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The Mental Health of U.S. Adolescents Adopted in Infancy

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Abstract

Objective—To determine whether adopted youth are at excess risk for clinically relevant behavioral and emotional problems.

Design—We examined whether adopted and non-adopted adolescents differed on quantitative indicators of mental health and the prevalence of childhood disorders, and whether differences exist between internationally and domestically placed adoptees.

Setting—Assessments occurred at the University of Minnesota from 1998-2004.

Participants—Adolescents adopted in infancy were systematically ascertained from records of three large Minnesota adoption agencies; non-adopted adolescents were ascertained from Minnesota birth records. The final sample included these adolescents with their rearing parents.

Main Exposure—The main exposure was adoptive status: non-adopted (N=540), international adoptive placement (N=514), or domestic adoptive placement (N=178).

Main Outcome Measures—DSM-IV clinical assessments based on child and parent reports of attention-deficit/hyperactivity, oppositional defiant, conduct, major depressive, and separation anxiety disorders; teacher reports of psychological health; and contact with mental health professionals.

Results—Adoptees scored only moderately higher than non-adoptees on quantitative measures of mental health. Nonetheless, being adopted approximately doubled the odds of having contact with a mental health professional (OR=2.05, CI=1.48, 2.84) and of having a disruptive behavior disorder (OR=2.34, CI=1.72, 3.19). Relative to international adoptees, domestic adoptees had higher odds of having an externalizing disorder (OR=2.60, CI=1.67, 4.04).

Conclusions—Moderate mean differences in quantitative indicators of mental health can lead to substantial differences in disorder prevalence. While the majority of adopted youth are psychologically healthy, they may be at elevated risk for some externalizing disorders, especially among those domestically placed.

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In the United States, approximately 120,000 children are adopted annually, and adopted individuals constitute about 1.5 million children younger than age 18 years¹. The face of adoption is changing, however, as a decreasing number of domestic adoptions has been accompanied by a sharp increase in the number of international adoptions. Worldwide, approximately 40,000 children per year are moved between more than 100 countries through adoption². Despite the popularity of adoption, there is a persistent concern that adopted children may be at heightened risk for mental health or adjustment problems³. Previous research has shown that adopted children with a history of prenatal substance exposure⁴ or pre-placement deprivation⁵ and those who were placed relatively late in their adoptive homes⁶ are at heightened risk of social, intellectual, and emotional problems. Nonetheless, existing research has not resolved the extent to which those adoptees with a good pre-placement history and an early age at placement are at increased risk for clinically relevant mental health problems.

Although the vast majority of adopted individuals are well adjusted, population-based studies have reported an elevated risk for psychological maladjustment in adopted as compared to representative samples of non-adopted children^{7, 8}. In a recent meta-analysis of findings from more than 25,000 adoptees, Juffer and van IJzendoorn² reported significantly more behavioral problems among adoptees as compared to non-adoptees. The effect sizes associated with these differences were, however, small, ranging from .16 to .24. Interestingly, international adoptees evidenced fewer behavioral and emotional problems than domestic adoptees.

Most studies in the meta-analysis, however, were based on questionnaire assessments of behavioral problems (e.g., the Child Behavior Checklist), and do not speak to the existence of clinically meaningful differences in diagnoses. This distinction is particularly salient because modest adoptee/non-adoptee differences in questionnaire assessments of population samples contrast with a substantial overrepresentation of adopted children in clinical samples. Estimates of the percentage of adopted children seen in mental health settings fall within the range of 5-12%⁹, or 2.5 to 6.0 times the percentage of adopted children in the general population. Indeed, the same meta-analytic review that reported modest differences in behavioral problems reported large differences for mental health referral between adopted versus non-adopted youth². The discrepancy between small adoptee/non-adoptee differences in questionnaire assessments and large differences in mental health referrals may, in part, reflect a lower threshold for referral in adoptive than non-adoptive families. Adoptive parents may be more willing to seek help from a mental health professional for their troubled child because they are better educated or have greater economic resources than many non-adoptive parents or because they have previously interacted with social service providers in the process of adopting¹⁰. Further, the parent of an adopted child may have a lower threshold than the parent of a non-adopted child for reporting a behavior as problematic. It is important to determine whether differences between adopted and non-adopted youth emerge when ratings from multiple sources (e.g., teacher, child, and parent reports) are considered.

Thus, a more general understanding of the extent to which adopted individuals are at increased risk for clinically relevant mental health problems relies upon research employing

multiple raters, that compares the prevalence of DSM disorders in population-based samples of adoptees and non-adoptees. Using a sample of 692 adopted and 540 non-adopted adolescents, the current study addressed the following questions: 1) Are common DSM childhood disorders more prevalent in adoptees than non-adoptees? 2) Are differences between adoptees and non-adoptees found across raters? 3) Do domestic adoptees have significantly more mental health problems than international adoptees?

Methods

Participants

Participants were drawn from the Sibling Interaction and Behavior Study (SIBS), a study of 409 adoptive and 208 non-adoptive families, each consisting of an adolescent sibling pair and one or both rearing parents. Adoptive families were systematically ascertained from infant placements made by three large private adoption agencies in Minnesota. Although parents provided information on the country of birth and ethnicity of participating adolescents, this information was not used in the recruitment process. We have no additional information on the biological parents or birth circumstances of the adoptees. Non-adoptive families were ascertained through Minnesota state birth records by identifying sequential births to the same mother and father (i.e., full biological siblings). To ensure comparability across samples, offspring in non-adoptive families were selected to have distributions of gender and birth year similar to those in adoptive families.

Eligibility requirements for adoptive families included having: 1) an adopted adolescent who had been placed permanently in the adoptive home prior to age 2 years and 2) a second adolescent sibling in the home who was not biologically related to the adopted adolescent but who could be biologically related to the rearing parents. Among the 409 adoptive families were 124 in which one member of the sibling pair was a biological child of the adoptive parents; these adolescents were included in the analyses and classified as non-adoptees. Non-adoptive families were required to have a pair of full biological adolescent siblings. All adolescents were required to be between 11 and 21 years. Additional requirements for both types of families included living within driving distance of our laboratories; neither adolescent having any handicap that would preclude completing our in-person assessment; and participating siblings being no more than 5 years apart in age.

Among eligible families, the percentage participating was slightly, but not significantly, higher among adoptive (63.2%) as compared to non-adoptive (57.3%) families. Sample representativeness was assessed by conducting a brief telephone interview with 73% of eligible but non-participating families. Participating and non-participating families did not differ significantly on father's education, mother's and father's occupational status, percent of original parents who remained married, or the number of parent-reported behavioral disorders in their children. In non-adoptive families, a higher percentage of participating mothers were college educated (43.8%) than non-participating mothers (28.6%). A comparison to integrated public use microdata series (IPUMS) for Census 2000¹¹ indicates that the percentage of non-adoptive fathers who graduated from college is similar to the population of families with at least two children residing in the Minneapolis-St. Paul metropolitan area (47% in the IPUMS sample and 44% in the non-adoptive families).

Similar to our analysis of non-participants, there appears to be a slight positive selection for college education in the non-adoptive mothers (39% in the IPUMS sample and 44% in the non-adoptive families). A complete description of the SIBS recruitment process including an analysis of non-participants can be found in McGue et al.¹².

Two adopted adolescents were ruled ineligible after participation, resulting in a sample of 1232 adolescents, including 540 non-adoptees, 514 adoptees born outside the US, and 178 adoptees born in the US. These groups are subsequently referred to as non-adopted controls, international adoptees, and domestic adoptees, respectively. The sample of international adoptees reflects the ethnic diversity and female preponderance of adopted infants placed in Minnesota during the relevant years. Sixty percent are female, and 90% were adopted from South Korea. The domestic adoptees are 41% female and largely Caucasian (79%). Consistent with Minnesota demographics, 96% of the non-adopted controls are Caucasian and 54% are female.

Procedure

The research protocol was approved by the University of Minnesota Institutional Review Board. Upon arriving at the laboratory, a complete description of the study was followed by written informed consent from parents and assent from minor offspring. Adolescents and their parents were interviewed simultaneously each in a separate room by a different interviewer. Interviewers had an M.A. or B.A. in psychology (or a related field), participated in intensive training in clinical diagnostic interviewing, passed written examinations, and satisfied proficiency criteria. Finally, for each adolescent still in grade or high school, we obtained teacher ratings from up to three recent teachers.

Measures

Family Socioeconomic Status—Each parent's level of education was coded on a 5-point scale (1 = less than high school, 2 = high school or GED, 3 = some college, 4 = college degree, 5 = professional degree). For all parents employed on a full-time basis, occupational status was coded on a 6-point reflected Hollingshead scale (1 = manual laborer to 6 = professional/managerial). We standardized the educational and occupational status scores for each parent using the mean and standard deviation from the distribution of scores for the non-adoptive families. We then summed these standardized scores for the parents in each family to form a composite socioeconomic (SES) status indicator (mean=0.35; SD=1.0).

Diagnostic Assessment—Adolescents age 15 or younger at the time of the assessment were interviewed with the revised version of the Diagnostic Interview for Children and Adolescents (DICA-R)^{13, 14}, modified to ensure complete coverage of DSM-IV childhood disorders. All questions asked of the child were also asked of the mother as they pertained to the child. Responses were written in the interview booklet, and the interview was audiotaped. Childhood disorders assessed over the lifetime included oppositional defiant (ODD), attention-deficit/hyperactivity (ADHD), conduct (CD), major depressive (MDD), and separation anxiety (SAD) disorders. ODD was assessed without regard for the presence of CD. Adolescents age 16 or older and their mothers were also administered the modified

DICA-R to assess the childhood disorders listed above. MDD was assessed with the Structured Clinical Interview for DSM-III-R¹⁵ updated to cover DSM-IV criteria.

Every interview was reviewed by at least two individuals with advanced clinical training (supervised by a Ph.D. clinical psychologist) who examined the interview booklet and listened to audio tapes as necessary. This information was used to code, by consensus, every DSM-IV symptom and diagnostic criterion. Consensus staff was blind to the diagnoses of other family members. For each of the five assessed disorders, for each rater (mother and child), we created a count of the number of positive symptoms as well as counts of the total number of externalizing (ADHD+CD+ODD) and internalizing (MDD+SAD) symptoms. Diagnoses were assigned by computer programs that implemented DSM-IV algorithms. Our software enabled us to combine information across adolescents and their mothers to yield “best-estimate” diagnoses, which were considered positive if all DSM-IV criteria were met¹⁶. Formal studies of more than 500 participants have determined the reliability (kappa coefficients) of our clinical assessments: .73 (ODD), .77 (ADHD), .80 (CD), .86 (MDD), and .88 (SAD). Composite externalizing (any of ODD, ADHD, and CD) and internalizing (either MDD or SAD) diagnoses were also computed.

Teacher Reports—The teacher rating form included items adapted from the Conners Teacher Rating Scale¹⁷, the Rutter Child Scale B¹⁸, and personality trait ratings. The teacher rating scales (along with internal consistency and inter-teacher reliability estimates) included in this study are: Oppositional (reliabilities = .96, .77), Hyperactive (reliabilities = .95, .74), Inattentive (reliabilities = .96, .74), Anxious (reliabilities = .80, .52), and Withdrawn (reliabilities = .77, .50). Teacher rating data were returned for 78% of eligible adolescents. Neither gender nor adoption status was related to percentage returned.

Contact with Mental Health Professional—As part of a Life History Interview, each parent was asked “Has your child ever seen anyone for emotional concerns?” Adolescents were coded as having contact with a mental health professional if this question was answered “yes” by either their mother or father. Parent agreement was assessed using the kappa coefficient (kappa = .53).

Statistical Analyses

The effect of adoption status (non-adopted control, domestic adoptee, or international adoptee), was investigated using analysis of variance (ANOVA) for quantitative outcomes and logistic regression for categorical outcomes. The clustered nature of the family data was taken into account with hierarchical linear models as incorporated into PROC MIXED (for quantitative outcomes) and PROC GENMOD (for categorical outcomes) in the Statistical Analysis System¹⁹. All quantitative measures were log-transformed prior to analysis. Overall analyses were followed by planned pair-wise comparisons of: 1) all adopted with all non-adopted adolescents, 2) domestic adoptees with all non-adopted adolescents, 3) international adoptees with all non-adopted adolescents, and 4) domestic with international adoptees. Covariates included age at assessment, gender, and family SES for all comparisons between adopted and non-adopted adolescents. An additional covariate, age at placement, was included for comparisons between domestic and international adoptees.

Effect sizes, for quantitative outcomes, odds ratios, for categorical outcomes, and confidence intervals are reported for pair-wise comparisons. Effect sizes were estimated by dividing the difference in the covariate-adjusted means by the residual standard deviation.

Results

Because domestic adoptees were significantly more likely to be male than non-adopted adolescents ($p < .01$) or international adoptees ($p < .001$), Table 1 gives means and standard deviations (SD) for quantitative variables separately by gender and adoption status including age at placement, age at assessment, family SES, teacher rating scales scores, and mother- and child-rated symptom counts for the individual disorders as well as for externalizing (ODD, ADHD, CD) and internalizing (MDD, SAD) disorders combined. Table 1 also gives the lifetime prevalence for DSM-IV diagnoses of ODD, ADHD, CD, MDD and SAD, any externalizing, any internalizing disorder, and contact with mental health professionals.

Looking first at demographic variables, age at assessment did not vary by adoption status. Although all adoptees were placed as infants, domestic adoptees were placed significantly earlier than international adoptees ($p < .001$). Family SES was significantly higher for all adopted adolescents ($p < .001$), and domestic ($p < .01$) and international adoptees separately ($p < .001$), as compared with non-adopted adolescents. In addition, family SES was significantly higher for international adoptees as compared with domestic adoptees ($p < .05$).

ANOVA results including effect size estimates (ES) and confidence intervals for all planned comparisons of the quantitative outcome measures are given in Table 2. After statistically adjusting for age at assessment, gender, and family SES, the adoption effect was statistically significant for every quantitative indicator of externalizing problems except the child-reported symptoms of CD. Overall, adoptees had a greater number of externalizing problems than non-adoptees as reported by teacher, parent, and child, with the associated effect sizes ranging from modest to moderate (i.e., .18-.46). Compared to non-adoptees, adoptees were rated as being significantly more anxious by their teachers (ES=.39), although adoptees did not have significantly more MDD or SAD symptoms by either parent or child report. Thus, adoption is associated with a modest to moderate elevation in externalizing problems and weaker effects on internalizing problems.

The subsample of domestic adoptees scored significantly higher than non-adoptees on all quantitative measures of externalizing psychopathology by all raters (ES = .20 to .68). They were also rated by their teachers as being more anxious (ES=.46). Relative to non-adoptees, the subsample of international adoptees was also seen as having higher levels of externalizing psychopathology, although differences were not always significant and the effect sizes were more modest than those observed with domestic adoptees. Focusing on internalizing problems, teachers reported that international adoptees were significantly more anxious than non-adopted adolescents (ES=.32), and their parents reported significantly more symptoms of internalizing disorders, specifically MDD and SAD (ES = .18 to .20).

For comparisons between international and domestic adoptees, age of placement was added as a covariate. Results show that domestic adoptees are consistently more extreme than

international adoptees on every quantitative indicator of externalizing behavioral problems, save child-reported ADHD symptoms; effect sizes ranged from small to moderate (i.e., .25-.63). In terms of internalizing problems, domestic and international adoptees did not differ consistently. For example, teachers reported that domestic adoptees were significantly more anxious than international adoptees ($ES=.25$), however, parents reported significantly fewer symptoms of SAD in domestic than international adoptees ($ES=-.23$).

Logistic regression results along with associated odds ratios (ORs) and confidence intervals for DSM-IV diagnoses are given in Table 3. Odds of being diagnosed with externalizing psychopathology (specifically ADHD and ODD), but not internalizing psychopathology, were approximately twice as high in all adopted adolescents as compared to non-adopted adolescents. Similar findings were observed when samples of domestic and international adoptees were each compared with non-adoptive controls. Domestic adoptees also had higher odds of having CD ($OR=2.10$) compared to non-adoptive controls. Adding age at placement as a covariate, ORs were consistently higher for domestic as compared to international adoptees for externalizing psychopathology ($OR=2.60$), specifically ADHD ($OR=2.61$). Finally, all adopted adolescents, and domestic and international adoptees separately, were significantly more likely to have had contact with a mental health professional as compared to non-adopted adolescents. There was no significant difference between domestic and international adoptees in likelihood of contact.

Comment

Consistent with recent meta-analyses, adopted adolescents scored significantly higher on quantitative measures of behavioral and emotional problems. Effect sizes were typically in the small to moderate range, higher for indicators of externalizing than internalizing, and generally robust across raters (parent versus teacher versus child). Importantly, we found the odds of help-seeking to be approximately twice as high in adopted adolescents. This overrepresentation mirrors higher levels of clinically significant problems in adopted youth.

Although Tieman and colleagues²⁰ have investigated the prevalence of DSM disorders in adopted adults, ours is the first study to investigate the prevalence of common DSM childhood disorders in a population-based sample of adopted adolescents. We found that the odds of being diagnosed with ADHD and ODD were approximately twice as high in adoptees as compared to non-adoptees; the prevalence of CD, MDD and SAD was not significantly associated with adoption status. Our finding of moderate mean differences on quantitative measures of adjustment coupled with a two-fold increase in odds for specific externalizing disorders implies that, while the majority of adopted adolescents are psychologically well adjusted, some adoptees may be at elevated risk for clinically significant problems.

This finding of minimal mean differences but two-fold differences in odds may appear inconsistent, however, a small shift in the mean of a distribution can have a dramatic effect in the tail of that distribution.^{9, 21} For example, the distributions of best-estimate ODD symptoms for adopted and non-adopted adolescents have a modest mean separation of .31 SDs. Using a diagnostic threshold of four or more symptoms, we capture only 10% of the

non-adoptees while capturing 19% of the adoptees, almost a two-fold difference. Thus, moderate mean differences can easily lead to substantial differences in disorder prevalence.

Because our sample included both domestic and international adoptees, we were able to directly compare outcomes for these two groups. Consistent with a recent meta-analysis², we found that international adoptees had consistently fewer externalizing behavioral problems than domestic adoptees; effect sizes were small to moderate in magnitude. Some have speculated that international adoptees would be at increased risk for mental health problems because they are more likely to have been placed in the adoptive home at a late age, experienced preplacement adversity, and been exposed to post-placement discrimination²². However, Juffer & van IJzendoorn² hypothesize that two factors might account for the better adjustment of international versus domestic adoptees. First, they suggest that the adoptive parents of international adoptees may be better prepared to rear an adopted child than the adoptive parents of domestic adoptees. In our sample, families of international adoptees did have higher SES scores when compared to families of domestic adoptees, however, statistically adjusting for SES did not eliminate, or even reduce, the differences between these two groups. Of course, parents of international and domestic adoptees may differ in ways not captured by SES, e.g., parenting style or attitudes toward adoption. Juffer & van IJzendoorn also suggest that domestic adoptees may experience greater prenatal exposure to teratogenic substances or carry a greater genetic risk for mental health problems than international adoptees. It will be important in future research to explore these possibilities.

It is important to interpret our findings in the context of several research limitations. Our samples of adolescents were ascertained to be representative of the populations from which they were derived and are constrained by both time and place. For example, results are limited to mental health outcomes appropriate to assess in adolescence. Further, our sample of non-adopted adolescents was drawn from Minnesota birth records and does not reflect the full ethnic diversity that exists within the U.S. Thus, we are reassured that the prevalence of DSM-IV disorders in this sample generally agree with those published in other epidemiological research^{23, 24}. Our sample of adopted adolescents was ascertained to be representative of placements made by the three largest Minnesota adoption agencies and is missing representation of adolescents whose adoption was arranged privately. In addition, the nature of international placements has changed in recent years so that the majority of internationally-placed babies no longer come from South Korea²⁵. It will be important to explore the adjustment of international adoptees from a broader range of countries. Finally, adoptees in our sample were all placed prior to age 2 years and results may not generalize to adoptees placed at a later age.

There are multiple implications of our results. First, the vast majority of individuals adopted as infants are well adjusted and psychologically healthy. Nonetheless, there exists a subset of adoptees who may be at increased risk for externalizing problems and disorders. The odds of being diagnosed with ADHD and ODD were approximately twice as high in adoptees as compared to non-adoptees. This excess of clinically meaningful behavioral problems in adopted adolescents has significance for researchers who examine the impact adoption has on individual functioning, for adoption agencies and their workers who counsel and advise

members of the adoption triad, and for clinicians who are dealing with an overrepresentation of adoptees in their clinical practices.

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Table 1

Descriptive Statistics by Gender and Adoption Status

	<u>Male Sample</u>			<u>Female Sample</u>		
	<u>Non-Adopted Adolescents</u>	<u>Domestic Adoptees</u>	<u>International Adoptees</u>	<u>Non-Adopted Adolescents</u>	<u>Domestic Adoptees</u>	<u>International Adoptees</u>
N	248	105	204	292	73	310
Demographic Variables						
Placement Age (Months)	--	3.00 (3.8)	5.54 (3.2)	--	1.88 (1.7)	5.28 (3.2)
Assessment Age (Years)	14.85 (1.8)	14.93 (2.1)	14.82 (1.5)	14.93 (2.0)	15.04 (2.1)	15.03 (2.1)
Family SES	0.09 (1.1)	0.34 (0.9)	0.66 (0.8)	0.08 (1.0)	0.39 (0.9)	0.60 (0.9)
Quantitative Outcomes -- Mean (SD)						
Teacher Reports						
Oppositional	34.40 (8.9)	39.11 (10.8)	35.81 (9.1)	31.43 (5.7)	35.85 (10.3)	31.95 (7.0)
Hyperactive	11.79 (4.5)	13.39 (4.6)	12.29 (4.4)	10.09 (2.4)	11.17 (2.9)	10.48 (3.0)
Inattentive	15.43 (6.2)	19.35 (7.2)	16.26 (6.4)	12.52 (4.2)	14.23 (4.8)	12.62 (4.4)
Anxious	9.27 (2.3)	10.45 (2.8)	10.56 (3.0)	9.75 (2.3)	10.91 (3.4)	10.23 (3.0)
Withdrawn	5.85 (2.1)	6.36 (2.4)	6.21 (2.1)	5.69 (1.9)	5.78 (2.1)	5.63 (1.9)
Parent Reports						
ODD Sxs	0.83 (1.4)	1.48 (1.9)	1.19 (1.7)	0.66 (1.2)	1.41 (1.8)	0.99 (1.5)
ADHD Sxs	1.11 (2.4)	3.12 (4.0)	2.30 (3.7)	0.81 (2.5)	1.55 (3.2)	0.86 (2.4)
CD Sxs	0.23 (0.6)	0.72 (1.4)	0.48 (1.2)	0.17 (0.5)	0.32 (0.7)	0.21 (0.6)
Externalizing Sxs	2.17 (3.2)	5.34 (5.7)	4.00 (5.5)	1.64 (3.2)	3.27 (4.6)	2.05 (3.5)
MDD Sxs	0.27 (1.0)	0.33 (1.4)	0.46 (1.3)	0.46 (1.4)	0.60 (1.5)	0.72 (1.8)
SAD Sxs	0.21 (0.6)	0.19 (0.5)	0.43 (0.9)	0.27 (0.6)	0.32 (0.7)	0.40 (0.9)
Internalizing Sxs	0.48 (1.1)	0.52 (1.5)	0.88 (1.8)	0.73 (1.5)	0.92 (1.9)	1.12 (2.2)
Child Reports						
ODD Sxs	0.49 (1.0)	1.09 (1.6)	0.71 (1.4)	0.46 (1.0)	0.85 (1.2)	0.63 (1.2)
ADHD Sxs	1.40 (2.5)	1.99 (3.4)	1.77 (3.0)	0.73 (2.0)	1.45 (2.6)	1.01 (2.3)
CD Sxs	0.74 (1.4)	0.86 (1.3)	0.43 (0.8)	0.22 (0.7)	0.26 (0.6)	0.25 (0.7)
Externalizing Sxs	2.63 (4.0)	3.96 (4.9)	2.91 (4.2)	1.36 (2.8)	2.56 (3.3)	1.90 (3.5)
MDD Sxs	0.35 (1.4)	0.43 (1.5)	0.36 (1.3)	0.53 (1.6)	0.51 (1.5)	0.77 (2.0)
SAD Sxs	0.19 (0.5)	0.21 (0.6)	0.21 (0.5)	0.30 (0.8)	0.25 (0.5)	0.28 (0.7)
Internalizing Sxs	0.53 (1.4)	0.64 (1.7)	0.58 (1.4)	0.82 (1.9)	0.75 (1.5)	1.05 (2.3)
Categorical Outcomes – Lifetime Prevalence (%)						
Clinical Disorders						

N	<u>Male Sample</u>			<u>Female Sample</u>		
	<u>Non-Adopted Adolescents</u>	<u>Domestic Adoptees</u>	<u>International Adoptees</u>	<u>Non-Adopted Adolescents</u>	<u>Domestic Adoptees</u>	<u>International Adoptees</u>
	248	105	204	292	73	310
ODD	11.7	25.2	20.2	8.6	19.2	15.8
ADHD	8.5	28.8	19.2	5.2	16.4	6.5
CD	6.5	14.6	8.4	2.4	2.7	2.6
MDD	5.3	4.9	5.5	7.6	8.2	12.6
SAD	2.0	2.9	6.0	3.5	2.7	5.8
Any Externalizing	20.6	47.6	33.0	12.7	30.1	18.7
Any Internalizing	7.3	7.8	10.5	10.7	11.0	17.4
Contact with Mental Health Professional	15.7	32.4	29.4	15.4	20.5	27.4

Number of symptoms is abbreviated as Sxs. Externalizing sxs were aggregated across Oppositional Defiant Disorder (ODD), Attention-Deficit/Hyperactivity Disorder (ADHD), and Conduct Disorder (CD). Internalizing sxs were aggregated Major Depressive Disorder (MDD) and Separation Anxiety Disorder (SAD).

Table 2

Standardized effect size estimates (d) from ANOVA of Quantitative Outcomes by Adoption Status

	Adopted vs. Non-Adopted (1) ES (95% CI)	Domestic vs. Non-Adopted (2) ES (95% CI)	International vs. Non-Adopted (3) ES (95% CI)	Domestic vs. International (4) ES (95% CI)
Teacher Reports				
Oppositional	.43 (.26, .59)	.67 (.44, .90)	.18 (.02, .34)	.63 (.39, .88)
Hyperactive	.35 (.19, .51)	.52 (.29, .75)	.17 (.01, .34)	.45 (.20, .69)
Inattentive	.38 (.21, .55)	.63 (.39, .87)	.13 (-.04, .30)	.62 (.39, .86)
Anxious	.39 (.23, .55)	.46 (.23, .68)	.32 (.17, .48)	.25 (.01, .50)
Withdrawn	.09 (-.07, .25)	.12 (-.11, .34)	.06 (-.09, .22)	.07 (-.17, .32)
Parent Reports				
ODD Sxs	.36 (.22, .50)	.49 (.29, .68)	.23 (.09, .37)	.35 (.13, .56)
ADHD Sxs	.36 (.23, .50)	.56 (.37, .74)	.17 (.04, .31)	.37 (.18, .56)
CD Sxs	.33 (.17, .48)	.49 (.28, .70)	.16 (.01, .32)	.37 (.14, .59)
Externalizing Sxs	.46 (.32, .60)	.68 (.49, .88)	.24 (.09, .38)	.50 (.29, .71)
MDD Sxs	.11 (-.03, .24)	.04 (-.15, .24)	.18 (.04, .31)	-.07 (-.28, .14)
SAD Sxs	.09 (-.06, .23)	-.01 (-.20, .19)	.18 (.04, .33)	-.23 (-.45, -.01)
Internalizing Sxs	.10 (-.04, .24)	.00 (-.20, .21)	.20 (.05, .34)	-.16 (-.38, .06)
Child Reports				
ODD Sxs	.32 (.19, .45)	.47 (.29, .66)	.17 (.04, .30)	.39 (.19, .60)
ADHD Sxs	.18 (.05, .30)	.23 (.06, .41)	.13 (-.01, .26)	.16 (-.05, .37)
CD Sxs	.06 (-.08, .20)	.20 (.02, .38)	-.08 (-.21, .06)	.44 (.22, .67)
Externalizing Sxs	.30 (.17, .43)	.45 (.27, .63)	.15 (.01, .29)	.39 (.18, .60)
MDD Sxs	.07 (-.06, .21)	.03 (-.16, .22)	.12 (-.02, .26)	-.05 (-.26, .16)
SAD Sxs	-.01 (-.13, .12)	-.03 (-.21, .15)	.02 (-.10, .15)	-.11 (-.31, .08)
Internalizing Sxs	.06 (-.08, .20)	.02 (-.17, .21)	.11 (-.03, .25)	-.10 (-.31, .12)

Number of symptoms is abbreviated as Sxs. Externalizing Sxs were aggregated across Oppositional Defiant Disorder (ODD), Attention-Deficit/Hyperactivity Disorder (ADHD), and Conduct Disorder (CD). Internalizing Sxs were aggregated across Major Depressive Disorder (MDD) and Separation Anxiety Disorder (SAD). Standardized effect size (ES) was computed as mean of first named group minus mean of second named group divided by residual standard deviation. Covariates for columns 1-3 include age at assessment, gender, and parental SES. Covariates for column 4 include age at placement, age at assessment, gender, and parental SES. Significant effects are highlighted in bold. All quantitative variables were log-transformed for analysis.

Table 3

Odds ratios (OR) from Logistic Regression of Categorical Outcomes by Adoption Status

	Adopted vs. Non-Adopted (1) OR (95% CI)	Domestic vs. Non-Adopted (2) OR (95% CI)	International vs. Non-Adopted (3) OR (95% CI)	Domestic vs. International (4) OR (95% CI)
Clinical Disorders				
ODD	2.24 (1.57, 3.20)	2.51 (1.58, 4.00)	1.99 (1.38, 2.88)	1.52 (0.95, 2.43)
ADHD	2.67 (1.78, 4.02)	3.95 (2.42, 6.44)	1.81 (1.16, 2.82)	2.61 (1.55, 4.37)
CD	1.64 (0.95, 2.83)	2.10 (1.04, 4.24)	1.29 (0.71, 2.34)	2.03 (0.94, 4.36)
Any Externalizing	2.34 (1.72, 3.19)	3.25 (2.16, 4.89)	1.69 (1.22, 2.32)	2.60 (1.67, 4.04)
MDD	1.27 (0.77, 2.09)	1.05 (0.52, 2.12)	1.55 (0.95, 2.52)	0.79 (0.38, 1.66)
SAD	1.49 (0.75, 2.94)	1.06 (0.39, 2.88)	2.08 (1.09, 3.99)	0.47 (0.16, 1.34)
Any Internalizing	1.34 (0.88, 2.05)	1.09 (0.60, 2.01)	1.64 (1.08, 2.50)	0.73 (0.38, 1.41)
Contact with Mental Health Professional	2.05 (1.48, 2.84)	2.04 (1.33, 3.13)	2.05 (1.47, 2.86)	1.19 (0.76, 1.86)

Any externalizing disorder includes Oppositional Defiant Disorder (ODD), Attention-Deficit/Hyperactivity Disorder (ADHD), and Conduct Disorder (CD). Any internalizing disorder includes Major Depressive Disorder (MDD) and Separation Anxiety Disorder (SAD). Diagnoses are based on DSM-IV, are lifetime, and generated using a "best-estimate" algorithm. Odds ratios (OR) reflect the increase in the odds of having the indicated disorder in the first named group relative to the second named group. Covariates for columns 1-3 include age at assessment, gender, and parental SES. Covariates for column 4 include age at placement, age at assessment, gender, and parental SES. Significant effects are highlighted in bold.