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Symptoms and Development of Anxiety in Children With or Without Intellectual Disability

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The purpose of this study was to examine group differences in presentation and trajectory of anxiety symptoms and disorders in children with moderate to borderline intellectual disability (ID) and children with typical cognitive development (TD). Examined anxiety disorders and symptoms in children with ID (n = 74) or TD (n = 116) annually from ages 5 through 9 using a parent structured interview and questionnaire. Logistic regression was used to examine odds of meeting anxiety criteria and hierarchical linear modeling was used to examine anxiety trajectory. Children with ID had significantly higher rates of clinical levels of anxiety on the Child Behavior Checklist at ages 8 and 9 and higher rates of separation anxiety disorder at age 5 compared to those with TD. Children with ID were also more likely to have externalizing problems co-occurring with anxiety. The rate of increase of anxiety symptoms over time was positive and similar in the two groups, and neither group showed sex differences in anxiety rates. Results suggest that children with ID have both higher rates of anxiety across time and are delayed in showing typical decreases in separation anxiety in early childhood. Implications for intervention are discussed in terms of the importance of screening for and treating anxiety in children with ID.

Intellectual disability (ID) is defined as exhibiting impairments in both intellectual and adaptive functioning with the severity of impairment ranging from borderline (IQ 70–84) to profound (IQ below 25; American Psychiatric Association [APA], 2000). In addition to these core deficits inherent to ID, there is a high prevalence of comorbid psychiatric disorders. At any given time, between 25% and 50% of youth with ID meet criteria for a psychiatric disorder, compared to 6% to 17% of youth with typical development (TD; e.g., Dekker & Koot, 2003; Einfeld, Ellis, & Emerson, 2011; Emerson & Hatton, 2007; Roberts, Roberts, & Xing, 2007). This elevated prevalence includes anxiety disorders; among youth with ID, 10% to 22% meet criteria for any anxiety disorder, compared to just 3% to 7% among youth with TD (e.g., Dekker & Koot, 2003; Emerson & Hatton, 2007; Roberts et al., 2007). Yet anxiety is understudied in youth with ID compared to other psychiatric symptoms, such as disruptive behavior (Baker, Neece, Fenning, Crnic, & Blacher, 2010).

Much of our understanding of psychiatric disorders among youth with ID comes from large epidemiological studies that generally include children across large developmental ranges (e.g., ages 5–16). These provide a broad understanding of the prevalence of anxiety diagnoses during youth, but there is a need for studies that examine the prevalence of anxiety across time between children with and without ID. The present study employed parent questionnaires and standardized diagnostic interviews to examine the diagnostic rates and presentation of anxiety symptoms and disorders among children with ID or TD across ages 5 through 9.

ANXIETY DISORDERS AMONG TD CHILDREN

Anxiety disorders are diagnosed when an individual's experience of fear and/or anxiety becomes excessive and impairs functioning. Among children with TD, the

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point prevalence estimates for some of the most common anxiety disorders are 0.5% to 3.0% for separation anxiety disorder (SAD), 0.3% to 2.5% for Social Phobia (SoP), and 0.4% to 2.5% for generalized anxiety disorder (GAD; e.g., Canino et al., 2004; Fleitlich-Bilyk & Goodman, 2004; Roberts et al., 2007). However, each anxiety disorder develops differently throughout childhood and adolescence. SAD is most prevalent in preschool and declines rapidly in prevalence throughout the elementary school years (Compton, Nelson, & March, 2000; Hale, Raaijmakers, Muris, van Hoof, & Meeus, 2008). SoP increases throughout development, particularly during late childhood and early adolescence (Canino et al., 2004). GAD tends to increase in girls but decrease in boys during later school-age years and adolescence (Cohen et al., 1993; Hale et al., 2008).

Anxiety diagnoses tend to be more prevalent in females than males, but these sex differences generally do not emerge until adolescence (e.g., Cohen et al., 1993; Compton et al., 2000; Roberts et al., 2007). In studies of young children, no sex differences in prevalence are typically found for any anxiety disorder (e.g., Canino et al., 2004).

The aforementioned epidemiology studies examined the prevalence of children meeting full diagnostic criteria for anxiety disorders. However, there also is a need to explore the prevalence of clinically significant anxiety symptoms throughout development, as high levels of anxiety symptoms can be impairing even when full diagnostic criteria are not met.

PSYCHOPATHOLOGY IN CHILDREN WITH INTELLECTUAL DISABILITIES

When studying psychopathology among children with ID, a key underlying question is often raised: Are mental disorders in persons with ID the same disorders as seen in persons with TD? One way to address this question is to examine if the presentation of the disorder (e.g., age of onset, sex differences, symptom presentation, symptom trajectory) is similar. Studies have begun to address this question in externalizing disorders, finding that disorder presentations are similar between youth with or without ID (Baker et al., 2010; Christensen, Baker, & Blacher, 2013). However, few comparable studies have examined internalizing disorders, and studies conducted have only examined a limited range of anxiety symptoms (e.g., fears; Li & Morris, 2007). Studies examining sex differences in anxiety have not found consistent differences in prevalence among children with ID (Einfield et al., 2011). However, these studies did not directly compare the presentation of anxiety symptoms across ID and TD youth.

In addition to having higher anxiety overall, children with ID also have higher co-occurrence of anxiety and other disorders. Dekker and Koot (2003) found that twice as many children with ID and an anxiety disorder also met criteria for one or more co-occurring disruptive behavior disorders (42.5%; i.e., attention deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder), compared to TD children with anxiety disorders (20.6–20.9%; e.g., Fleitlich-Bilyk & Goodman, 2004). This higher co-occurrence is of particular clinical importance, given high levels of impairment seen in both groups of disorders and possible interactions between externalizing and anxiety symptoms (e.g., Hammerness et al., 2009; Tsang et al., 2012). The co-occurrence between anxiety and mood disorders is lower across both ID and TD populations (7.4–12.3%) and is more similar across the two groups (e.g., Dekker & Koot, 2003; Fleitlich-Bilyk & Goodman, 2004).

CURRENT STUDY

The present study assessed early elementary school-age children longitudinally for clinically significant anxiety symptoms as well as the rates and diagnostic presentations of SAD, SoP, and GAD. The following hypotheses were examined: (a) children with ID have higher rates of anxiety disorders and symptoms compared to children with TD, (b) children with ID have higher co-occurrence of anxiety with other domains of psychiatric symptoms, (c) children with or without ID do not show sex differences in rates of anxiety symptoms, and (d) children with or without ID have similar developmental trajectories of anxiety.

METHOD

Participants

Participants were families selected from a longitudinal study of children, followed from age 3 to 9, with or without developmental delays (Baker, Blacher, Crnic, & Edelbrock, 2002). The study was conducted at three universities: the University of California, Los Angeles; the University of California, Riverside; and Pennsylvania State University. Families of children with developmental delays were recruited primarily through agencies that provide diagnostic and intervention services for these individuals; families of typically developing children were recruited through preschools and daycare programs. Of the 238 children who participated in the study at age 5, children who met classification criteria (see next) and had Child Behavior Checklist (CBCL) data for at least two time points for ages 5 through 9 were

included (N=190). The 48 families (20.2% of total enrolled) who were excluded did not differ on any demographic variables or CBCL total or *Diagnostic and Statistical Manual of Mental Disorders (DSM)* scale scores at age 5 from the 190 families included (79.8% of total enrolled).

Participants were classified as having either ID (n=74) or TD (n=116) based on age 5 Stanford Binet full scale scores (Thorndike, Hagen, & Sattler, 1986) and Vineland Adaptive Behavior Scales (VABS; Sparrow, Cicchetti, & Balla, 2005) scores. ID group children received (a) a score of 40 to 84 on the Stanford-Binet and (b) a score below 85 on the VABS. In the ID group, 21 children had borderline ID (IQ=71–84), 27 had mild ID (IQ=55–70), and 26 had moderate ID (IQ=36–54; APA, 2000). Children in these three groups were combined and referred to as the ID group. IQ was stable between ages 5 to 9 (r =.90). Exclusion criteria at study entry (age 3) included autism and other identified neurodevelopmental disorders. TD children received a score of 85 or above on the Stanford-Binet and did not have premature birth or a known developmental disability.

Table 1 presents demographics for both status groups at age 5. In the combined sample, 60% of mothers identified their children as White, non-Hispanic; 15.3% as Hispanic; 8.4% as African American; 1.6% as Asian; and 14.7% as "other," usually mixed race or ethnicity. Fifty percent of mothers in the sample had at least 4 years of college education, and 60.1% had an annual income of $50,000 or above, with mothers of TD children reporting significantly more grades of schooling and higher family incomes. These variables were considered as covariates. There were no significant between-group differences in child sex or race-ethnicity.

Procedure

The Institutional Review Boards of each collaborating university approved all procedures. Informed consent was obtained at child age 3 and again at child age 6 in this longitudinal study. The informed consent document was mailed to families before their assessment session. The visit then began with reviewing research procedures, answering questions, and obtaining informed consent. Data for the current study were obtained from annual assessments with the families at child ages 5 through 9. Measures of the child's intellectual level and adaptive behavior were obtained at ages 5 and 9 years. The remaining data used in this study came from annual assessments in the study center (ages 5 and 9) or in the home (ages 6, 7, and 8), and from parent packets completed annually by mothers.

Measures

Stanford-binet IV (SB-IV; Thorndike et al., 1986). Children's cognitive ability was evaluated at age 5 years with the SB-IV, a widely used assessment instrument with sound psychometric properties. The SB-IV yields an IQ score with a normative mean of 100 (SD=15).

VABS-II (Sparrow et al., 2005). This semistructured interview asks caregivers to report on their children's adaptive behaviors. The Adaptive Behavior Composite score (*communication, daily living skills*, and *socialization*) was used. The VABS has good reliability (split-half r =.97; test–retest intraclass correlation coefficient =.94) and validity (Sparrow et al., 2005).

Child behavior checklist for ages $1\frac{1}{2}$–5, CBCL for ages 6-18 (Achenbach & Rescorla, 2000,

TABLE 1
Descriptive Statistics

	TD % or M (SD)[a]	*ID % or M (SD)*[b]	$\chi^2(1)$ *or t(148)*	*Cohen's d*	*F (Levine's Test for Equality of Variances)*
Child Sex (% Male)	56%	61%	0.51		
Child Race (% Minority)	37%	45%	0.30		
Family Income (%<$50k)	32%	52%	7.12**		
Stanford-Binet IQ (Age 5)	103.8 (11.8)	59.6 (14.4)	22.04***		4.42*
Mother Grade Completed	15.8 (2.4)	14.5 (2.1)	4.07***		1.60
CBCL Anxiety Problems *T* ScoreAge 5 (n=115 TD; 73 ID)	53.03 (6.3)	55.73 (8.5)	–2.33*	–0.34	6.80*
Age 6 (n=112 TD; 74 ID)	54.1 (6.3)	56.8 (7.0)	–2.45*	–0.36	3.52†
Age 7 (n=108 TD; 69 ID)	54.7 (6.4)	56.4 (6.9)	–1.67	–0.25	0.90
Age 8 (n=102 TD; 57 ID)	54.3 (6.7)	57.1 (7.7)	–2.27*	–0.36	4.10*
Age 9 (n=105 TD; 57 ID)	54.6 (6.1)	57.6 (7.8)	–2.48*	–0.39	8.36**

Note: Scores reported from child age 5 years except where otherwise noted. TD=typical cognitive development; ID=intellectual disability; CBCL=Child Behavior Checklist.

[a] n=92.

[b] n=56.

† p<.10. *p<.05. **p<.01. ***p<.001.

2001). The CBCL was used to assess mothers' report of internalizing and externalizing symptoms. For the age 5 assessment the preschool version (ages 1.5–5 years) was used and for the remaining assessments (ages 6–9) the child version was used (ages 6–18 years). This measure has high test–retest reliability and internal consistency on all scales used (Achenbach & Rescorla, 2000, 2001). Because the number of items differed between the preschool and child versions, *T* scores were used for analyses. The focus was on whether children were above the borderline clinical cutoff for the clinical scales (anxiety, oppositional defiant, affective, or attention deficit/hyperactivity problems; *T* score of 65 or higher) or for the broad band Externalizing Problems scale (*T* score of 60 or higher). These are the recommended cutoffs for the CBCL (Achenbach & Rescorla, 2000, 2001). Thus, these participants are not necessarily diagnosed with an anxiety disorder when meeting criteria for anxiety on the CBCL but can be considered to have clinically elevated symptoms of anxiety.

Diagnostic interview schedule for children version IV (DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The DISC, administered to mothers annually at child ages 5 to 9, is a structured diagnostic interview assessing current *DSM* criteria for child psychiatric disorders. In the present study, we used an alternative way of administering the DISC (Baker et al., 2010; Edelbrock, Crnic, & Bohnert, 1999). The interviewer read a brief summary of the criteria for each diagnosis and then asked the mother to indicate whether each area is of concern for her child. Standard administration was followed for all modules the mother considered relevant. This administration procedure has been found to take less time, increase reliability, and decrease attenuation (reporting fewer symptoms for disorders assessed later in the interview and on retest) than the standard procedure of administering all areas in a fixed order (Edelbrock et al., 1999). In the current study, only the anxiety modules (SAD, SoP, and GAD) were considered. This measure has moderate test–retest reliability for all subscales used (r =.54–.65; Shaffer et al., 2000). Participants were divided into anxiety and no-anxiety groups based on whether they met DISC criteria for any of these disorders. The DISC diagnosis was based on meeting symptom criteria only, not on level of impairment.

Family income. Family income was measured as a covariate. Information was collected at the age 5 visit on a 7-point scale for annual family income: \$0–\$15,000; \$15,001–\$25,000; \$25,001–\$35,000; \$35,001–\$50,000; \$50,001–\$70,000; \$70,001–\$95,000; > \$95,000. For simplification in presenting information in Table 1, this measure was translated into a dichotomous measure of income above or below \$50,000. However, for all analyses covarying family income, income was represented by the original 7-point scale.

RESULTS

Descriptive Analyses

Table 1 shows descriptive statistics for CBCL Anxiety Problems *T* scores at each age. At all ages except 7 years, children with ID had significantly higher scores on this scale than children with TD; children with ID also had significantly greater variability in scores at ages 5, 8, and 9. Effect sizes ranged from–0.25 to–0.39, indicating small to moderate differences between the average anxiety ratings in the TD and ID groups. Table 2 shows percentages of children in each group meeting criteria for each CBCL and DISC scale of interest.

Group Differences in Rates

Logistic regression analyses were conducted to examine the number of children in each group meeting criteria for the DISC anxiety scales (separation anxiety [SAD] and social phobia [SoP]), any anxiety disorder on the DISC, and the number of children at or above the borderline cutoff (*T*-score of 65 or higher) on the Anxiety Problems scale of the CBCL. GAD was included only in the "Any Anxiety" analyses given the very low rates of this disorder in both groups. Family income, child sex, and a Sex × ID-TD status interaction term were also entered as covariates to determine whether income and sex affected the odds of meeting anxiety criteria. To conserve power, covariates were removed from the final model if $p > .10$. Sex and the interaction between sex and ID-TD status were not significant in any model. Results are displayed in Table 3. Group differences were seen in the CBCL Anxiety Problems scores at ages 8 and 9 years and the DISC SAD scores at age 5 years, with the ID group having significantly higher rates of anxiety in each of those analyses.

Co-Occurrence of Anxiety and Other Disorders

Logistic regression analyses were conducted to examine the odds of meeting the CBCL cutoff for Anxiety Problems, as well as for another CBCL scale (Affective, Attention Deficit/Hyperactivity, or Oppositional Defiant Problems, or the overall Externalizing Problems scale) for both ID and TD status groups. DISC diagnoses were not examined due to the low numbers of participants meeting anxiety criteria on the DISC. Results are displayed in Table 4. The odds were

TABLE 2
Percentage Of Participants In Each Group Meeting Criteria For A Disc Anxiety Disorder Or Cbcl Dsm Scale Cutoff

	Age 5		*Age 6*		*Age 7*		*Age 8*		*Age 9*	
Variable	*TD*	*ID*	*TD*	*ID*	*TD*	*TD*	*TD*	*ID*	*TD*	*ID*
CBCL Anxiety Problems Cutoff	6.0	13.7	11.6	17.6	14.8	15.9	11.8	28.1	10.5	24.6
DISC Separation Anxiety	5.2	17.6	9.5	4.1	3.4	8.1	0.9	5.4	2.6	8.1
DISC Social Phobia	3.4	2.7	2.6	5.4	3.4	6.8	7.8	5.4	7.8	10.8
DISC Generalized Anxiety	0.9	0.0	0.9	4.1	3.4	1.4	0.9	1.4	4.3	5.4
DISC Any Diagnosis	9.5	17.6	10.3	10.8	7.8	12.2	8.6	9.5	12.1	14.9
CBCL Affective Problems	7.0	16.4	8.9	17.6	9.3	18.8	8.8	14.0	10.5	12.3
CBCL Attention Deficit/Hyperactivity Problems	2.6	17.8	5.4	24.3	4.6	26.1	8.8	28.1	6.7	26.3
CBCL Oppositional Defiant Problems	4.3	16.4	10.7	21.6	13.0	17.4	8.8	22.8	10.5	26.3
CBCL Externalizing Problems	21.4	38.4	24.1	28.4	16.7	37.7	21.0	45.6	21.0	38.6
Co-occurrences										
CBCL Anxiety and Affective Problems	2.6	6.8	4.5	9.5	2.8	8.7	5.9	7.0	4.8	12.3
CBCL Anxiety and Attention Deficit/Hyperactivity Problems	1.7	4.1	2.7	10.8	0.0	7.2	1.0	8.8	1.9	14.0
CBCL Anxiety and Oppositional Defiant Problems	1.7	8.2	2.7	9.5	1.9	7.2	3.9	12.3	2.9	8.8
CBCL Anxiety and Externalizing Problems	3.5	12.3	6.3	10.8	4.6	11.6	2.9	19.3	3.8	15.8

Note: N for CBCL analyses = Age 5: 115 TD, 73 ID; Age 6: 112 TD, 74 ID; Age 7: 108 TD, 69 ID; Age 8: 102 TD, 57 ID; Age 9: 105 TD, 57 ID. *N* for DISC analyses = 116 TD; 74 ID at all ages. DISC = Diagnostic Interview Schedule for Children; CBCL = Child Behavior Checklist; DSM = *Diagnostic and Statistical Manual of Mental Disorders*; TD = typical cognitive development; ID = intellectual disability.

significantly higher in the ID group than in the TD group for the co-occurrence of Anxiety Problems with Attention Deficit/Hyperactivity Problems at every age except 5 years, and with Externalizing Problems at ages 5, 8, and 9 years. There were no significant differences in odds for the co-occurrence of Anxiety Problems with Affective or Oppositional Defiant Problems at any age. Because rates of each individual disorder were higher in the ID group, higher co-occurrence is likely in this group simply by chance. To determine whether co-occurrence was above chance levels, we calculated the joint probability of each disorder (Affective, Attention Deficit/Hyperactivity, Oppositional Defiant, and Externalizing Problems) co-occurring with Anxiety

TABLE 3
Logistic Regression Analyses of ID versus TD Status Group Difference in Odds of Meeting CBCL or DISC Anxiety Criteria

	Age 5			*Age 6*			*Age 7*			*Age 8*			*Age 9*		
Variable	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*
CBCL Anxiety Problems (T score)	–2.74			–2.03			–0.67			–2.02			–2.15		
Family Income							–0.23	**0.80***	.64, .99						
ID-TD Status	0.90	2.45†	.88, 6.76	0.48	1.62	.71, 3.73	–0.11	0.89	.38, 2.11	1.07	**2.93***	1.27, 6.74	1.02	**2.78***	1.17, 6.63
DISC Separation Anxiety	–2.91			–0.72			–1.88			–4.75		.72, 59.99	–3.63	3.32†	.81, 13.73
Family Income				–0.34	**0.71****	.54, .95	–0.33	0.72†	.51, 1.02						
ID-TD Status	1.36	**3.91****	1.41, 10.80	–1.20	0.30†	.08, 1.16	0.68	1.96	.52, 7.40	1.88	6.57†	.72, 59.99	1.20	3.32†	.81, 13.73
DISC Social Phobia	–3.33			–3.63			–1.41			–0.48			–2.48		
Family Income							–0.46	**0.63***	.43, .92	–0.47	**0.63****	.46, .86			
ID-TD Status	–0.25	0.78	.14, 4.36	0.77	2.15	.47, 9.90	0.41	1.51	.38, 6.03	–0.75	0.48	.13, 1.68	0.37	1.44	.53, 3.92
DISC Any Anxiety	–2.26			–0.61			–0.84			–0.69			–1.99		
Family Income				–0.34	**0.71***	.55, .91	–0.36	**0.70****	.53, .91	–0.38	**0.69****	.53, .90			
ID-TD Status	0.71	2.03	.86, 4.82	–0.22	0.67	.30, 2.15	0.23	1.26	.46, 3.45	–0.18	0.83	.29, 2.39	0.24	1.27	.54, 2.98

Note: Positive B for ID-TD typical cognitive development status variable indicates the odds of having anxiety are greater for ID compared to TD. Negative B for family income indicates that the odds of having anxiety increase as family income decreases. Odds ratio (*OR*) indicates the percent greater likelihood of having anxiety for one status group over another (ID compared to TD if B is negative) and for each 1-level decrease in family income. For ease of interpretations, significant *OR*s where the odds are greater for ID compared to TD are bold. ID = intellectual disability; TD = typical cognitive development; CBCL = Child Behavior Checklist; DISC = Diagnostic Interview Schedule for Children; CI = confidence interval.

$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

TABLE 4
Logistic Regression Analyses of ID versus TD Status Group Difference in Odds of Meeting Criteria for CBCL Anxiety Problems and Another CBCL Scale

	Age 5			*Age 6*			*Age 7*			*Age 8*			*Age 9*		
Variable	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*	*B*	*OR*	*95% CI*
CBCL Affective Problems	–3.62			–3.06			–1.43			–2.77			–3.00		
Family Income							–0.53	**0.59***	.39, .89						
ID-TD Status	1.01	2.75	.63, 11.85	0.80	2.24	.68, 7.33	0.92	2.16	.58, 10.78	0.19	1.21	.33, 4.47	1.03	2.80†	.85, 9.27
CBCL Attention Deficit/ Hyperactivity Problems	–4.03			–3.59			–21.20			–4.62			–3.94		
ID-TD Status	0.88	2.42	.40, 14.85	1.48	**4.40***	1.13, 17.19	18.65	—[a,*]	—[a]	2.27	**9.71***	1.11, 85.31	2.13	**8.41****	1.72, 41.08
CBCL Oppositional Defiant Problems	–4.03			–3.59			–3.97			–3.20			–3.53		
ID-TD Status	1.62	5.06†	.99, 25, 79	1.33	3.80+	.95, 15.18	1.42	4.14†	.78, 21.97	1.23	3.42†	.96, 12.27	1.19	3.26	.75, 14.22
CBCL Externalizing Problems	–3.32			–2.71			–0.79			–3.50			–3.23		
Family Income							–0.56	**0.57****	.40, .81						
ID-TD Status	1.36	**3.90***	1.16, 13.18	0.60	1.82	.63, 5.25	0.70	2.02	.60, 6.77	2.07	**7.89****	2.10, 29.65	1.56	**4.73***	1.39, 16.15

Note: Positive B for ID-TD Status variable indicates the odds of having anxiety are greater for ID compared to TD. Negative B for family income indicates that the odds of having anxiety increase as family income decreases. Odds ratio (*OR*) indicates the percentage greater likelihood of having anxiety for one status group over another (ID compared to TD if B is negative) and for each 1-level decrease in family income. For ease of interpretations, significant *OR*s where the odds are greater for ID compared to TD are bold. ID=intellectual disability; TD=typical cognitive development; CBCL=Child Behavior Checklist; DISC=Diagnostic Interview Schedule for Children; CI=confidence interval.

[a]Zero typical cognitive development TD children at age 84 months met CBCL criteria for both Anxiety and ADHD, thus the OR is infinitely large.

†p < .10. *p < .05. **p < .01. ***p < .001.

Problems in each group by chance. Odds were well above chance in the ID group (most at least two times the frequency expected to occur by chance), indicating that the higher co-occurrence is likely not due simply to higher rates of each independent disorder.

Growth Model for CBCL Anxiety Problems

Group differences in anxiety trajectory were examined by conducting a multilevel growth model analysis using hierarchical linear modeling (Raudenbush & Bryk, 2002). This analysis examined anxiety severity as a continuous measure using *T* scores on the CBCL. *T* scores were used because the focus was on increases in clinically severe anxiety in each group. Each model consisted of two levels of analysis. Level 1 included predictors of CBCL Anxiety Problems *T* scores, including the anxiety intercept at age 5 years and the anxiety slope over time. Level 2 included the time-invariant predictors (cognitive status: ID or TD) as well as family income, sex, and a Sex × ID-TD Status interaction. The three demographics were not significant and thus were removed from the final model. ID-TD status was coded such that the TD group=0 and the ID group=1 so that intercept coefficients pertained to the significance for the TD group, and the Intercept × Status interactions tested whether there was a significant difference between groups.

Table 5 shows the results of this growth model. The variable used to represent time ranged from 0 to 4 because there were five annual time points of CBCL data. As in regression analyses, because Time 1 (age 5 years) was set to 0, the intercept (initial time point of each trajectory) of the model indicated the mean score at age 5 on the CBCL Anxiety Problems subscale for the TD group, and the coefficient for the "ID-TD status" variable indicated the difference in initial Anxiety Problems scores in the ID group compared to the TD group. Consistent with the *t* tests (see Table 1), the ID group had significantly higher Anxiety Problems scores

TABLE 5
Results of Growth Model Predicting CBCL Anxiety Problems T Scores

Variable	*Coefficient (SE)*
Intercept	53.53*** (0.54)
By ID-TD Status[a]	2.36* (1.01)
Slope	0.32* (0.15)
By ID-TD Status[a]	–0.02 (0.28)

Note: CBCL=Child Behavior Checklist; ID=intellectual disability; TD=typical cognitive development.

[a]The ID-TD status coefficient specifies whether and by how much the ID coefficient is greater than or less than the TD coefficient.

*$p < .05$. ***$p < .001$.

at age 5 years. The growth model had a significant, positive slope, indicating that anxiety increased significantly across time. There was no significant difference in Slope × ID-TD Status.

DISCUSSION

This study examined the presentation and development of clinical levels of anxiety during middle childhood in children with intellectual disability versus typical cognitive development. Children with ID had significantly higher anxiety scores on the CBCL at all ages except 7 years, as well as significantly higher likelihood of meeting clinical cutoffs for Anxiety Problems on the CBCL at ages 8 and 9 years and on the DISC Separation Anxiety subscale at age 5 years. There were no significant group differences in DISC SoP or GAD at any age, with low rates of each disorder found. There were no significant sex differences in percentage meeting CBCL anxiety criteria within either ID-TD status group, which is consistent with studies of TD children showing no sex differences in preadolescent children (e.g., Cohen et al., 1993). The rates of co-occurring disorders with anxiety was significantly higher for children with ID for Attention Deficit/Hyperactivity Problems (at four out of five time points) and the CBCL broad-band Externalizing Problems scale (at three out of 5 time points). This is consistent with previous findings (e.g., Baker et al., 2010) that externalizing disorders are more common in children with ID; however, co-occurrence was even higher than expected at these time points given the probability of having each disorder alone.

The trajectory of anxiety symptoms in each group was examined using hierarchical linear modeling. Although the ID group initially had higher symptoms, both groups increased at a similar rate. Child sex was not a significant predictor of initial symptoms or slope for either group. These findings are consistent with the TD anxiety literature findings that anxiety as a whole tends to increase with age (e.g., Canino et al., 2004). However, it should be noted that the CBCL Anxiety Problems scale is a general measure of clinical risk for anxiety disorders rather than a measure of specific disorders. Thus, although risk for anxiety increases similarly in both groups, different disorders may not follow the same trajectories; for example, SAD may take longer to decrease in children with ID as it is significantly higher at age 5 and then drops closer to TD levels by age 6 years. Conversely, SoP appeared to increase similarly for both groups over time.

Overall, results suggest that children with ID are about 4 times more likely to meet criteria for SAD compared to TD peers at age 5, and 2 to 3 times more likely to be at high clinical risk for anxiety, particularly as they get older. Despite the higher rates, the presentation of anxiety is similar to that in TD in some respects: In both groups there are no sex differences throughout early elementary years, and both show anxiety increases over time, particularly SoP and GAD. However, an important difference is that anxiety is 4 to 10 times more likely to co-occur with externalizing problems in children with ID, particularly attention deficit/hyperactivity problems. Given that children with ID have poorer emotion regulation skills and more difficulty expressing themselves verbally, they may be more likely to act out or be noncompliant when they are anxious.

A limitation of this study was the insufficient power to examine in more detail children who met full criteria for anxiety disorders on the DISC. Future studies will require larger samples given the low base rates of anxiety (as compared to externalizing problems). This would allow for more accurate prevalence comparisons of specific disorders as well as examination of comorbidity. In addition, it will be important to examine group differences in the manifestation of anxiety into adolescence, when GAD and SoP increase and sex differences begin to emerge in TD youth (e.g., Cohen et al., 1993; Hale et al., 2008). This is particularly important given study findings that group differences in anxiety risk appear to emerge later in childhood (i.e., ages 8–9 years). This could indicate increased risk in the ID group for development of anxiety disorders in middle school years and adolescence.

Although this study used two types of anxiety measures, both were based on parent report. For older children especially, parents may not be fully aware of their children's internalizing symptoms, so it would be useful to examine self-report and observational measures of anxiety. Finally, neither the DISC diagnoses nor the CBCL take into account impairment, which is an important consideration for a clinical diagnosis. However, the high co-occurrence with other externalizing and internalizing symptoms gives some indication of impairment.

Despite these limitations, results of this study suggest that school-age children with ID may benefit from anxiety-targeted prevention and intervention services. Given the high co-occurrence of anxiety and behavior problems in this group, it may be useful to integrate interventions targeting both problems. There is little research on treatment studies for children with ID and anxiety disorders, though studies of children with ASD suggest that CBT for anxiety can be successfully integrated with parent management training to reduce anxiety of children with developmental delays and borderline to average IQ (Wood et al., 2009).

In conclusion, having lower cognitive ability appears to put children at greater risk for anxiety compared to typically developing peers. These preliminary results are mixed as to whether anxiety presents as the same

disorder in children with or without ID. Children with ID show similar increases in anxiety across early elementary years, though their initial anxiety rates are higher. In addition, anxiety may more often be expressed along with attention or hyperactivity problems in children with ID, highlighting the importance of screening for anxiety in children with ID and behavioral problems.

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REFERENCES

Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA preschool forms & profiles*. Burlington: University of Vermont, Research Center for Children, Youth, & Families.

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms & profiles*. Burlington: University of Vermont, Research Center for Children, Youth, & Families.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Baker, B. L., Blacher, J., Crnic, K. A., & Edelbrock, C. (2002). Behavior problems and parenting stress in families of three-year-old children with and without developmental delays. *American Journal on Mental Retardation, 107,* 433–444. doi:10.1352/0895-8017(2002)107<0433:BPAPSI>2.0.CO;2

Baker, B. L., Neece, C. L., Fenning, R. M., Crnic, K. A., & Blacher, J. (2010). Mental disorders in five year old children with or without developmental delay: Focus on ADHD. *Journal of Clinical Child and Adolescent Psychology, 39,* 492–505. doi:10.1080/15374416.2010.486321

Canino, G., Shrout, P. E., Rubio-Stipec, M., Bird, H. R., Bravo, M., Ramirez, R., & Martinez-Taboas, A. (2004). The *DSM-IV* rates of child and adolescent disorders in Puerto Rico: Prevalence, correlates, service use, and the effects of impairment. *Archives of General Psychiatry, 61,* 85–93. doi:10.1001/archpsyc.61.1.85

Christensen, L., Baker, B. L., & Blacher, J. (2013). Oppositional Defiant Disorder in children with intellectual disabilities. *Journal of Mental Health Research in Intellectual Disabilities, 6,* 225–244. doi:10.1080/19315864.2012.661033

Cohen, P., Cohen, J., Kasen, S., Velez, C. N., Hartmark, C., Johnson, J., & Streuning, J. (1993). An epidemiological study of disorders in late childhood and adolescence - I. Age- and gender-specific prevalence. *Journal of Child Psychology and Psychiatry, 34,* 851–867. doi:10.1111/j.1469-7610.1993.tb01094.x

Compton, S. N., Nelson, A. H., & March, J. S. (2000). Social phobia and separation anxiety symptoms in community and clinical samples of children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 39,* 1040–1046. doi:10.1097/00004583-200008000-00020

Dekker, M. C., & Koot, H. M. (2003). *DSM-IV* disorders in children with borderline to moderate intellectual disability. I: Prevalence and impact. *Journal of the American Academy of Child & Adolescent Psychiatry, 42,* 915–922. doi:10.1097/01.CHI.0000046892.27264.1A

Edelbrock. C., Crnic, K., & Bohnert, A. (1999). Interviewing as communication: An alternative way of administering the Diagnostic Interview Schedule for Children. *Journal of Abnormal Child Psychology, 27,* 447–453. doi:10.1023/A:1021979925865

Einfeld, S. L., Ellis, L. A., & Emerson, E. (2011). Comorbidity of intellectual disability and mental disorder in children and adolescents: A systematic review. *Journal of Intellectual and Developmental Disability, 36,* 137–143. doi:10.1080/13668250.2011.572548

Emerson, E., & Hatton, C. (2007). Mental health of children and adolescents with intellectual disabilities in Britain. *The British Journal of Psychiatry, 191,* 493–499. doi:10.1192/bjp.bp.107.038729

Fleitlich-Bilyk, B., & Goodman, R. (2004). Prevalence of child and adolescent psychiatric disorders in southeast Brazil. *Journal of the American Academy of Child & Adolescent Psychiatry, 43,* 727–734. doi:10.1097/01.chi.0000120021.14101.ca

Hale, W. W., Raaijmakers, Q., Muris, P., van Hoof, A., & Meeus, W. (2008). Developmental trajectories of adolescent anxiety disorder symptoms: A 5-year prospective community study. *Journal of the American Academy of Child & Adolescent Psychiatry, 47,* 556–564. doi:10.1097/CHI.0b013e3181676583

Hammerness, P., Geller, D., Petty, C., Lamb, A., Bristol, E., & Biederman, J. (2009). Does ADHD moderate the manifestation of anxiety disorders in children? *European Child & Adolescent Psychiatry, 19,* 107–112. doi:10.1007/s00787-009-0041-8

Li, H., & Morris, R. J. (2007). Assessing fears and related anxieties in children and adolescents with learning disabilities or mild mental retardation. *Research in Developmental Disabilities, 28,* 445–457. doi:10.1016/j.ridd.2006.06.001

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods.* Thousand Oaks, CA: Sage.

Roberts, R. E., Roberts, C. R., & Xing, Y. (2007). Rates of *DSM-IV* psychiatric disorders among adolescents in a large metropolitan area. *Journal of Psychiatric Research, 41,* 959–967. doi:10.1016/j.jpsychires.2006.09.006

Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry, 39,* 28–38. doi:10.1097/00004583-200001000-00014

Sparrow, S. S., Cicchetti, D. V., & Balla, D. A. (2005). *Vineland Adaptive Behavior Scales, second edition (Vineland–II): Survey Interview Form/Caregiver Rating Form*. Livonia, MN: Pearson Assessments.

Thorndike, R. L., Hagen, E. P., & Sattler, J. M. (1986). *The Stanford-Binet Intelligence Scale, Fourth Edition: Guide for administering and scoring*. Chicago, IL: Riverside.

Tsang, T. W., Kohn, M. R., Efron, D., Clarke, S. D., Clark, C. R., Lamb, C., & Williams, L. M. (2012). Anxiety in young people with ADHD: Clinical and self-report outcomes. *Journal of Attention Disorders*. Advance online publication. doi:10.1177/1087054712446830

Wood, J. J., Drahota, A., Sze, K., Har, K., Chiu, A., & Langer, D. A. (2009). Cognitive behavioral therapy for anxiety in children with autism spectrum disorders: A randomized, controlled trial. *Journal of Child Psychology and Psychiatry, 50,* 224–234. doi:10.1111/j.1469-7610.2008.01948.x