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Conduct Problems in Adopted and Non-adopted Adolescents and Adoption Satisfaction as a Protective Factor

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Abstract

The present study compared the level of conduct problems at age 17 in a large, non-clinical sample of adopted participants placed in infancy and children in non-adoptive families matched to the adoptive families on demographic characteristics. Higher levels of adolescent and parent adoption satisfaction were associated with lower levels of conduct problems. Gender by adoption status interactions were not significant. However, female adopted participants had higher levels of conduct problems than female non-adopted participants, whereas male adopted and non-adopted participants had similar levels of conduct problems. In the overall sample, differences between adopted and matched control participants on all conduct problem measures were nonsignificant.

Keywords

Adoption; Conduct Problems; Adolescents; Adoption Satisfaction

Conduct disorder (CD) affects a significant proportion of adolescents in the United States and debilitates functioning in many facets of life. The prevalence of CD is approximately 6% to 16% in males and 2% to 9% in females under the age of 18 (*Diagnostic and statistical manual of mental disorders, fourth edition*, [DSM-IV], American Psychiatric Association [APA], 1994). Adolescents diagnosed with CD, who manifest externalizing behaviors (i.e., the propensity to express distress outwards, e.g., Krueger, McGue, & Iacono, 2001), have increased use of drugs and alcohol, higher incidence of crime, age norm violations (e.g., staying out at night without parents' permission), violations of the rights of others, and persistent lying. This symptomatology also correlates with low achievement in school, lower family functioning, and comorbidity with other disorders such as attention-deficit/hyperactivity disorder (DSM-IV, APA, 1994). Implications for the lives of affected adolescents, their relatives and acquaintances, and society as a whole warrant an investigation of the etiology as well as risk factors influencing CD.

There is a significant body of literature suggesting that adopted individuals are at a high risk for psychopathology, specifically, conduct problems. A meta-analysis conducted by Wierzbicki (1993) examined 66 published studies comparing adopted participants with their nonadopted peers on seven domains of functioning. While significant differences were not found on levels of internalizing disorders, neurological abnormalities, or psychotic characteristics, adopted participants had significantly higher representations in clinic samples, significantly higher levels of externalizing disorders ($d = .22$), significantly more academic problems ($d = .13$), and significantly greater general severity ($d = .23$) than non-adopted participants.

Another meta-analysis examined 64 studies with any combination of internationally adopted samples, domestically adopted samples, and nonadopted control samples (Juffer & Ijzendoorn, 2005). Studies examining samples of physically or mentally disabled children,

hard to place adoptees, or children exposed to alcohol or drugs in the womb were excluded. Overall, adopted participants had a higher level of externalizing ($d = .24$), internalizing ($d = .16$), and total ($d = .18$) behavior problems than non-adopted participants, with the effect sizes being larger for the difference between international adopted participants and non-adopted participants than for the difference between domestic adopted participants and non-adopted participants ($d = .20$ vs. $.11$ for total behavior problems, $d = .34$ vs. $.10$ for externalizing problems, and $d = .23$ vs. $.07$ for internalizing problems).

Other researchers suggest that the studies reporting high levels of behavior problems among adopted individuals are often conducted using a clinical sample of adopted individuals, and that the results are not generalizable to the adopted population as a whole (Smith, 2001). Many studies suggesting that adopted individuals have a higher risk for behavior problems base their results on the high representation of adopted individuals in clinical settings (Kotsopoulos, Cote, Joseph, Pentland, Stavrakaki, et al., 1988). While adopted individuals make up approximately 1% – 2% of the U.S. adolescent population, they represent 8.7% – 21.2% of adolescents admitted into inpatient care and 1.1% – 7.5% of outpatients (Haugaard, 1998). Although researchers generally conclude that adopted adolescents are over-represented among those who receive psychological treatment, they disagree regarding the influences causing the higher prevalence. There is a growing body of research suggesting that the higher prevalence may be in part due to increased disposition to seek psychological assistance among adoptive parents (Miller, Fan, Grotevant, et al., 2000). For example, Stams, Juffer, Rispen, and Hoksbergen (2000) examined differences in behavior problems in adopted and non-adopted participants via mother and teacher ratings. There were no statistically significant differences between the two groups on any of the domains measured via teacher ratings. In contrast, mothers of adopted girls reported significantly more aggressive behavior and externalizing behavior problems than mothers of nonadopted girls, and mothers of adopted boys reported significantly greater problems in every domain measured except thought problems than mothers of nonadopted boys. These findings support the hypothesis that people who choose to adopt children may be more sensitive to behavior changes than biological parents.

Several studies examining non-clinical samples contradict findings that suggest adopted participants are at greater risk for conduct problems. A study examining a large, non-clinical sample of adopted and non-adopted participants found no difference in the prevalence of antisocial personality disorder (3.0% in both groups; Tieman, van der Ende & Verhulst, 2005). Results were similar when the effects of gender were controlled. Burrow, Tubman and Finley (2004) found little mean difference in delinquency between adopted and non-adopted adolescents. Grotevant et al. (2006) took a different approach and examined adoption status as a predictor of antisocial behavior, and concluded that it is not an independent predictor of either aggressive or nonaggressive antisocial behavior after controlling for background characteristics, early maltreatment, peer relations, and family relationships. Also, although Miller, Fan, Christensen, et al. (2000) reported differences in behavioral problems between adopted and non-adopted groups in the National Longitudinal Study of Adolescent Health sample, Fan et al. (2002) later reported that these differences were exaggerated because a group of adolescents who mis-identified themselves as “adoptees” gave extreme responses. Some researchers also have suggested that adopted individuals may even have a *lower* incidence of some antisocial behaviors, such as physical fighting, than their non-adopted peers (e.g., Feigelman, 2001).

Another explanation for the difference in the level of conduct problems between adopted and non-adopted children and adolescents may be the confounding variable of age at adoption. In contrast to adopted individuals placed in their adoptive homes soon after birth, later-adopted children may be more likely to have characteristics, such as medical

conditions, that make them more difficult to place, or enter the adoption system after experiencing trauma in the homes of their biological parents. Although many studies have reported an increased level of behavior problems in adopted individuals, the differences between adopted and non-adopted individuals are diminished when age at adoption is controlled. The increased level of behavior problems may be limited to late-placed adopted individuals. Sharma, McGue, and Benson (1996) examined four different age-at-adoption groups: 0–1 year-old, 2–5 years old, 6–10 years old, and older than 10 years old. They observed that antisocial behavior and drug use were significantly greater for those who were over the age of 10 at adoption placement than for adopted participants placed at infancy. Those adopted at age 2–5 years and 6–10 years were less likely to have problems than those adopted later than 10 years of age and more likely to have problems than those adopted at 0–1 year, but there was not a significant difference between those adopted at age 2–5 years and those adopted at age 6–10 years. These results suggest that the increased risk for conduct problems in adopted individuals placed later in life can be explained by pre-adoption life experiences incurred in early childhood (Verhulst, Althaus, & Versluis-den Bieman, 1992). Thus, it is clear that there is an association between age at adoption and the level of conduct problems for adopted adolescents.

Some researchers have postulated adopted individuals' high risk for psychopathology to be related to unresolved abandonment issues, identity confusion, and thoughts about birth parents (Hollingsworth, 1998; Feigelman, 1997; Smith, 2001). As adopted individuals reach adolescence, they may become more aware of physical differences between themselves and their adoptive parents, initiating further fantasies regarding birth parents (Silin, 1996). "If such an issue is fundamental to growing up adopted, then such identity seeking and turmoil would be manifested in more dysfunctional conduct compared to the nonadopter as the adoptee moves from childhood into adulthood" (Feigelman, 1997, p. 201).

Adoption satisfaction, or family satisfaction, is a possible protective factor that has received little attention in the literature. Grotevant, Wrobel, Dulmen and McRoy (2001) examined the compatibility between adopted participants and adoptive parents over an eight-year period as reported by the adoptive parents. After categorizing families into five groups ranging from consistently compatible to consistently incompatible, the researchers observed that problem behavior scores increased as compatibility decreased.

In the present study, we examined data from the Colorado Adoption Project (CAP; Plomin & DeFries, 1985), comparing the level of DSM-IV conduct disorder symptoms and conduct problems in adopted and non-adopted participants at age 17. The CAP includes a large sample of adopted participants adopted in infancy and ascertained from the general population and a control sample of adolescents who were reared by one or both biological parents and whose demographic variables have been matched to be comparable to the adopted sample. These data allow us to compare the level of conduct problems in adopted and non-adopted participants during adolescence while controlling for possible confounding effects, such as age at adoption.

Five previous studies have compared conduct problems at earlier ages and traits associated with conduct problems (i.e., substance use and age at sexual initiation) in adopted and non-adopted participants in the CAP. Plomin and DeFries (1985) found few significant differences at ages 12 and 24 months on parent- and teacher-rated measures of temperament and behavior, and these differences revealed fewer problems for adopted than control infants. Rhea and Corley (1994) reported that adopted participants had significantly more conduct problems than non-adopted participants, with consistent results for parent- and teacher-reported externalizing behaviors at ages 7 and 9 and self-reported conduct problems at age 9. They noted, however, that adoption status accounted for only a small percentage of

variance, and the effect sizes of the difference between adopted and non-adopted participants were in the small to moderate range (i.e., between .23 and .38). Results were consistent for boys and girls, with no statistically significant gender by adoption status interactions.

Wadsworth et al. (1997) examined differences in the prevalence of self-reported substance use between adopted and non-adopted participants in the CAP, examining cigarettes, alcohol, marijuana, and other drugs. For the prevalence of use, there were only six statistically significant differences between adopted and non-adopted participants out of 30 tests, with a greater percentage of adopted participants than non-adopted participants drinking by grades 8 and 9 and smoking by grades 9 and 10. Again, Wadsworth et al. noted that the differences between adopted and non-adopted participants were small, with adoption status accounting for less than 4% of the variance in substance use. They reported the interesting finding that there were fewer sex differences among adopted adolescents than among non-adopted adolescents, and that gender was less of a protective factor in adopted girls than in non-adopted girls.

Iervolino (2003) examined parent, teacher, and self-reports of problem behavior and emotional adjustment at ages 9–16. Parents and teachers rated the adopted adolescents higher on externalizing behaviors, and the group difference was stronger in females than in males. Although these differences were significant, as with earlier analyses, adopted status accounted for only about 4% of the variance.

Bricker et al. (2006) recently examined self-reported age at sexual initiation in the CAP sample and also reported a possible gender by adoption status interaction. Adopted participants' age at sexual initiation was 8 months earlier than that of non-adopted participants. However, consistent with the trend found by Iervolino (2003), the difference between adopted and non-adopted participants was statistically significant in females (16.4 years in adopted participants vs. 17.4 years in non-adopted participants), but not in males (16.8 years in adopted participants and 17.0 years in non-adopted participants).

We also examined whether adoption satisfaction is a protective factor against conduct problems in the adopted participants. We examined adopted participants' report of the acceptance of adoption status and security in belonging to the adoptive family as well as the adoptive parents' reports of the integration of the adopted child into their family and differences between their family and biological families. Although we predicted that acceptance and security reported by the adopted participants and integration reported by the adoptive parents will be protective factors against conduct problems, it is unclear whether differences reported by the adoptive parents should be a protective factor or a risk factor. For example, Kirk (1964) concluded that a balance between denial and acknowledgment of differences made by adoption was ideal, but that acknowledgment of differences was better than denial of differences.

Method

Participants

Data have been collected from the Colorado Adoption Project (CAP), an ongoing, longitudinal study at the Institute for Behavioral Genetics at the University of Colorado at Boulder. Adoptive parents working with one of two large adoption agencies in the Rocky Mountain region (Denver Catholic and Lutheran Social Services) were asked to participate in the project after completion of the adoption process. The result was a sample of 245 adopted participants and their adoptive parents and siblings. All adopted participants were adopted as infants and were placed in two-parent families. Approximately 90% of the

adopted participants' biological parents and 95% of adoptive parents were Caucasian. Data were also collected from adopted siblings of the adopted participants. We did not examine data from these siblings given the issue of non-independence.

A sample of non-adoptive families whose demographics match those of the adoptive families was also recruited in the CAP. Non-adoptive families were recruited through hospitals in the Denver area. Letters describing the project were provided to families with newborn children. Those interested in participating were interviewed for comparative demographics: gender, number of children in the family, age of father, occupational status of the father, and father's education level. In total, 245 non-adoptive families were selected.

Data were collected from both samples annually through early adulthood. The current study examined data collected from adopted and non-adopted cohorts at ages 16–19, with most individuals being assessed at age 17. The sample examined in the present study consists of 202 adopted and 215 control participants (112 male and 90 female adopted participants and 113 male and 102 female control participants).

Measures

Two measures, the Diagnostic Interview Schedule for Children – Child Version (DISC) and the Monitoring the Future High School Senior Survey (MTF), were used to assess the level of conduct problems in both the adopted and the non-adopted participants. The adopted participants and adoptive parents also completed a measure assessing the level of adoption satisfaction.

The current Diagnostic Interview Schedule for Children – Child Version (DISC) is a structured interview administered to adolescents by non-clinicians in order to obtain psychiatric diagnoses according to the DSM-IV criteria. However, a portion of our sample was administered the previous version of the DISC, which assessed DSM-III-R CD. Therefore, items from the previous DISC were added to the current DISC, allowing the assessment of both DSM-III-R and DSM-IV CD (Fisher, Shafer, Piacentini, Lapkin, Kafantaris, et al., 1993). The DISC was used to assess DSM-III-R CD symptoms and CD diagnoses over the lifetime. The criterion validity for the CD assessed via the DISC (i.e., comparisons to clinician ratings) is moderate, with kappas ranging from .52 to .57 (Schwab-Stone, Shaffer, Dulcan, Jensen, Fisher, et al., 1996). Data on DISC CD were available for 200 adopted participants and 215 control participants.

The Monitoring the Future High School Senior Survey (MTF; Johnston, O'Malley, & Bachman, 1986) is a questionnaire presented to adolescents in order to measure past-year conduct problems, and includes 14 items assessing fighting, aggression, weapon use, stealing, breaking and entering, and property damage. In the present sample, there was a significant correlation between the number of DSM-III-R CD symptoms and the number of MTF conduct problems ($r = .57$, $p < .01$). Data on the MTF conduct problems scale were available for 198 adopted participants and 210 control participants.

A 79-item questionnaire was administered to the adopted participants in order to assess their adoption satisfaction (Sharma et al., 1998). Two scales from this questionnaire were examined. The first scale consisted of 12 items and assessed acceptance of adoption status, including responses to statements such as “Being adopted makes me feel loved,” “I wish people did not know I was adopted,” and “I feel like something is missing in my life”. The internal consistency (Cronbach's α) for this scale was .83. The second scale consisted of 6 items and assessed security in belonging to the adoptive family, and included responses to statements such as “I worry that my parents might not want me,” “I think my parent(s) would love me more if I were their birth child,” and “I feel like I don't belong to anyone”.

The internal consistency of this scale was .78. Responses on the adoption satisfaction scales were available in 194 adopted participants. A higher acceptance score means higher acceptance of adoption status, and a higher security score means higher security in belonging to the adoptive family.

Adoptive parents were administered a shorter, 17-item parent version of the questionnaire, and we examined two scales derived from this measure. The first scale assessed how well they felt their adopted child integrated into the family. The scale includes three items with statements such as, "I usually don't think of my child as having been adopted". The internal consistency of this scale was .64. Second, 14 items were used to assess adoptive parents' ideas about how different their family's situation is in comparison to biological families. This scale included statements such as, "A family with adopted children faces challenges and issues that other families do not face," and "I introduce my child to others as an adopted child." The internal consistency of this scale was .85. Each scale was administered to mothers (n=176) and fathers (n=155) separately. A higher integration score means that parents feel that their adopted child has not been integrated into the family well, and a higher difference score means that parents feel that adoptive families are different from non-adoptive families.

In order to explore whether children with more antecedent behavior problems have lower adoption satisfaction at age 17, we examined the externalizing behavior scale from the Child Behavior Checklist (CBCL; Achenbach, 1991), a parent questionnaire. The average of the externalizing scale scores at ages 4, 7, 9, 10, 11, and 12 was used to increase its reliability.

Analysis

An independent samples t-test was conducted to examine whether adopted and control participants differed in the number of CD symptoms displayed over the life course as measured by the DISC. We also conducted an independent samples t-test to examine the difference in level of conduct problems as measured by the MTF between the adopted and control participants. In addition, the chi-square test was used to test whether the prevalence of CD diagnoses over the life course differed between the adopted and control participants. These analyses were also conducted separately for males and females to examine potential sex differences.

The power to detect a difference in the number of DISC CD symptoms or the MTF scores between adopted and control participants was .64 to .65 for small effect sizes ($d=.20$), but greater than .99 for moderate ($d=.50$) and large ($d=.80$) effect sizes. Similarly, the power to detect a small difference ($w = .10$) in the percentage of individuals with a CD diagnosis between adopted and control participants was .53, but greater than .99 for moderate ($w = .30$) and large ($w = .50$) effect sizes.

We calculated Pearson correlations between each adoption satisfaction scale (separating mother and father responses on the parent scales) and each measure of conduct problems (the DISC measure of number of CD symptoms and the MTF measure of level of conduct problems). Also, Pearson correlations between each adoption satisfaction scale and childhood externalizing behavior scale score were calculated to examine whether adopted participants with more behavior problems in childhood have less adoption satisfaction at age 17. All analyses were also conducted separately for males and females to examine potential sex differences. The power to detect a difference in the level of adoption satisfaction between adopted participants with and without CD was .24 to .30 for small effect sizes ($d = .20$), .77 to .88 for moderate effect sizes ($d = .50$), and greater than .99 for large effect sizes ($d = .80$). The power to detect a small correlation ($r = .10$) between conduct problems and

adoption satisfaction was between .34 to .40, but greater than .99 for moderate ($r = .30$) and large ($r = .50$) effect sizes.

Results

Table 1 shows the results of t-tests examining potential differences in the mean number of CD symptoms and conduct problems in the adopted and control participants. There was little difference between adopted and control participants in the number of DSM III-R CD symptoms, as measured by the DISC, and the mean difference was not statistically significant. There was little difference in the number of CD symptoms between male adopted participants and male control participants. In fact, control males had a slightly higher number of CD symptoms than adopted males. In contrast, adopted females had a significantly greater number of DSM III-R CD symptoms than female control participants, resulting in a gender by adoption status interaction that approached significance, $t(411) = -1.90$, $p = .06$.

The mean level of conduct problems measured by the MTF was not significant between the two groups. However, again, adopted participants displayed a slightly greater level of conduct problems than control participants. Gender disparities that were observed with the DISC were also seen with MTF scores. Male adopted participants and male control participants did not differ significantly on their mean level of conduct problems. However, female adopted participants had a significantly higher mean level of conduct problems than female control participants. Again, the gender by adoption status interaction approached statistical significance, $t(404) = -1.76$, $p = .08$.

The two samples also did not differ significantly in the percentage of individuals with a CD diagnosis, $\chi^2(1, 415) = 1.85$, $p = .17$. The percentage of individuals with a CD diagnosis was higher in the adopted participants (21.5%) than in the control participants (16.3%), although this was a small effect ($w = .07$; w is the effect size index for categorical data, Cohen, 1988). Again, adopted males and control males showed no difference in the prevalence of CD diagnosis (25.9% in adopted participants and 25.7% in control participants), $\chi^2(1, 225) = 0.002$, $p = .97$, but female adopted participants had a higher prevalence of CD diagnosis than female control participants (15.9% in adopted participants and 5.9% in control participants), $\chi^2(1, 190) = 5.04$, $p = .02$.

Table 2 shows the results of t-tests examining potential sex differences in the level of adoption satisfaction. None of the differences were statistically significant; however, female adopted participants and their parents reported lower adoption satisfaction than male adopted participants and their parents on all six measures of adoption satisfaction.

The relationship between adoption satisfaction and conduct problems was assessed by calculating Pearson correlations among the number of CD symptoms, assessed using the DISC, the level of conduct problems, assessed using the MTF survey, and domains of adoption satisfaction in the adopted participants as well as in the adoptive parents.

All correlations between adoptee measures of adoption satisfaction and measures of conduct problems were statistically significant, suggesting that adopted participants with higher adoption acceptance and security in the family have lower CD symptoms and level of conduct problems (see Table 3). Correlations between the parent scales (integration in the family and adoptive family differences) and adolescent CD symptoms and level of conduct problems followed a similar pattern, suggesting that adopted participants whose parents felt that they had integrated into the adoptive family well and that adoptive families are not different from non-adoptive families have lower number of CD symptoms and level of conduct problems (see Table 3). The fathers' reports of integration and differences were not

significantly correlated with the MTF measure of conduct problems, although they were significantly correlated with the DISC measure of CD symptoms. The mothers' reports of integration and differences were significantly correlated with both measures. We also examined the correlations among the adoption satisfaction scales (see Table 3). All correlations among the scales, except for the correlation between adoption acceptance and father integration and between father integration and mother difference, were statistically significant.

When these correlations were calculated separately for males and females, the overall results were similar. Although some of the correlations that were statistically significant in the whole sample were not significant when calculated separately by gender, the correlations were in the same direction (i.e., greater conduct problems being correlated with lower adoption satisfaction) in both males and females. Exceptions are correlations between integration reported by the fathers and MTF survey ($r = -.07$, $p = .59$) and difference reported by the fathers and MTF survey ($r = -.01$, $p = .96$) in females.

It is possible that early problem behaviors in childhood in the adopted participants led to lower satisfaction regarding adoption by both the adopted participants and the adoptive parents. In order to examine this possibility, we examined the correlations between the average externalizing behavior score (from age 4 to 12) and each of the adoption satisfaction scales. Average externalizing behavior score in childhood was positively correlated with both DISC CD symptoms ($r = .32$, $p < .01$) and total MTF score ($r = .11$, $p = .14$) at age 17. None of the adoption satisfaction scales were significantly correlated with early problem behaviors in the entire sample, although the direction of effect was consistent with those for DISC CD and MTF survey (i.e., greater problem behaviors in childhood was correlated with lower adoption satisfaction; $r = -.02$ to $-.12$ for adoption satisfaction reported by the adopted participants and $r = .05$ to $.10$ for adoption satisfaction reported by the adoptive parents). In males, two of the correlations were statistically significant (integration reported by the fathers; $r = .26$, $p = .02$) or approached significance (difference reported by the fathers; $r = .20$; $p = .06$). In females, none of the correlations were statistically significant, and the direction of three of the correlations (integration reported by the fathers and mothers and difference reported by the fathers) were opposite that expected (i.e., lower problem behaviors in childhood was correlated with lower adoption satisfaction).

Discussion

We examined whether adopted adolescents have an increased prevalence of conduct problems when compared to their non-adopted peers. Sharma et al. (1996) have shown that later adoption placement increases the likelihood of the development of antisocial behavior in adolescents. Also, Miller, Fan, Grotevant, et al. (2000) suggest that adoptive parents may be more sensitive to psychological dysfunction and more likely to obtain clinical services for their adopted children. Adoptive parents also may be more aware of clinical services as a result of the adoption process and any counseling they may have received. Due to these confounding variables, past studies examining conduct problems in adopted individuals and their non-adopted peers have been inconclusive. The main strength of the present study is that these two potential confounding variables, later age at adoption and clinical ascertainment, were eliminated. All of the adopted participants in the present study were placed in their adoptive families before the age of 12 months, controlling for late-placement adjustment problems. In addition, the adopted participants from the present study were ascertained from the general population, and the control sample was matched to the adoptive families on several demographic variables, including gender, number of children in the family, age of father, occupational status of the father, and father's education level. Plomin and DeFries (1985) and Rhea and Corley (1994) examined potential differences in family

environment and parent personality in the adoptive and non-adoptive families in the CAP sample when the adopted participants and their matched control participants were 1, 2, 7 and 9 years old, and did not find significant differences, giving further support to the assertion of adequate control for potential confounding variables. Although both samples were ascertained from the general population and the adoptive and non-adoptive families were similar on many demographic variables, it is possible that adoptive parents are more sensitive to possible conduct problems in their children than control parents. Therefore, we examined self-reports of conduct problems from the adolescents.

We found that there were not significant differences between adopted and matched control participants on measures of CD symptoms, level of conduct problems, and CD diagnosis. However, our findings suggest that adopted participants have a slightly greater number of CD symptoms, level of conduct problems, and likelihood of having a CD diagnosis when compared to matched control participants. The effect sizes for the difference between the adopted and matched control participants were small for all measures, and the power to detect a small effect size was weak for all measures. Although the gender $\times$ adoption status interaction was not statistically significant, there was a trend. When analyses were conducted separately for males and females, female adopted participants had more conduct problems than control participants; in contrast, the level of conduct problems between male adopted and control participants was very similar.

The result that the difference in level of conduct problems is significantly different between female adopted and control participants, but not between male adopted and control participants, is consistent with Iervolino (2003) and Bricker et al.'s (2006) results, suggesting the possibility that psychological problems associated with being adopted may affect female adopted individuals disproportionately. To examine this possibility, we tested whether female adopted participants and their adoptive parents report less adoption satisfaction than male adopted participants and their adoptive parents. None of the results were statistically significant, but for each of the six measures (acceptance and security reported by the adopted participant, integration and difference reported by the father, and integration and difference reported by the mother), adoption satisfaction was lower for female adopted participants and their parents than for male adopted participants and their parents. The Iervolino and Bricker et al. studies examined the same sample as the one examined in the present study, and it is possible that the pattern of female-only significant results may be limited to the Colorado Adoption Project.

Another possible explanation for the significant difference in the level of conduct problems between adopted and non-adopted females (but not in males) in the CAP is the earlier onset of puberty in adopted females than in non-adopted females. Adopted females reached menarche .33 year earlier than nonadopted females ($t = 2.71$, $df = 284$, $p < .01$). There is a sharp increase in the prevalence of psychopathology after the onset of puberty in girls (Stattin & Magnusson, 1990). Also, girls are more likely than boys to react negatively to pubertal changes when they occur or are perceived to occur "off-time" compared with most of their peers (Silbereisen & Kracke, 1997); there is an association between early pubertal timing in females and increases in deviant and high risk behavior (Stattin & Magnusson, 1990) and higher rates of teenage pregnancy (Manlove, 1997).

It is clear that adoption presents a unique set of circumstances that can affect both the child's and parents' feelings about family dynamics. We examined two domains of adoption satisfaction reported by the adolescents (i.e., adoption acceptance and security in the family) and two domains of adoption satisfaction reported by the adoptive mother and father (i.e., integration in the family and adoptive family differences). We examined whether adopted participants who accept their adoptive status more and are more secure in the adoptive

family display fewer conduct problems, and whether adopted participants whose parents report that the adopted participant is well-integrated into the family and that adoptive families are not different from biological families display fewer conduct problems.

Overall, the adopted participants in the CAP reported a high level of adoption satisfaction. For example, over 70% of the adopted participants answer “Often True” or “Always True” to the items “Being adopted makes me feel loved” and “I feel good that I’m adopted”. Generally, our findings show that as adoption satisfaction increases, the level of conduct problems and number of CD symptoms decrease significantly. All measures of adoption satisfaction were significantly related to all measures of conduct problems, with the exception of the correlation between the level of conduct problems as measured by the MTF survey and the fathers’ report of integration and differences. Many of the correlations between adoption satisfaction and conduct problems are moderate, suggesting that the relationship between adoption satisfaction and conduct problems is not only statistically significant but also clinically meaningful.

Our findings lend support to a growing body of research suggesting that adopted adolescents who were adopted at an early age and ascertained from the general population do not display elevated conduct problems compared to their non-adopted peers, including reports by Tieman et al. (2005) and Burrow et al. (2004). Our findings also support those reported by Grotevant et al. (2001), who found that decreased family compatibility was associated with increased conduct problems in adopted participants, although it is unclear whether conduct problems lead to adoption dissatisfaction or adoption dissatisfaction leads to conduct problems.

The results of this study should be interpreted while considering the following limitations. We had relatively weak power to detect a small difference in conduct problems between adopted and matched control participants. However, even if a larger sample had been available and a statistically significant difference between the adopted and matched control participants had been found, our results suggest that this difference is small and not clinically significant.

Our measure of adoption satisfaction is not widely used, and only one other study using the same measure has been published (Sharma et al., 1998). The validity for this measure is not well established, and the internal consistencies of the domains were not uniformly high. However, we found that the domains of adoption satisfaction were significantly correlated with each other and with the number of conduct problems.

Given the clear evidence establishing the relationship between adoption satisfaction and conduct problems, future research should focus on why adoption satisfaction is related to conduct problems, and what leads to greater adoption satisfaction. It is possible that adoption satisfaction (either in the adopted participant or the adoptive parent) has a direct, causal effect on conduct problems. On the other hand, it is also possible that adoption satisfaction and conduct problems are related because they share common genetic influences. For example, adopted individuals with a high genetic risk for externalizing behavior may be at risk for both being unsatisfied with adoption and the adoptive family and for having conduct problems. To examine this hypothesis, we calculated the correlations between childhood externalizing problems (measured between age 4 and 12) and adoption satisfaction. Although none of these correlations were statistically significant, the direction of effect was consistent with the hypothesis (i.e., greater problem behaviors in childhood was correlated with lower adoption satisfaction at age 17). Additional research examining these alternative hypotheses is warranted.

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Number of Conduct Disorder Symptoms and Conduct Problems in Adopted and Control participants

Table 1

	Adopted Participants		Control Participants		Effect Size (d)	Statistical Test
	Mean	SD	Mean	SD		
DISC						
All	1.59	1.76	1.31	1.62	.17	t (413) = 1.68, p = .09
Males	1.76	2.03	1.79	1.87	.02	t (223) = -0.11, p = .91
Females	1.38	1.32	0.78	1.08	.50	t (188) = 3.40, p = .01
MTF						
All	19.18	4.11	18.77	4.42	.10	t (406) = 0.97, p = .33
Males	19.16	4.01	19.46	5.51	.06	t (218) = -0.46, p = .64
Females	19.19	4.26	18.00	2.61	.35	t (186) = 2.35, p = .02

Note. SD = standard deviation; d = Cohen's d; p = probability; = Diagnostic Interview Schedule for Children; MTF = Monitoring the Future High School Senior Survey.

Table 2

Adoption Satisfaction in Male and Female Adopted Participants

	Males		Females		Effect Size (d)	Statistical Test
	Mean	SD	Mean	SD		
Acceptance	49.84	7.02	49.41	7.82	.06	$t(192) = 0.41, p = .68$
Security	28.20	3.16	27.77	3.29	.13	$t(192) = 0.93, p = .35$
Integration – Father	4.06	1.83	4.36	1.76	.17	$t(152) = -1.03, p = .30$
Difference – Father	24.85	7.07	27.03	8.61	.28	$t(153) = -1.73, p = .09$
Integration – Mother	3.85	1.35	4.16	1.56	.21	$t(173) = -1.37, p = .17$
Difference – Mother	24.86	5.95	26.34	8.00	.21	$t(174) = -1.41, p = .16$

Note. SD = standard deviation; d = Cohen's d; p = probability. Higher acceptance and security scores indicate greater adoption satisfaction. Higher integration and difference scores indicate lower adoption satisfaction.

Table 3

Correlations Among CD Symptoms (DISC), Level of Conduct Problems (MTF), and Adoption Satisfaction Domains

	MTF	Acceptance	Security	Integ - F	Diff - F	Integ - M	Diff - M
DISC							
All	0.57	-0.17	-0.29	0.27	0.26	0.21	0.16
Males	0.55	-0.16	-0.38	0.37	0.39	0.21	0.04
Females	0.67	-0.22	-0.19	0.09	0.12	0.26	0.36
MTF							
All		-0.22	-0.35	0.04	0.07	0.24	0.18
Males		-0.26	-0.49	0.12	0.15	0.22	0.06
Females		-0.18	-0.20	-0.07	-0.01	0.25	0.26
Acceptance							
All			0.64	-0.18	-0.25	-0.19	-0.28
Males			0.58	-0.14	-0.16	-0.22	-0.09
Females			0.70	-0.09	-0.31	-0.16	0.43
Security							
All				-0.19	-0.23	-0.32	-0.20
Males				-0.30	-0.18	-0.46	-0.10
Females				-0.04	-0.25	-0.17	-0.28
Integ - F							
All					0.54	0.30	0.03
Males					0.54	0.44	0.00
Females					0.55	0.11	0.02
Diff - F							
All						0.29	0.28
Males						0.41	0.17
Females						0.16	0.34
Integ - M							
All							0.51
Males							0.42
Females							0.57

Note. DISC = Diagnostic Interview Schedule for Children; MTF = Monitoring the Future High School Senior Survey; Integ – F – Integration Father; Integ – M – Integration Mother; Diff – M – Difference Mother. Statistically significant correlations are bolded. Higher acceptance and security scores indicate greater adoption satisfaction. Higher integration and difference scores indicate lower adoption satisfaction.