother/parent-as-adolescent relationship, as well as the parent's relationship with his/her own child, in prevention and treatment programs targeting children's externalizing behavior might reduce the transmission of this behavior across generations. Policymakers might consider incorporating the present results when designing prevention and intervention programs addressing the transmission of family dysfunction and externalizing behavior from one generation to the next.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Fig. 1.

Obtained Model: Standardized pathways (z-statistic) from Familial Factors to Child Externalizing Behavior (N=281)

Note: 1. * $p < .05$, ** $p < .01$, *** $p < .001$;

2. GFI=.91, RMSEA=.048, SRMR=.063;

3. G2 parent's age, gender, educational level, and G3 child age and gender were statistically controlled.

4. G1 are the mothers of G2 and the grandmothers of G3. G2 are the male and female children of G1. Each G2 participant is a parent of a G3 child.

Table 1

Standardized Total Effects (z-statistic) of Familial Factors Related to Child Externalizing Behavior (N=281)

Independent Constructs	G3 Child Externalizing Behavior (T7)	
	Standardized Total Effects (z-statistic)	Standardized Total Indirect Effects (z-statistic)
G2 SUDs (T7)	.13 (2.55) *	Not Applied
G2-G3 Parent-Child Relationship (T7)	-.82 (-13.43) ***	Not Applied
G2 Substance Use (T5-T6)	.28 (3.34) ***	.28 (3.34) ***
G2 Externalizing Behavior (T4)	.14 (2.59) **	.14 (2.59) **
G1-G2 Parent-Child Relationship (T2-T3)	-.06 (-2.34) *	-.06 (-2.34) *

Note: 1. * $p < .05$, ** $p < .01$, *** $p < .001$;

2. G2 parent's age, gender, educational level, and G3 child age and gender were statistically controlled.