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The Association between Parent Early Adult Drug Use Disorder and Later Observed Parenting Practices and Child Behavior Problems: Testing Alternate Models

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Abstract

This study tested the association between parent illicit drug use disorder (DUD) in early adulthood and observed parenting practices at ages 27 – 28 and examined the following three, theoretically-derived models explaining this link: a) a disrupted parent adult functioning model, b) a pre-existing parent personality factor model, c) a disrupted adolescent family process model. Associations between study variables and child externalizing problems also were examined. Longitudinal data linking two generations were drawn from the Seattle Social Development Project (SSDP) and The SSDP Intergenerational Project (TIP), and included 167 parents and their 2- to 8-year-old child. Path modeling revealed that parent DUD in early adulthood predicted later observed low-skilled parenting, which was related to child externalizing problems. The pre-existing parent personality factor model was supported. Parent negative emotionality accounted for the association between parent early adult DUD and later parenting practices. Parent negative emotionality also was related directly to child externalizing behavior. Limited support for the disrupted transition to adulthood model was found. The disrupted adolescent family process model was not supported. Results suggest that problem drug use that occurs early in adulthood may affect later parenting skills, independent of subsequent parent drug use. Findings highlight the importance of parent negative emotionality in influencing their own problem behavior, their interactions with their child, and their child's problem behavior. Prevention and treatment

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programs targeting young adult substance use, poor parenting practices, and child behavior problems should address parent personality factors that may contribute to these behaviors.

Keywords

substance use disorder; parenting; observation; negative emotionality

Research has identified associations between non-gestational parent substance use disorder and adverse child outcomes such as problem behavior, poor school performance, and child substance use (Chassin, Rogosch, & Barrera, 1991; Hawkins, Catalano, & Miller, 1992; Leib et al., 2002). Prior findings suggest that disrupted parenting practices may explain the association between parent substance use disorder and adverse child outcomes (Chaffin, Kelleher, & Hollenberg, 1996; Chassin, Curran, Hussong, & Colder, 1996; Walsh, MacMillan, & Jamieson, 2003). This study extends prior literature by considering the possible effects of parent problem substance use during a key developmental period, the transition to adulthood, on later parenting practices and child development. It further extends prior literature by testing three alternative developmental-ecological- and life-course-theory-derived hypotheses about what may underlie the link between parent substance use and parenting practices: a) a disrupted parental adult functioning model, b) a pre-existing parent personality and behavioral trait model, c) a disrupted family process during the parents' adolescence model. Associations between parent early adult DUD, observed parenting practices and parent-rated child externalizing problems also are tested.

Parent Substance Use Disorder, Parenting, and Child Externalizing

Most prior research on the effects of parent substance use disorder on parenting practices has focused on the effects of *lifetime* or *current* substance abuse or dependence. Studies have found associations between lifetime substance use disorders among parents and harsh or punitive discipline (Walsh et al., 2003), poor monitoring (Chassin et al., 1996; Chassin, Pillow, Curran, Molina, & Barrera, 1993), lower levels of parental support, and inconsistent discipline (King & Chassin, 2004), and child externalizing problems (Hussong, Huang, Curran, Chassin, & Zucker, 2010; Marmorstein, Iacono, & McGue, 2009). Current parental substance abuse/dependence has been associated with more authoritarian parenting strategies (Mayes, 1995), aggression, rejection, neglect, low warmth, and unskillful interactions (Das Eiden & Leonard, 2000; Locke & Newcomb, 2004), as well as externalizing behavior among children (Catalano, Haggerty, Gainey, & Hoppe, 1997; Kuperman, Schlosser, & Lidral, 1999; Merikangas, Dierker, & Szatmari, 1998). Hussong and colleagues tested associations between current, lifetime, and persistent parent alcohol problems, and found that lifetime diagnosis at baseline and average symptomatology over the longitudinal study period (i.e., persistence) were most strongly related to child externalizing problems; effects of time-varying measures of current parent alcoholism were less consistent (Hussong et al., 2010).

This study extends prior work by taking a more developmental approach to investigating the relationships among parental substance misuse, parenting behaviors, and child externalizing behaviors by considering the developmental timing of parent substance use problems. For example, parent substance use problems during key developmental transitions, like the transition to adulthood, may be more disruptive to later parenting practices and child behavior than problems that occur at less developmentally sensitive times. The present study examines whether parent illicit DUD during the transition to adulthood (ages 21 and 24), a key developmental period, is associated with their later observed parenting practices with their 2- to 8-year-old children and with child externalizing behaviors.

Mechanisms Linking Early Adult Substance Use and Later Parenting

Developmental-ecological and life course theories emphasize the importance of individual developmental processes and the interactional and changing nature of the relationship between individual and environment across development (Bronfenbrenner, 1986; Catalano & Hawkins, 1996; Elder, 1998; Hawkins & Weis, 1985), pointing out that problems can occur when individuals become involved in environments that encourage antisocial behavior (Catalano & Hawkins, 1996; Hawkins & Weis, 1985), when environmental transitions or stressors occur off time or at times when the individual is vulnerable (Elder, 1998), or when the environment does not meet the developmental needs of the individual (Eccles et al., 1993; Gutman, Eccles, Peck, & Malanchuk, 2011). These frameworks highlight several possible explanations for the hypothesized link between early adult substance use and later parenting practices. Three potential explanations are examined here.

One hypothesis is that early adult substance use disrupts the transition to adulthood, resulting in poor adult functioning that negatively affects parenting practices. Life course theorists argue that early adulthood is an important developmental period during which young people become independent from their families of origin, try out new roles, experience new opportunities, and begin to define the path that they will take as adults (Arnett, 2000; Elder, 1998). Adolescent and young adult problem substance use can disrupt the transition to adulthood and lead to poorer adult functioning in a wide array of domains, including continued substance use, depression, poorer physical health, poorer social functioning, and lower levels of education and income (Bailey, Hill, Oesterle, & Hawkins, 2006; Brook, Adams, Balka, & Johnson, 2002; Fergusson & Boden, 2008; Hill, White, Chung, Hawkins, & Catalano, 2000; Oesterle et al., 2004). Many of these indicators of poor adult functioning have been linked, in turn, to suboptimal parenting practices (Hans, 2002; McCarty, McMahon, & Conduct Problems Prevention Research Group, 2003; Shaw, Connell, Dishion, Wilson, & Gardner, 2009). This study tests the hypothesis that indicators of poor adult functioning mediate the expected association between early adult DUD and later parenting practices.

According to developmental-ecological and life course theories, enduring individual traits influence the environments individuals choose; the ways in which individuals interact with their environments, including other people; and the behaviors individuals engage in (Bronfenbrenner, 1986; Catalano & Hawkins, 1996; Elder, 1998; Hawkins & Weis, 1985; White, Bates, & Buyske, 2001). Thus, a second potential explanation for the hypothesized link between early adult DUD and later parenting practices is that common individual personality or behavioral traits lead to both outcomes. In adolescence, behavioral disinhibition and externalizing problems have been linked repeatedly to young adult substance use (Bailey et al., 2006; Hawkins et al., 1992; McGue, Iacono, Legrand, Malone, & Elkins, 2001; Serbin & Karp, 2004) and to poorer parenting practices later on (Capaldi, Pears, Patterson, & Owen, 2003; Thornberry, Freeman-Gallant, Lizotte, Krohn, & Smith, 2003). In adulthood, negative emotionality, or a tendency toward negative emotional states such as distress, worry, and anger (Bornstein, Hahn, & Haynes, 2011), has been associated with both substance use disorder (Kotov, Gamez, Schmidt, & Watson, 2010; Prisciandaro, McRae-Clark, Moran-Santa Maria, Hartwell, & Brady, 2011) and undesirable parenting practices (Bornstein et al., 2011; Clark, Kochanska, & Ready, 2000). The present study examines whether these characterological traits may explain both early adult DUD and later parenting practices.

Developmental-ecological and life course perspectives also emphasize the importance of systems or developmental contexts that surround the individual, especially the family (Bronfenbrenner, 1986; Catalano & Hawkins, 1996; Eccles et al., 1993; Elder, 1998;

Hawkins & Weis, 1985). Prior research has found strong support for a link between experiencing poor parenting and disrupted family processes during adolescence (e.g., poor family management, conflict) and young adult substance use (Bailey, Hill, Meacham, Young, & Hawkins, 2011; Hawkins et al., 1992; Kendler, Myers, & Prescott, 2000). Growing evidence also suggests that many parenting behaviors are transmitted intergenerationally. In a recent special section of this journal, several prospective, multigenerational studies found support for intergenerational continuity in parenting quality, measures of positive or constructive parenting, and specific parenting practices including monitoring and harsh discipline (Bailey, Hill, Oesterle, & Hawkins, 2009; Kerr, Capaldi, Pears, & Owen, 2009; Kovan, Chung, & Sroufe, 2009; Neppl, Conger, Scaramella, & Ontai, 2009; Shaffer, Burt, Obradovic, Herbers, & Masten, 2009). Thus, experienced poor parenting and disrupted adolescent family processes may lead to early adult DUD and may be echoed in the parenting practices of adolescents when they become parents. This third hypothesis also is tested in the present study.

Methods

Sample and Procedure

This study used data from two closely related research projects: the Seattle Social Development Project (SSDP), a longitudinal study of youth development and pro- and antisocial behavior, and The SSDP Intergenerational Project (TIP), a longitudinal study of the effects of parent and grandparent substance use on child development. SSDP participants were recruited from 18 Seattle public elementary schools that served a mix of lower and higher risk neighborhoods. From the population of 1,053 students entering Grade 5 (age 10) in participating schools in the fall of 1985, 808 students (77% of the population) consented to participate in the longitudinal study and constitute the SSDP sample. Student interviews were conducted yearly from ages 10 to 16, at age 18, and every 3 years thereafter through age 33. The present study used data collected as a part of the SSDP study at ages 10 – 16, 18, 21, 24, and 27. A portion of SSDP sample members were exposed to a quasi-experimental preventive intervention during elementary school (see Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005; 2008).

Participant retention has been high, with interview completion rates of 87% at age 11, 69% at age 12, 81% at age 13, and between 92% and 97% at ages 14–16, 18, 24, and 27. Percentages are based on the full sample of 808 minus those who had died ($n = 15$ by age 27). Nonparticipation at each assessment was not consistently related to ethnicity or early initiation of alcohol, tobacco, marijuana, or other illicit drug use (measured at age 10). At age 27, slightly more women than men participated (94.7% vs. 90.3%), however, this was explained by higher rates of death among male participants (3% versus 1% for women), and likely not attributable to a differential willingness to participate.

The second longitudinal study, TIP, began data collection in 2002 on those SSDP participants who had become parents, and their children. SSDP sample members were invited to participate in TIP if they had a biological child with whom they had face-to-face contact on at least a monthly basis. The oldest child was selected to participate in cases where there were multiple biological children. TIP used a rolling enrollment strategy in which new families were recruited for the study as SSDP participants became parents for the first time. The TIP study did not include an intervention for either parents or children. The present study makes use of data from the first two annual data collection waves of TIP, the only two waves for which coded observational data are available. These two data collection waves occurred when SSDP sample member parents averaged 27 and 28 years old, respectively, and their children ranged from ages 0 to 14.

There were 377 SSDP participants who reported having a biological child by the second year of TIP, of whom 340 met the eligibility criterion (face-to-face contact with the child at least once per month). About 76% ($n = 258$) of eligible SSDP parents consented to participate in Wave 1 and/or 2. Eligible parents (i.e., those actively parenting their child) were rated by teachers during childhood as having less externalizing behavior, were more likely to be female than parents who did not have sufficient contact with their child to meet eligibility requirements, and endorsed fewer illicit drug abuse and dependence criteria and had more education at age 27 compared to those who were not eligible. Eligible parents who chose to participate in TIP reported more education at age 27 than those who did not participate.

TIP parent and child interviews were conducted in person by trained interviewers. Interviews were timed to occur within 6 weeks of the child's birthday each year. During the interviews, parents and children participated in videotaped observations performing the Parent-Child Interaction Task (PCIT) employed by Eyberg and Robinson (1983) and modified by Forehand and McMahon (1981). Children ages 2 to 8 ($n = 167$) participated in three play tasks (child-directed play, parent-directed play, cleanup) with the SSDP parent and, when applicable, a second caregiver. Tasks proceeded in order of increasing constraint on the child's behavior; therefore, they were administered in the same order to all parent-child pairs. Because historical data on young adult substance use disorder were not available for the second caregivers, the present analyses include only data from the SSDP parent. The analysis sample ($n = 167$) was gender-balanced and ethnically diverse. Parents were 61% female, 25% African American, 14% Asian/Pacific Islander, 4% Native American, 41% Caucasian, 17% multiracial, 8% Hispanic (not mutually exclusive with other racial/ethnic categories), and averaged 27.7 years of age ($SD 0.6$). Children in the sample were 53% female, 19% African American, 10% Asian/Pacific Islander, 2% Native American, 35% Caucasian, 32% multiracial, 12% Hispanic (not mutually exclusive with other racial/ethnic categories), and averaged 5.1 years of age ($SD 2.0$).

Eight trained coders used Noldus Observer (v. 5.0) software to code the interactions. Training involved the use of detailed coding manuals and extensive discussion of cultural differences in behavior and in the meaning of behavior. Coders were required to maintain a minimum of 75% agreement with other coders to be considered reliable. Agreement was defined as recording the same score or, for Likert-type items, a score within 1 of other coders (e.g., two coders who recorded, respectively, 4 and 4, 4 and 5, or 4 and 3 for an item with a 5-point Likert response scale were considered "in agreement"). In both Waves 1 and 2, coders achieved 90% agreement across the 144 items rated. The Human Subjects Review Committee at the University of Washington approved the procedures and measures used in both the SSDP and TIP studies.

Measures

Parent early adult illicit drug use disorder—At ages 21 and 24, parents responded to the illicit drug abuse and dependence module from the Diagnostic Interview Schedule (DIS) (Robins, Helzer, Croughan, Williams, & Spitzer, 1981). Illicit DUD criterion counts at each age were based on the total number of DSM-IV abuse and dependence criteria met in the prior year. To create an index of total illicit drug-related problems, we did not exclude abuse symptoms if dependence symptoms were present, as is suggested for diagnoses (American Psychiatric Association, 1994). Information on withdrawal symptoms was not available at the age 21 interview. Abuse and dependence criterion counts had possible ranges of 0 to 11 (4 abuse criteria + 7 dependence criteria), except at age 21, which could only range from 0 to 10. Age 21 and 24 criterion counts were averaged to create a measure of early adult illicit DUD.

Observed parenting practices—Information about the items making up the observed parenting scales is available online (Appendix A). At the first and second waves of TIP, parents and children participated in three videotaped play activities. Trained observers rated parents' skills and the degree to which the parents provided prosocial opportunities and rewarded their child's prosocial behavior. Each task was rated separately. Ratings were averaged across tasks and, for those who participated in both waves, across waves. A *low-skilled parenting* score was computed by averaging observer ratings on four items assessing parent effectiveness ($\alpha = .86$ across the three tasks combined). A *prosocial opportunities* score was computed by averaging observer ratings on seven items tapping the degree to which parents encouraged their child's participation and modeled good behavior ($\alpha = .82$ across all three tasks combined). A *rewards for prosocial behavior* score was computed by averaging observer ratings on eight items assessing the degree to which parents rewarded their child's good behavior with attention or praise ($\alpha = .89$ across all three tasks combined). The prosocial opportunities and rewards for prosocial behavior scales were highly correlated ($r = .73, p < .001$) and related similarly to other study variables. They were combined to form a *prosocial socialization* scale (see Huang, Kosterman, Catalano, Hawkins, & Abbott, 2001; Lonczak et al., 2001). Preliminary analyses suggested one very high score and possible outlier on the low-skilled parenting scale, which was coded down to the next highest value.

Child externalizing behavior—During the first two annual data collection waves of TIP, parents completed the Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001) about their children. Externalizing scale scores based on recommendations by Lengua and colleagues (2001) were created for children at each wave. For those children who participated in both waves, externalizing scores were averaged across waves. Because different versions of the CBCL with slightly different items are used for children aged 1.5 to 5 years and for children aged 6 to 18 years, scores were standardized within test form to increase comparability of externalizing scores across ages 2 to 8.

Disrupted adult functioning—All measures of adult functioning were taken at age 27. *Parent social skills* were measured using the total score from the Interpersonal Competence Questionnaire ($\alpha = 0.89$) (Buhrmester, Furman, Wittenberg, & Reis, 1988). *Parent poor physical health* was measured using the physical health items from the Short Form Health Survey (SF-12) (Ware, Kosinski, & Keller, 2002). *Parent depressive symptomatology* was measured using the major depressive episode module from the DIS (Robins et al., 1981). Similar to the abuse and dependence criterion counts, a count of DSM-IV major depressive episode (MDE) criteria was constructed (range 0 – 9). *Continued illicit drug use disorder* was measured using the DIS, similarly to the age 21 and 24 DUD measures described above. An *income to needs ratio* was calculated based on self-reported household income and size and using contemporaneous poverty thresholds (2002) from the U.S. Census Bureau. Parents self-reported their highest level of *educational attainment*.

Parent behavior and personality traits—Adolescent *parent externalizing behavior* was measured when parents were ages 11 through 14. Their teachers completed the Teacher Report Form of the Child Behavior Checklist (Achenbach & Edelbrock, 1983) annually. Again following the approach recommended by Lengua and colleagues (2001), externalizing scale scores were averaged across ages 11 – 14. *Behavioral disinhibition* was self-reported at ages 15–16 and 18 (Cronbach's alpha ranged between 0.72 to 0.80 at each age). Five items assessed the degree to which respondents endorsed behaviors indicative of disinhibition (see Appendix A) (Hill et al., 2010). Cross-age stability was high (alpha = 0.76); available measures were averaged across adolescence. *Negative emotionality* in young adulthood was assessed at age 21, and consisted of scale scores on the distress (alpha = 0.80), anger (alpha

= 0.54), and fearfulness ($\alpha = 0.73$) subscales of the EAS Temperament Survey (Buss & Plomin, 1984); study-designed scales assessing social withdrawal ($\alpha = 0.70$) and rebelliousness ($\alpha = 0.77$; see Appendix A for items); and DSM-IV MDE criterion count. Scale scores were standardized to establish a common metric and normalize variances and then averaged ($\alpha = 0.70$). Reliabilities on the EAS Temperament Survey subscales were similar to those in other published studies (e.g., Naerde, Roysamb, & Tambs, 2004).

Adolescent family process—Family management, conflict, positive involvement, and bonding during adolescence (see Bailey et al., 2011 for items) were reported yearly by parents when they were ages 10–16 and 18, except involvement, which was measured at ages 10–16. Scales showed acceptable reliabilities at each age (average age-specific $\alpha = 0.68$). Family process constructs were stable across the available time points (average cross-age $\alpha = 0.81$) (Bailey et al., 2011). Available measures were averaged across adolescence. Items were recoded as necessary so that higher scores indicated more of the construct. Although not derived from observational data, the family management and positive involvement scales are similar to the observed low-skilled parenting and prosocial socialization measures.

Additional variables—The age of the target child is included in analyses because young adults who had children already at ages 21 or 24 may have reported fewer drug problems and parenting practices may be rated differently for older and younger children. Child age was reported by the parent. Young adult substance use may increase the likelihood of child prenatal drug exposure (Gavin, Hill, Hawkins, & Maas, 2011). Biological mothers participating in TIP (either SSDP parents or second caregivers; $n = 150$ in the present analyses) were asked about their *prenatal substance use* (cigarette, alcohol, marijuana, and other illicit drugs) in the first two waves of TIP when the SSDP parents were ages 27 and 28, on average. Finally, parent sex and race/ethnicity may be related to their young adult substance use or observer-rated parenting practices; parent sex and race/ethnicity were self-reported.

Analysis

A series of path models was estimated. Model 1 tested the hypothesized relationships among early adult DUD criterion count, observed parenting practices, and child externalizing behavior. Model 2 tested the hypothesis that disrupted adult functioning would mediate the link between early adult DUD and later parenting practices. Relationships between parent adult functioning variables and child externalizing also were examined. Model 3 tested whether enduring parent characterological traits would explain both early adult DUD and later parenting practices. Model 4 tested the hypothesis that the link between early adult DUD and later parenting practices would be explained by disrupted family processes in adolescence. Diagrams of the models are available online (Appendix B). In the models tested, 0.9% of the values across all variables and cases were missing. Full Information Maximum Likelihood estimation (FIML) was used in all analyses to minimize potential bias due to missing data (Muthén & Muthén, 1998–2007; Schafer & Graham, 2002). Parent sex and ethnicity were represented by a series of dummy variables. Given the small number ($n = 13$) of Native American parents in the sample, Native American and Caucasian parents were grouped together in the analyses presented here. Supplementary analyses separating Caucasian and Native American parents (not shown) produced nearly identical parameter estimates and an identical pattern of significant findings in all four models. Although children in the study did not experience an intervention, some of the parents did participate in the SSDP intervention when they were in elementary school. We have found evidence for level, or mean, differences between control group members and individuals receiving the “full” intervention in grades 1–6 on a broad array of outcomes through age 30 (Hawkins et

al., 2005; 2008). We have never found evidence that participation in the intervention lead to differential etiology in the intervention group compared to the control group. To be cautious, we compared the results of Model 1 in the full intervention and control groups using multiple group modeling. Chi-squared difference testing revealed no evidence of moderation by parent treatment group. Therefore, parent treatment and control groups were collapsed for analyses.

Results

Descriptive Findings

In early adulthood, 24% of participants reported meeting at least one illicit DUD criterion [number of criteria met $M(SD) = 0.49 (1.4)$]. At age 27, 9% reported meeting at least one illicit DUD criterion [number of criteria met $M(SD) = 0.20 (.83)$]. About 21% of participants met at least one criterion for MDE at age 27 [number of criteria met $M(SD) = 1.49 (3.03)$]. In 30% of cases, biological mothers reported at least some substance use during pregnancy (primarily cigarette use). A table of zero-order associations among study variables is available online (Appendix C). Early adult illicit DUD was positively related to observed low-skilled parenting at ages 27–28 ($r = .24, p < .05$), but not related to prosocial socialization practices ($r = .03$). Observed low-skilled parenting was significantly associated with parent-rated child externalizing behavior ($r = .19, p < .05$), but prosocial socialization was not ($r = -.02$).

Path Model Findings

Model 1 tested associations between early adult illicit DUD symptomatology, observed parenting practices, and child externalizing (see Table 1). The early adult DUD variable was positively associated with low-skilled parenting, but was not related to prosocial socialization. Low-skilled parenting, but not prosocial socialization, was positively related to child externalizing. The two parenting measures were inversely related. There was no significant, direct relationship between parent early adult DUD and child externalizing, although the indirect relationship was significant [standardized estimate = 0.06, unstandardized estimate (SE) = 0.04 (0.02), $p = 0.02$]. Child age was negatively related to observed low-skilled parenting and prosocial socialization practices. A path linking child age and child externalizing behavior was not significant (not shown), and was dropped from this model and from further analyses. Model fit was good [$\chi^2 (2) = 0.204, p = 0.90, CFI = 1.0, TLI = 1.2, RMSEA (90\% CI) = <0.001 (<0.001 - 0.065), SRMR = 0.005$].

Model 2 (see Table 2) tested the hypothesis that early adult DUD disrupts the transition to adulthood, which results in poor parent functioning and negatively affects parenting practices. All variables measuring parent functioning in adulthood were significantly associated with early adult DUD. None of these variables, however, was uniquely related to low-skilled parenting, and only educational attainment at age 27 was related to observed prosocial socialization practices. None of the parent adult functioning variables was uniquely related to child externalizing behavior. The association between early adult DUD and low-skilled parenting remained significant. MDE criteria and income to needs ratio were associated, as were social skills and poor health. Child age was negatively associated with parent educational attainment at age 27 and observed low-skilled parenting. Parent gender and race/ethnicity were related to some of the adult functioning variables, but were not related to early adult DUD, observed parenting, or child externalizing. Model fit was good [$\chi^2 (20) = 26.448, p = 0.15, CFI = 0.97, TLI = 0.85, RMSEA (90\% CI) = 0.044 (<0.001 - 0.085), SRMR = 0.033$].

Model 3 tested the hypothesis that both early adult DUD and parenting practices are influenced by pre-existing parental personality and behavioral characteristics (see Table 3). Parent early adult DUD was associated with negative emotionality at age 21, but not with externalizing or behavioral disinhibition in adolescence. Negative emotionality was significantly predictive of later observed low-skilled parenting, observed prosocial socialization, and child externalizing. The association between early adult DUD and low-skilled parenting was reduced by 30% (0.15 versus 0.23 in Model 1) and was not significant ($p = .051$). Parent externalizing in adolescence was inversely related to later observed prosocial socialization practices. Child age was negatively related to low-skilled parenting. Being Asian American was associated with less early adult DUD in this model, but no other associations with parent gender and race/ethnicity were observed. Although correlations among model independent variables are not shown in the figure and were not estimated, Mplus notes the observed correlations among independent variables in the raw data and accounts for them in model estimation (Muthén & Muthén, 1998–2007). Model fit was good [$\chi^2(2) = 1.533, p = 0.46, CFI = 1.0, TLI = 1.1, RMSEA(90\% CI) < 0.001 (< 0.001 - 0.142), SRMR = 0.009$].

Model 4 tested the hypothesis that experienced parenting and disrupted adolescent family process may account for both early adult DUD and later parenting practices (see Table 4). None of the experienced parenting or adolescent family process variables was uniquely related to early adult DUD, low-skilled parenting, or prosocial socialization practices. Adolescent family variables also were unrelated to child externalizing behavior. Child age was related to the observed parenting practices variables. Again, the observed correlations among independent variables in the model were accounted for by default in Mplus (Muthén & Muthén, 1998–2007). Model fit was good [$\chi^2(2) = 0.018, p = 0.99, CFI = 1.0, TLI = 1.4, RMSEA(90\% CI) < 0.001 (< 0.001 - < 0.001), SRMR = .001$]. Given the strong correlations among adolescent family variables (.45 to .64), supplementary analyses creating a single adolescent family climate variable by averaging family management, involvement, conflict, and bonding (not shown) were conducted. The average adolescent family parenting/process variable also was unrelated to parent young adult DUD, observed parenting practices, or child externalizing behavior.

Discussion

This study tested the association between early adult illicit DUD and later observed parenting practices, and extended prior literature by examining three potential alternative models explaining this link. Consistent with expectations, young adult illicit DUD was associated with observed parenting practices and indirectly with child externalizing behavior. Specifically, higher levels of DUD symptomatology at ages 21–24 were associated with more low-skilled parenting at ages 27–28, which was associated with increased child externalizing behavior. Analyses from Model 2 suggest that the negative association between parent early adult DUD and later parenting practices persisted even when current parent DUD at age 27 was included. Further, parent current DUD at age 27 was not significantly related to observed parenting practices. These findings extend prior research on associations among parent current and lifetime substance use disorder, parenting practices, and child externalizing behavior by considering the importance of the timing of substance use disorder within the parent's life course. Taken together with results from Hussong and colleagues (2010), these results argue for the importance of parent problem substance use that occurs historically in parents' lives, perhaps even before parenting begins. The present results suggest that substance use in early adulthood may be particularly relevant to later parenting. Future research should consider the developmental timing of parent substance use problems and explore the effects of problem occurrence at various developmental stages on later parenting practices and child externalizing behavior.

This study found limited support for the disrupted transition to adulthood explanation of the link between parent early adult DUD and parenting practices. Consistent with this hypothesis, DUD at ages 21–24 significantly predicted most measures of parent adult functioning at age 27. Yet, of the adult functioning measures, only parent educational attainment was uniquely related to prosocial socialization practices and none of the young adult functioning variables was uniquely related to low-skilled parenting or to child externalizing behavior. These findings are consistent with a number of studies showing associations between adolescent and early adult substance use and a range of adjustment problems in young adulthood (Bailey et al., 2006; Brook et al., 2002; Fergusson & Boden, 2008; Gavin et al., in press; Hill et al., 2000; Oesterle et al., 2004). Findings are only partially in line with prior research showing associations between poor parent functioning and parenting practices (e.g., Hans, 2002; McCarty et al., 2003; Shaw et al., 2009). More research is necessary to examine the roles of parent educational attainment and social skills in the association between early adult DUD and later parenting practices.

Findings from the present study supported the hypothesis that pre-existing personality or behavioral traits may explain both early adult DUD and later parenting practices. The link between early adult DUD and low-skilled parenting was reduced to nonsignificance in Model 3. Consistent with prior literature and expectations, negative emotionality was related to both early adult DUD and observed parenting practices (Bornstein et al., 2011; Clark et al., 2000; Kotov et al., 2010; Prisciandaro et al., 2011). The role of negative emotionality in both early adult DUD and parenting practices also is consistent with developmental-ecological and life course theories suggesting that enduring characterological traits affect both individual behavior and the ways in which individuals interact with others (Bronfenbrenner, 1986; Catalano & Hawkins, 1996; Elder, 1998; Hawkins & Weis, 1985; White et al., 2001). Parent negative emotionality also had a direct relationship with child externalizing beyond its relationship with parenting practices. These results highlight the importance of parent negative emotionality in influencing their own problem behavior, their interactions with their child, and their child's problem behavior.

Surprisingly, we did not find strong evidence that behavioral disinhibition and externalizing behavior in adolescence were related to early adult DUD and parenting practices. Adolescent externalizing was associated with later observed prosocial socialization practices, but neither adolescent characteristic was significantly related to early adult DUD or low-skilled parenting. This is in contrast to previous studies showing associations between adolescent disinhibitory and externalizing psychopathology and later substance use and parenting practices (Bailey et al., 2006; Capaldi et al., 2003; Hawkins et al., 1992; Hops, Davis, Leve, & Sheeber, 2003; McGue et al., 2001; Serbin & Karp, 2004; Thornberry et al., 2003). One reason we did not find an association between adolescent behavioral characteristics and low-skilled parenting may be the somewhat small sample size; behavioral disinhibition was marginally related to low-skilled parenting ($p < 0.10$). The parameter estimate linking these variables was small, however, suggesting that even in a larger sample adolescent behavioral disinhibition would not be a strong predictor of low-skilled parenting in this sample. Although the original SSDP sample was a higher-risk sample, those parents who met eligibility criteria for TIP had fewer externalizing problems in adolescence, were more likely to be female, and had higher levels of education and lower levels of drug use symptomatology at age 27 than those SSDP participants who were not parents or who did not have sufficient face-to-face contact with their child to participate in TIP. This may have affected our ability to detect associations between adolescent behavioral disinhibition and externalizing problems and young adult DUD.

Results did not support the hypothesis that experienced parenting in adolescence and disrupted adolescent family processes may explain the association between early adult DUD

and observed parenting practices. We did not find evidence that experienced parenting and adolescent family process was related to either outcome. This was surprising, given prior evidence and theory (e.g., Bailey et al., 2011; Bronfenbrenner, 1986; Catalano & Hawkins, 1996; Eccles et al., 1993; Elder, 1998; Hawkins et al., 1992; Hawkins & Weis, 1985; Kendler et al., 2000). All of the adolescent family process variables were significantly associated with negative emotionality, however, which was related to both early adult DUD and observed parenting practices (see Appendix C online for zero-order correlation coefficients). Thus, it is possible that family processes in adolescence influence young adult outcomes in part by influencing personality characteristics like negative emotionality. Some studies have found significant associations between parenting practices and child and adolescent negative emotionality (Haller & Chassin, 2011; Lengua & Kovacs, 2005), supporting this notion. Future research is needed to clarify the relationship among adolescent family processes and experienced parenting, adolescent and young adult negative emotionality, young adult substance use, and later parenting practices.

Limitations

Several limitations should be noted. First, the parents in this study were selected from a geographically limited area when they were in 5th Grade in 1985, and this may affect the generalizability of results. Approximately 40% of the families have moved outside of the metropolitan area where they were recruited, however, and live all across the U.S. and, in some cases, outside the U.S. Second, although a sample size of 167 is large for a study employing observational data, it is small compared to many studies of the effects of parent substance use on parenting practices and child externalizing behavior. Ideally, the results reported here would be replicated in a larger sample. Third, some parents had already had their child at the time the age 21–24 DUD measures were taken. Because data on child characteristics from before the parent early adult DUD measure are unavailable, we cannot rule out possible child effects on parent DUD. Finally, parents who were eligible and chose to participate in the TIP study were more educated and had fewer DUD symptoms at age 27 than those who were not eligible or did not participate. These results likely generalize best to families where parents are actively parenting (i.e., have frequent, face-to-face contact with) their child.

Conclusions

The current results suggest that problem drug use that occurs in early adulthood may affect later parenting skills. These findings argue against the notion that a circumscribed period of heavy substance use in the early 20s will not affect later parenting. Future studies should consider not only the presence or absence of parent problem substance use, but also the timing of problem substance use in relation to parenting and in relation to parents' own life course. Results from this study also highlight the importance of parent personality factors, especially negative emotionality, in influencing parents' own problem behaviors, the developmental environment they provide for their children, and child problem behaviors. Prevention and treatment programs aimed at addressing young adult substance use, poor parenting practices, and child behavior problems should pay attention to parent personality factors that may contribute to these behaviors. Programs designed to help relieve or support coping with negative emotionality in young adulthood may have significant benefits for young adults and, when they become parents, for their children.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Parameter Estimates from Model 1 Testing the Associations among Parent Early adult DUD, Observed Parenting Practices, and Child Externalizing.

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
<i>Early adult DUD regressed on</i>			
Child age	-.09	-.05 (.05)	.30
African American	-.09	-.27 (.25)	.29
Asian American	-.13	-.52 (.31)	.09
Female	-.07	-.19 (.23)	.40
<i>Low-skilled parenting regressed on</i>			
Early adult DUD	.23*	.07 (.02)	<.01
Child age	-.16*	-.03 (.02)	.05
African American	.10	.10 (.07)	.20
Asian American	.04	.04 (.09)	.65
Female	-.02	-.01 (.07)	.84
<i>Prosocial socialization regressed on</i>			
Early adult DUD	<.01	<.01 (.03)	.99
Child age	-.19*	-.04 (.02)	.02
African American	-.16	-.17 (.09)	.05
Asian American	-.04	-.06 (.11)	.59
Female	.09	.09 (.08)	.26
<i>Child externalizing regressed on</i>			
Prosocial socialization	.14	.26 (.18)	.15
Low-skilled parenting	.26*	.57 (.21)	.01
African American	.02	.04 (.17)	.80
Asian American	<-.01	-.01 (.21)	.98
Female	-.01	-.03 (.15)	.85
Correlations specified in the model			
Prosocial socialization with low-skilled parenting	-.63*	-.12 (.02)	<.01

* $p < .05$

NOTE: *P* values were rounded to two decimal places. Variables are parent measures unless “child” is specified. Comparison group for ethnicity variables is Caucasian/Native American. DUD = drug use disorder.

Table 2

Parameter Estimates from Model 2 Testing the Disrupted Transition to Adulthood Hypothesis

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
<i>Early adult DUD regressed on</i>			
Child age	-.09	-.05 (.05)	.30
African American	-.09	-.27 (.25)	.29
Asian American	-.13	-.52 (.31)	.09
Female	-.07	-.19 (.23)	.40
<i>DUD at age 27 regressed on</i>			
Early adult DUD	-.26*	-.16 (.04)	<.01
Child age	.10	.04 (.03)	.20
African American	.19*	.35 (.14)	.02
Asian American	.01	.02 (.18)	.93
Female	-.09	-.16 (.13)	.23
<i>Educational attainment by age 27 regressed on</i>			
Early adult DUD	-.16*	-.28 (.13)	.03
Child age	-.23*	-.24 (.08)	<.01
African American	-.08	-.40 (.41)	.33
Asian American	-.03	-.18 (.50)	.72
Female	.24*	1.12 (.37)	<.01
<i>Poor health at age 27 regressed on</i>			
Early adult DUD	.30*	.09 (.02)	<.01
Child age	.08	.01 (.01)	.32
African American	.13	.12 (.07)	.09
Asian American	.18*	.21 (.09)	.02
Female	.12	.10 (.06)	.11
<i>MDE criteria at age 27 regressed on</i>			
Early adult DUD	.24*	.52 (.17)	<.01
Child age	-.04	-.05 (.11)	.65
African American	.11	.71 (.54)	.19
Asian American	.19*	1.61 (.66)	.02
Female	.12	.76 (.49)	.12
<i>Income:needs ratio at age 27 regressed on</i>			
Early adult DUD	-.15*	-.24 (.12)	.05
Child age	.03	.03 (.08)	.72
African American	-.21*	-1.04 (.40)	.01
Asian American	.05	.33 (.50)	.51
Female	-.09	-.42 (.36)	.24
<i>Social skills at age 27 regressed on</i>			
Early adult DUD	-.19*	-.07 (.03)	.01

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
Child age	-.07	-.02 (.02)	.42
African American	.01	.02 (.09)	.80
Asian American	-.10	-.14 (.12)	.22
Female	<-.01	<-.01 (.09)	.96
<i>Prenatal substance use regressed on</i>			
Early adult DUD	.20*	.07 (.03)	.01
Child age	.11	.02 (.02)	.20
African American	-.08	-.09 (.09)	.33
Asian American	-.25*	-.33 (.11)	<.01
Female	.02	.01 (.08)	.89
<i>Low-skilled parenting regressed on</i>			
Early adult DUD	.17*	.05 (.03)	.04
DUD at age 27	-.04	-.02 (.04)	.61
Prenatal substance use	.02	.02 (.07)	.80
Educational attainment by age 27	-.12	-.02 (.01)	.14
Poor health at age 27	.02	.02 (.08)	.81
MDE criteria at age 27	.02	<.01 (.01)	.86
Income:needs ratio at age 27	-.09	-.02 (.02)	.25
Social skills at age 27	-.11	-.09 (.06)	.14
Child age	-.19*	-.04 (.02)	.02
African American	.09	.08 (.08)	.31
Asian American	.03	.03 (.10)	.75
Female	-.01	<-.01 (.07)	.95
<i>Prosocial socialization regressed on</i>			
Early adult DUD	.08	.03 (.03)	.37
DUD at age 27	.01	.01 (.05)	.89
Prenatal substance use	-.10	-.11 (.09)	.22
Educational attainment by age 27	.17*	.04 (.02)	.03
Poor health at age 27	-.09	-.11 (.10)	.26
MDE criteria at age 27	.08	.01 (.01)	.31
Income:needs ratio at age 27	.05	.01 (.02)	.54
Social skills at age 27	.08	.08 (.07)	.30
Child age	-.12	-.03 (.02)	.14
African American	-.15	-.16 (.09)	.08
Asian American	-.06	-.08 (.11)	.48
Female	.06	.06 (.08)	.50
<i>Child externalizing regressed on</i>			
Prosocial socialization	.16	.30 (.18)	.10
Low-skilled parenting	.23*	.49 (.21)	.02
DUD at age 27	.03	.03 (.09)	.71

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
Prenatal substance use	.13	.24 (.16)	.13
Educational attainment by age 27	-.05	-.02 (.03)	.56
Poor health at age 27	.12	.26 (.18)	.15
MDE criteria at age 27	.05	.01 (.02)	.59
Income:needs ratio at age 27	-.10	-.04 (.03)	.25
Social skills at age 27	-.01	-.01 (.14)	.89
African American	-.01	-.03 (.17)	.85
Asian American	.01	.03 (.22)	.88
Female	-.03	-.06 (.15)	.68
<i>Correlations specified in the model</i>			
Prosocial socialization with low-skilled parenting	-.62*	-.11 (.02)	<.01
MDE criteria at age 27 with income:needs ratio	-.25*	-1.53 (.50)	<.01
Social skills at age 27 with poor health	-.17*	-.03 (.02)	.03
Prenatal substance use with income:needs ratio	-.13	-.12 (.08)	.10

*
 $p < .05$

NOTE: *P* values were rounded to two decimal places. Variables are parent measures unless "child" is specified. Comparison group for ethnicity variables is Caucasian/Native American. DUD = drug use disorder, MDE = major depressive episode.

Table 3

Results from Model 3 Testing the Pre-existing Personality Characteristic Hypothesis

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
<i>Early adult DUD regressed on</i>			
Negative emotionality at age 21	.36*	.79 (.17)	<.01
Externalizing in adolescence	.02	.12 (.42)	.76
Behavioral disinhibition in adolescence	-.09	-.17 (.15)	.26
Child age	-.09	-.05 (.05)	.26
African American	-.11	-.34 (.25)	.17
Asian American	-.17*	-.65 (.31)	.03
Female	-.15	-.41 (.24)	.09
<i>Low-skilled parenting regressed on</i>			
Early adult DUD	.15	.05 (.02)	.05
Negative emotionality at age 21	.22*	.14 (.05)	.01
Externalizing in adolescence	.10	.15 (.13)	.24
Behavioral disinhibition in adolescence	-.13	-.07 (.05)	.10
Child age	-.18*	-.03 (.02)	.03
African American	.05	.05 (.08)	.51
Asian American	.01	.01 (.10)	.95
Female	-.06	-.05 (.08)	.53
<i>Prosocial socialization regressed on</i>			
Early adult DUD	.07	.02 (.03)	.39
Negative emotionality at age 21	-.19*	-.14 (.06)	.02
Externalizing in adolescence	-.19*	-.33 (.15)	.03
Behavioral disinhibition in adolescence	.06	.04 (.05)	.48
Child age	-.15	-.03 (.02)	.06
African American	-.10	-.11 (.09)	.23
Asian American	-.05	-.07 (.11)	.52
Female	.07	.07 (.09)	.43
<i>Child externalizing regressed on</i>			
Prosocial socialization	.15	.28 (.18)	.12
Low-skilled parenting	.19*	.42 (.20)	.04
Negative emotionality at age 21	.29*	.43 (.12)	<.01
Externalizing in adolescence	.02	.06 (.29)	.84
Behavioral disinhibition in adolescence	-.05	-.06 (.10)	.58
African American	.01	.02 (.17)	.93
Asian American	-.03	-.07 (.21)	.74
Female	-.08	-.15 (.16)	.35
<i>Correlations specified in the model</i>			
Prosocial socialization with low-skilled parenting	-.61*	-.11 (.02)	<.01

*
 $p < .05$

NOTE: *P* values were rounded to two decimal places. Correlations among exogenous personality and control variables are not estimated in the model, but the observed correlations from raw data are taken into account by Mplus. Variables are parent measures unless “child” is specified. Comparison group for ethnicity variables is Caucasian/Native American. DUD = drug use disorder.

Table 4

Results from Model 4 Testing the Disrupted Adolescent Family Process Hypothesis

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
<i>Early adult DUD regressed on</i>			
Family management in adolescence	.08	.35 (.51)	.50
Family conflict in adolescence	.10	.26 (.30)	.38
Positive involvement in family in adolescence	-.02	-.07 (.49)	.89
Bonding to family in adolescence	-.09	-.26 (.37)	.48
Child age	-.11	-.07 (.05)	.21
African American	-.09	-.26 (.25)	.29
Asian American	-.10	-.39 (.32)	.22
Female	-.07	-.19 (.23)	.41
<i>Low-skilled parenting regressed on</i>			
Early adult DUD	.23 *	.07 (.02)	<.01
Family management in adolescence	-.16	-.20 (.15)	.17
Family conflict in adolescence	-.03	-.02 (.09)	.78
Positive involvement in family in adolescence	.09	.11 (.14)	.42
Bonding to family in adolescence	-.05	-.04 (.11)	.70
Child age	-.18 *	-.03 (.02)	.03
African American	.12	.11 (.07)	.14
Asian American	.04	.05 (.09)	.61
Female	-.01	-.01 (.07)	.94
<i>Prosocial socialization regressed on</i>			
Early adult DUD	<.01	<.01 (.03)	.98
Family management in adolescence	.04	.06 (.17)	.74
Family conflict in adolescence	-.05	-.04 (.10)	.67
Positive involvement in family in adolescence	.03	.05 (.16)	.78
Bonding to family in adolescence	-.10	-.11 (.12)	.38
Child age	-.19 *	-.04 (.02)	.03
African American	-.16	-.17 (.09)	.05
Asian American	-.04	-.05 (.11)	.66
Female	.09	.09 (.08)	.27
<i>Child externalizing regressed on</i>			
Prosocial socialization	.13	.24 (.18)	.18
Low-skilled parenting	.24 *	.53 (.20)	.01
Family management in adolescence	-.18	-.50 (.32)	.12
Family conflict in adolescence	-.01	-.01 (.18)	.96
Positive involvement in family in adolescence	-.03	-.09 (.30)	.77
Bonding to family in adolescence	-.01	-.02 (.23)	.93
African American	.02	.05 (.16)	.78
Asian American	.01	.03 (.21)	.88

<i>Association Tested</i>	Standardized Estimate	Unstandardized Estimate (SE)	<i>p</i>
Female	.01	.01 (.15)	.95
<i>Correlations specified in the model</i>			
Prosocial socialization with low-skilled parenting	-.63*	-.12 (.02)	<.01

* $p < .05$

NOTE: *P* values were rounded to two decimal places. Correlations among exogenous adolescent family process and control variables are not estimated in the model, but the observed correlations from raw data are taken into account by Mplus. Variables are parent measures unless "child" is specified. Comparison group for ethnicity variables is Caucasian/Native American. DUD = drug use disorder.