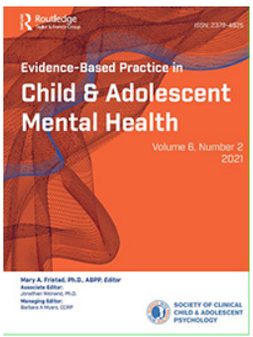

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The Role of Intolerance of Uncertainty in Treatment for Pediatric Anxiety Disorders and Obsessive-Compulsive Disorder

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ABSTRACT

This study investigated the role of intolerance of uncertainty (IU) in an intensive group-based cognitive behavioral therapy (CBT) program with family involvement for children with anxiety disorders and obsessive-compulsive disorder (OCD). One hundred four children and adolescents, aged 8–19 years, who were patients in an intensive outpatient group-based treatment program and their parents participated in this intervention-based study. From both children's and parents' perspectives at admission, higher IU in children was associated with both higher levels of anxiety and functional impairment. Both children and parents reported significant reductions in children's IU by discharge, and these reductions were associated with greater reductions in children's anxiety and functional impairment. However, children who reported higher levels of IU at admission, reported fewer reductions in their anxiety and functional impairment. These findings demonstrate an association between IU and children's anxiety and OCD intensive treatment outcomes. Those with higher levels of IU may benefit from more interventions that address tolerating uncertainty.

KEYWORDS

Intolerance of uncertainty; children, anxiety disorders; OCD; CBT

Anxiety disorders are the most common mental illnesses in youth (Cartwright-Hatton et al., 2011; Merikangas et al., 2010); more than one-third of children will meet criteria for an anxiety disorder before adulthood (Higa-mcmillan et al., 2015). Furthermore, anxiety disorders have been associated with current functional impairment (Ezpeleta et al., 2001), and if left untreated, they have been linked with long-term consequences, such as negative impacts on interpersonal relationships, affective disorders and complications during pregnancy and childbirth, financial struggles, unfavorable outcomes in education and occupation, and somatoform disorders (Asselmann et al., 2018).

Obsessive-Compulsive disorder (OCD) affects about 2–3% of youth and has been linked with impairment in academic, home, and social environments. Furthermore, the symptoms and impairment often persist into adulthood (Freeman et al., 2014). Given the prevalence of and long-term impairment involved in anxiety disorders and OCD, effective treatments are needed. Cognitive behavioral therapy (CBT) is a "well-established" treatment for pediatric anxiety disorders (Higa-mcmillan et al., 2015) and is "probably efficacious" for pediatric OCD (Freeman et al., 2014). Although CBT is a gold standard of treatment, it's not meeting the needs of all youth with anxiety and OCD; weekly CBT only predicts symptom remission for about half of the youth who receive the treatment (Bloch & Storch, 2015; Ginsburg et al., 2011). More research is needed to determine what factors are interfering with treatment progress as well as how treatment can be improved to address these factors.

One such factor may be one's intolerance of uncertainty (IU). Carleton, 2016b, p. 31) defines IU as . . . "[A]n individual's dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty." Carleton, 2016a also theorized that IU is a derivative of the fear of the unknown (FOTU), and that FOTU is a transdiagnostic underlying feature of several different anxiety disorders. A meta-analysis of cognitive vulnerabilities associated with depression and anxiety demonstrated that IU yielded the strongest factor loading (Hong & Cheung, 2015). This finding suggests that there may be a common treatment target for individuals with various anxiety disorders that needs to

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be addressed. Identifying and treating a common underlying factor that contributes to psychopathology is consistent with the aims of the National Institute of Mental Health's Research Domain Project (Cuthbert & Insel, 2013) and also may allow the mental health field to support more of the community. In addition, addressing a factor that is pervasive, such as IU, may facilitate generalization post-discharge and help patients sustain treatment gains.

A meta-analysis of studies that investigated IU in youth found that IU accounted for 36% and 39.69% of the variance of anxiety and worry respectively (Osmanagaoglu et al., 2018). Although most research on IU for those with obsessive-compulsive disorder (OCD) has focused on adults (Gillette et al., 2018)), research that combined IU and perfectionism to form one category found that increases in those concerns predicted increases in OCD severity one year later (Pozza et al., 2019). Given the significant role that IU plays in anxiety and OCD, it warrants examination of how IU may impact treatment of pediatric anxiety disorders and OCD.

The transdiagnostic model of IU suggests that difficulties with tolerating uncertainty contribute to the development of maladaptive cognitive, emotional, and behavioral coping strategies (Palitz et al., 2019). Research has found that with adults, higher IU levels at baseline were associated with higher anxiety ratings at baseline, and that greater reductions in IU following treatment using the unified protocol for the transdiagnostic treatment of emotional disorders (Barlow et al., 2017), an emotion-focused CBT, were associated with greater reductions in anxiety symptoms (Boswell et al., 2013). Research also has demonstrated that group-based treatments addressing underlying factors of internalizing disorders with a transdiagnostic approach have been helpful in treating pediatric anxiety disorders with comorbid depression symptoms (Bilek & Ehrenreich-May, 2012; Chu et al., 2016), but IU was not a factor that was examined. Most of the literature on IU and its association with treatment for anxiety has focused on adults (Kendall et al., 2020).

Very little research has explored how children's IU may be associated with their anxiety or OCD treatment outcomes. One study that investigated IU's role in children's treatment for anxiety found that decreases in IU over the course of weekly CBT were associated with decreases in children's anxiety severity and functional impairment as well as increases in coping efficacy (Palitz et al., 2019). Dugas et al., 1998 posited that cognitive exposures for those with persistent worries help reduce one's intolerance of uncertainty by providing new meanings to future events originally perceived as threats.

The scant research on IU in children's anxiety and OCD treatments focuses on weekly therapy. Research has yet to demonstrate IU's role in intensive treatment for pediatric anxiety and OCD. Intensive treatments for youth with panic disorder, agoraphobia, OCD, separation anxiety disorder, and specific phobia(s) in a research setting have been effective (Angelosante et al., 2009; Oar et al., 2015; Ollendick et al., 2009; Ost & Ollendick, 2017; Santucci et al., 2009; Storch et al., 2007), and they also have yielded reductions in children's anxiety, functional impairment, and comorbid depression symptoms in a clinical setting (Sperling et al., 2020). Researchers have demonstrated some benefits of intensive treatment compared to weekly CBT, including reduced attrition rates for pediatric anxiety treatment (Ost & Ollendick, 2017) and greater remission and improvement rates for pediatric OCD treatment (Storch et al., 2007). Craske et al., 2012 explained that intensive treatment can increase the effectiveness of exposure therapy by abbreviating time between exposure sessions.

This study aims to build upon the research on IU's role in weekly treatment and outcomes for intensive treatment by examining the role of IU in intensive treatment for pediatric anxiety disorders and/or OCD. The current hypotheses are as follows: higher IU levels at admission will be associated with higher child anxiety and functional impairment levels at admission, IU levels will decrease significantly by discharge, higher levels of IU at admission will be linked with less change in children's anxiety and functional impairment at discharge, and greater reductions in IU between admission and discharge will be associated with lower levels of child anxiety and functional impairment at discharge.

Method

Participants

One hundred four children and adolescents, aged 8–19 years, who were patients in an intensive outpatient group-based treatment program at an academic hospital in an urban city on the east coast provided assent, and their families provided consent for their treatment data to be used for research purposes. Participants either were referred to treatment by outpatient providers, inpatient or residential treatment providers, or school staff members, or their families learned about the program through the hospital's website or through local community members. Among the participants, 62 (59.6%) identified as female, 35 (33.7%) identified as male, 3 (2.9%) identified as transgender, 2 (1.9%) identified as nonbinary, 1 (1.0%) identified as agender, and 1 (1.0%) identified as other, questioning, or queer. The median age was 15 years old (SD = 2.78), and 87 (83.7%) identified as White, 9 (8.7%) as Asian, Asian American, or Pacific Islander, 6 (5.8%) as Latino/Latina Hispanic (White), 3 (2.9%) as Latino/Latina Hispanic (Nonwhite), 1 (1.0%) as Black or African American, 1 (1.0%) as Native American, 0 (0.0%) as Middle Eastern, and 2 (1.9%) as Other. Among the youth, 76 (73.1%) identified as heterosexual, 10 (9.6%) as bisexual, 7 (6.7%) as gay/lesbian, 4 (3.8%) identified as pansexual, 4 (3.8%) identified as questioning or queer, 2 (1.9%) identified as asexual, and 1 (1.0%) identified as demisexual.

The majority of families endorsed earning an annual family income greater than $100,000 [85 (81.7%), and 2 (1.9%) did not respond to this question] and also were highly educated [42 (40.4%) earned a bachelor's degree, 37 (35.6%) earned a master's degree, 16 (15.4%) earned a professional degree (e.g., M.D., Ph.D., J.D., etc.), 8 (7.7%) did not finish or attend college, and 1 (1.0%) did not respond to this question].

Measures

Child Anxiety Impact Scale (CAIS-C and CAIS-P; Langley et al., 2004). The CAIS-C and the CAIS-P are 27-item questionnaires for children and parents respectively, and they assess for interference in social, home, and academic domains. The measures are administered at admission and discharge assessments to assess the impact of anxiety on children's functioning. Respondents choose answers from a 4-point Likert scale, ranging from 0 ("not at all") to 3 ("very much"). The range of possible scores is 0–81, with higher scores indicating greater interference.

In these data, there was one item missing from the child- and parent-report of the CAIS: "Spending the night at a friend's house." All participants completed measures with the omitted question, so all change scores compared the same number of answered questions. The additional item would have potentially increased the total score at each time point by a maximum of three points.

Spence Children's Anxiety Scale (SCAS-C and SCAS-P; Spence, 1997). The SCAS-C and the SCAS-P are a 44-item child questionnaire and a 39-item parent respectively that measure anxiety severity and are administered at admission and at discharge assessments. Respondents choose answers from a 4-point Likert scale, ranging from 0 ("Never") to 3 ("Always"). The range of possible scores is 0–132 for children and is 0–117 for parents, with higher scores indicating greater levels of anxiety.

Intolerance of Uncertainty Scale for Children (IUSC-C and IUSC-P; Comer et al., 2009). The IUSC-C and IUSC-P are 27-item child-report and parent-report respectively questionnaires that were adapted from the adult version to measure children's emotional, cognitive, and behavioral reactions to uncertain experiences (Comer et al., 2009). These measures use a 5-point Likert Scale that ranges from "Not at all" to "Very much" and are administered at admission and discharge. The range of possible scores is 27–135 for each measure, with higher scores indicating greater levels of intolerance of uncertainty.

Procedure

Parents' and children's informed consent and assent respectively were obtained at the families' initial visit at the program. When the participants first started the program and on the last day of treatment, the child- and parent-report measures were completed to gather admission and discharge data.

Each family was assigned a team of a psychologist, psychiatrist, and clinical or counseling psychology doctoral student. There were two separate treatment groups, one for children aged 8–13 and one for adolescents and young adults aged 14–19. There were five-to-six patients enrolled in the child group, and six-to-eight patients in the adolescent group. Psychologists and doctoral students co-led the groups.

During the treatment program, children attended treatment four afternoons per week for a minimum of four weeks and with the option of extending for any number of full weeks (with a minimum extension of two weeks). The average length of treatment was 6.51 weeks (SD = 2.67) with a maximum of 16 weeks. The program ran for two-and-a-half hours four days per week. Three days included a 50-minute psychoeducation group, which taught children about their anxiety and/or OCD as well as specific skills, such as mindfulness exercises, cognitive coping tools, relaxation exercises, and relapse prevention techniques. Following a 10-minute break, participants attended a 90-minute ERPgGroup, which consisted of the participants engaging in personalized exposures that were planned based on a fear and avoidance hierarchy developed with the family at the beginning of treatment. The exposures were adjusted as needed based on how treatment progressed. On one of the group days, participants met in a local public setting, for both groups, to help them increase the external validity of their exposures. At the end of the ERP group, clinicians discussed the action plan assignments with each patient that involved rehearsing the exposures completed or planned during the session at home. Patients were involved in the planning to facilitate action plan completion.

Exposures addressing uncertainty were incorporated into treatment regularly during the 90-minute ERP group. For example, patients with emetophobia typically practiced eating and sitting with the uncertainty of whether the food ingested would contribute to a vomiting episode later. When indicated, clinicians collaborated with families, including the children in the program, so that the children were on board with the upcoming exposures, to gradually increase the level of uncertainty in everyday exposures (e.g., caregivers planned to go out for dinner but did not specify which restaurant will be visited). During the IU-based exposures, clinicians aimed to facilitate generalization by explicitly discussing with patients about how they were practicing tolerating the unknown and demonstrating that they can engage in value-based behaviors even when there was uncertainty about the future.

Caregivers attended a twice-weekly 50-minute caregiver guidance group that taught caregivers skills aimed to facilitate their children's treatment as well as provide support for families. Some of the skills reviewed were behavioral parent training techniques, validation, self-care, accommodation reduction strategies, and independence-fostering exercises. At the end of each group day, a clinician met with a caregiver and the child privately to review the exposures that were completed that day and the action plan to be completed before the next treatment day.

Every family attended a weekly 45-minute family meeting, during which topics such as diagnostic impressions, how to support patients' treatment, and discharge plans, were discussed. In addition, each family attended a session with a program's psychiatrist for medication consultation if relevant. Medications were prescribed only when indicated and when welcomed by families.

Results

All patients completed the program except for eight. Three of the eight required a higher level of care, such as inpatient treatment. Two of the eight exhibited rule-out symptoms, such as the engagement of self-injurious behaviors after exposures, that needed to be the primary focus of treatment instead. Three patients refused to engage in treatment and were referred for alternative treatment, such as motivational interviewing.

Data analysis plan

Separate analyses for child-reported data and parent-reported data were run for each hypothesis, and the mean admission and discharge data reported by both children and parents are presented in Table 1. To examine changes in scores over the course of treatment, change scores were computed by

Table 1. Child- and parent-reported admission and discharge scores.

Measure	Admission		Discharge	
	Child M(SD)	Parent M(SD)	Child M(SD)	Parent M(SD)
SCAS	36.58(17.42)	34.05(13.13)	21.74(17.48)	22.37(12.75)
CAIS	25.47(15.69)	30.70(15.05)	16.52(14.27)	18.95(14.58)
IUSC	67.26(24.09)	66.61(26.29)	53.62(19.40)	57.21(24.95)

subtracting discharge ratings from admission ratings. There were no significant differences between children, aged 8–13, and adolescents, aged 14–19, the two age-based cohorts in the program, on any of the admission, discharge, or change variables. Therefore, age was not included in the analyses below.

Hypothesis 1: Higher IU levels at admission will be associated with higher child anxiety and functional impairment levels at admission.

It was hypothesized that higher IU levels at admission would be associated with higher anxiety levels at admission, and Pearson correlations were run to test this hypothesis both for the child-reports and for the parent-reports. This hypothesis was supported for both the child-reports and the parent-reports: child-reported IU was positively correlated with child-reported anxiety symptoms [r(104) =.69, p = .000], and parents' report of their children's IU and anxiety levels were positively correlated [r(104) =.51, p = .000].

It also was hypothesized that higher IU levels at admission would be correlated with higher levels of functional impairment, and Pearson correlations were run to test this hypothesis both for the child-reports and for the parent-reports. This hypothesis was supported for both the child-reports and the parent-reports: child-reported IU was positively correlated with child-reported functional impairment [r(104) =.60, p = .000], and parents' report of their children's IU and functional impairment were positively correlated [r(104) =.54, p = .000]. Table 2 displays the correlations among all of the admission and discharge variables.

Hypothesis 2: IU levels will decrease significantly by discharge.

It was hypothesized that IU levels would decrease after treatment, and the results from paired-samples t-tests support these findings for both children's reports of IU [M(child at admission) = 63.32, SD = 21.64; M(child at discharge) = 53.62, SD = 19.40; t(73) = 4.17, p = .000] and parents' reports of IU [M(parent at admission) = 67.30, SD = 27.35; M(parent at discharge) = 57.21, SD = 24.95; t(76) = 3.62, p = .001].

Hypothesis 3: Higher levels of IU at admission will be linked with less change in children's anxiety and functional impairment at discharge.

This hypothesis was tested using multiple regressions (see, Tables 3 and 4). Admission IU and anxiety scores were the independent variables, and the change in anxiety score was the dependent variable.

The regression model was significant for the child-reported data [F(2,81) = 9.15, p = .000, R^2 = .184]. Higher IU levels at admission predicted less change (β = −.18, t = −2.10, p = .038). Higher levels

Table 2. Correlations among child- and parent-reported admission and discharge scores.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Admission Child SCAS												
2. Admission Parent SCAS	.522***											
3. Admission Child CAIS	.619***	.340***										
4. Admission Parent CAIS	.227*	.552***	.446***									
5. Admission Child IUSC	.691***	.390***	.595***	.347***								
6. Admission Parent IUSC	.149	.507***	.113	.539	.332***							
7. Discharge Child SCAS	.658***	.457***	.381***	.303**	.568***	.336**						
8. Discharge Parent SCAS	.283**	.558***	.052	.427***	.301**	.430***	.531***					
9. Discharge Child CAIS	.391***	.347**	.444***	.446***	.440***	.296**	.780***	.470***				
10. Discharge Parent CAIS	.090	.347***	.107	.572***	.240*	.274*	.363***	.669***	.511***			
11. Discharge Child IUSC	.308**	.130	.311**	.347**	.528***	.307**	.618***	.289**	.708***	.356*		
12 Discharge Parent IUSC	−.118	.288*	−.062	.398***	.219	.565***	.173	.632***	.257*	.581***	.215	

Note. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Table 3. Hypothesis 3: higher levels of iu at admission will be linked with less change in children's anxiety at discharge.

Independent Variables	B	SE	β	t	p-level	Lower-Bound CI	Upper-Bound CI
Child-Reported Data							
Intercept	8.57	4.40		1.95	.055	−.18	17.33
Admission IUSC	−.18	.09	−.28	−2.10	.038*	−.35	−.01
Admission SCAS	.48	.11	.56	4.18	.000***	.25	.40
Parent-Reported Data							
Intercept	−1.28	3.57		−.36	.722	−8.38	5.83
Admission IUSC	−.09	.05	−.20	−1.74	.086†	−.19	.01
Admission SCAS	.55	.11	.59	5.26	.000***	.34	.76

Note. † $p \leq .10$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Table 4. Hypothesis 3: higher levels of IU at admission will be linked with less change in children's functional impairment at discharge.

Independent Variables	B	SE	β	t	p-level	Lower-Bound CI	Upper-Bound CI
Child-Reported Data							
Intercept	1.40	4.26		.33	.743	−7.08	9.88
Admission IUSC	−.17	.08	−.25	−2.19	.031*	−.33	−.02
Admission CAIS	.73	.12	.71	6.22	.000***	.50	.97
Parent-Reported Data							
Intercept	−3.77	3.76		−1.00	.320	−11.26	3.73
Admission IUSC	.04	.06	.08	.66	.509	−.08	.16
Admission CAIS	.40	.11	.44	3.64	.000***	.18	.62

Note. † $p \leq .10$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

of admission anxiety, however, predicted greater reductions in anxiety by discharge (β = .48, t = 4.18, p = .000).

Table 5. Hypothesis 4: greater reductions in iu will be associated with lower levels of child anxiety at discharge.

Independent Variables	B	SE	β	t	p-level	Lower-Bound CI	Upper-Bound CI
Child-Reported Data							
Intercept	−4.26	2.96		−1.44	.155	−10.16	1.65
Change in IUSC	−.32	.07	−.39	−.46	.000***	−.46	−.18
Admission SCAS	.78	.08	.81	9.24	.000***	.61	.94
Parent-Reported Data							
Intercept	1.89	3.04		.62	.535	−4.16	7.94
Change in IUSC	−.17	.05	−.30	−3.37	.001***	−.26	−.07
Admission SCAS	.65	.09	.68	7.60	.000***	.48	.81

Note. † $p \leq .10$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Although the regression model for parent-reported data was significant [$F(2,80)$ = 14.62, p = .000, R^2 = .268], IU only trended toward significance as a predictor (β = −.09, t = −1.74, p = .086). Admission levels of parent-reported child anxiety, however, was a significant predictor (β = .55, t = 5.26, p = .000).

When the change in child functional impairment was the dependent variable, the admission IU and functional impairment scores were added as independent variables.

The model for child-reported data was significant [$F(2,81)$ = 21.52, p = .000, R^2 = .347]. Higher IU levels at admission significantly predicted less change in functional impairment (β = −.17, t = −2.19, p = .031). More functional impairment at admission, however, predicted greater reductions in functional impairment by discharge (β = .73, t = 6.22, p = .000).

Although the regression model for parent-reported data was significant [$F(2,78)$ = 12.13, p = .000, R^2 = .237], the IU score at admission was not a significant predictor. Functional impairment at admission, however, was a significant predictor (β = .40, t = 3.64, p = .000) with higher levels of functional impairment predicting more improvement by discharge.

Hypothesis 4: Greater reductions in IU between admission and discharge will be associated with lower levels of child anxiety and functional impairment at discharge.

Multiple regressions were computed to test this hypothesis. All of the regression models above remained the same except the admission IU score as the independent variable was replaced with changes in IU over the course of treatment as an independent variable (see, Tables 5 and 6).

When changes in child anxiety over the course of treatment was the dependent variable, the model was significant for the child-reported data [$F(2,71)$ = 22.16, p = .000, R^2 = .384]. Greater reductions in IU predicted larger decreases in anxiety by discharge (β = .32, t = 4.46, p = .000). Higher levels of anxiety also predicted greater changes in anxiety by discharge (β = .22, t = 2.66, p = .010).

Table 6. Hypothesis 4: greater reductions in IU will be associated with lower levels of child functional impairment at discharge.

Independent Variables	B	SE	β	t	p-level	Lower-Bound CI	Upper-Bound CI
Child-Reported Data							
Intercept	5.99	2.45		2.44	.017*	1.11	10.88
Change in IUSC	−.34	.07	−.51	−4.89	.000***	−.47	−.20
Admission CAIS	.51	.09	.56	5.39	.000***	.32	.70
Parent-Reported Data							
Intercept	1.86	2.49		.75	.458	−3.10	6.81
Change in IUSC	−.30	.05	−.49	−6.11	.000***	−.40	−.20
Admission CAIS	.69	.08	.72	8.90	.000***	.54	.85

Note. † $p \leq .10$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

The regression model also was significant for the parent-reported data when the change in anxiety by discharge was the dependent variable [$F(2,72) = 18.87$, $p = .000$, $R^2 = .344$], Greater changes in IU predicted larger reductions in anxiety by discharge (β = .17, $t = 3.37$, $p = .001$. Admission anxiety also was a significant predictor; higher levels of anxiety at admission predicted greater reductions in anxiety by discharge (β = .36, $t = 4.19$, $p = .000$).

When the change in child functional impairment was the dependent variable, the model for child-reported data was significant [$F(2,71) = 41.81$, $p = .000$, $R^2 = .541$]. Greater reductions in IU predicted more improvement in functioning by discharge (β = .34, $t = 4.89$, $p = .000$). More functional impairment at admission also predicted greater reductions in functional impairment by discharge (β = .49, $t = 5.24$, $p = .000$).

The regression model for parent-reported data also was significant [$F(2,72) = 35.98$, $p = .000$, $R^2 = .500$]. Greater reductions in IU predicted more improvement in functioning by discharge (β = .30, $t = 6.11$, $p = .000$). More functional impairment at admission also predicted greater reductions in functional impairment by discharge (β = .31, $t = 3.99$, $p = .000$).

Discussion

Research on IU has demonstrated that IU is negatively associated with treatment gains in both adults' and children's weekly outpatient treatment for anxiety (Barlow et al., 2017; Palitz et al., 2019), but research has yet to examine its role in intensive treatment for pediatric anxiety disorders and OCD. This study aimed to address that research gap.

Hypothesis 1: Higher IU levels at admission will be associated with higher child anxiety and functional impairment levels at admission.

As expected, higher IU levels at admission were associated with both higher anxiety levels and higher levels of functional impairment at admission for both the child-reports and parent-reports. These findings are in line with past research that found that IU explained a significant amount of the variance for pediatric anxiety disorders as well as OCD experienced by adults (Osmanagaoglu et al., 2018; Pozza et al., 2019). These findings also highlight the importance of addressing IU in treatment.

Hypothesis 2: IU levels will decrease significantly by discharge.

This study demonstrated that intensive treatment could reduce IU levels from both children's and parents' perspectives. Incorporating multiple exposures each week into treatment for children to sit with the uncertainty of what may happen after they engage in specific feared behaviors can offer opportunities for them to teach themselves that they can manage even if the situation were difficult. For example, a child working on separation anxiety may practice having a parent do errands in a neighboring town for a predetermined amount of time but not know which specific stores will be visited. A child with a fear of dogs may work on meeting dogs with whom the child does not have previous experience interacting. Someone with social anxiety may practice asking strangers for directions without knowing how receptive they will be to providing them. Creating multiple exposure opportunities that incite uncertainty allows children to learn that they can manage a variety of experiences that are challenging despite their unpredictable nature.

Hypothesis 3: Higher levels of IU at admission will be linked with less change in children's anxiety and functional impairment at discharge.

Although this study demonstrated that intensive treatment could help reduce IU levels by discharge, the analyses also illustrated that improvement may be inhibited by IU levels at admission. Higher IU levels at admission predicted less change in anxiety and in functional impairment by discharge from children's perspectives even after controlling for baseline anxiety or functional impairment, and these associations were marginally significant for parents' perspectives.

Comer et al., 2009 found that parent and child agreement on the IUSC measures was poor, and that may be because IU is an internal experience, one that is difficult for parents to measure (Comer & Kendall, 2005). This difficulty may explain why there were significant associations for the child-reported IU but not for the parent-reported IU.

Hypothesis 4: Greater reductions in IU between admission and discharge will be associated with lower levels of child anxiety and functional impairment at discharge.

When there were greater decreases in IU by discharge, both children and parents were more likely to endorse lower levels of anxiety and functional impairment at discharge. These findings are consistent with past research on weekly treatment for pediatric anxiety disorders (Palitz et al., 2019). Children with reported higher levels of anxiety and functional impairment at admission also had reported greater reductions in anxiety and functional impairment respectively. This may be due to a floor effect for those who had fewer symptoms and less room for improvement.

The data provide further evidence that addressing common underlying factors can facilitate treatment gains in treating pediatric internalizing disorders (Bilek & Ehrenreich-May, 2012; Chu et al., 2016). By addressing IU in treatment, such as by creating exposures that teach children that they can manage uncertainty, children can experience even more improvement in their distress and in their participation in their daily activities. Because the findings from this study also highlight that IU can interfere with treatment gains, children who begin treatment with relatively higher levels of IU may benefit from additional exposures that address uncertainty to facilitate more treatment gains.

Limitations and future directions

This study expands upon the scant research on IU in children by demonstrating how IU can impact children's treatment outcomes in an intensive program. Although this study began to address a gap in the literature, there were some limitations to the study.

One of the limitations was the relatively homogenous sample. The program's commitment of time and financial resources may have restricted access to a more diverse population. Although the program has a scholarship program available, this option may be less well-known in the community. The program currently is involved in expanding its outreach in the community, and future research is needed to explore the role IU plays in a more diverse population's intensive treatment.

In addition, this study only examined IU levels at the beginning and at the end of treatment. The study's results indicate that it may be helpful to assess IU levels more often, such as weekly, to see if treatment were adequately addressing children's tolerance of uncertainty.

Lastly, the data are based on self- and parent-report. It may be helpful to include assessments by independent evaluators to have an objective measure of IU and treatment outcomes.

Despite these limitations, this study demonstrated that IU is relevant for pediatric anxiety and OCD treatment outcomes. Identifying a common underlying factor that may undermine treatment for many different presenting concerns may allow clinicians to better help a wide range of children in the community. Repeatedly assessing for IU and designing treatment interventions that address the management of IU may be indicated to better support children and their families to make sure that clinicians are targeting the construct sufficiently. By creating experiences for children to

learn that they can tolerate uncertain outcomes, youth may be more able to approach the unpredictable nature of future experiences.

Disclosure statement

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References

Angelosante, A. G., Pincus, D. B., Whitton, S. W., Cheron, D., & Pian, J. (2009). Implementation of an intensive treatment protocol for adolescents with panic disorder and agorophobia. *Cognitive and Behavioral Practice*, *16*(3), 345–357. https://doi.org/10.1016/j.cbpra.2009.03.002

Asselmann, E., Wittchen, H.-U., Lieb, R., & Beesdo-Baum, K. (2018). Sociodemographic, clinical, and functional long-term outcomes in adolescents and young adults with mental disorders. *Acta Psychiatrica Scandinavica*, *137*(1), 6–17. https://doi.org/10.1111/acps.12792

Barlow, D. H., Farchione, T. J., Bullis, J. R., Gallagher, M. W., Murray-Latin, H., Sauer-Zavala, S., Bentley, K. H., Thompson-Hollands, J., Conklin, L. R., Boswell, J. F., Ametaj, A., Carl, J. R., Boettcher, H. T., & Cassiello-Robbins, C. (2017). The unified protocol for transdiagnostic treatment of emotional disorders compared with diagnosis-specific protocols for anxiety disorders: A randomized clinical trial. *JAMA Psychiatry*, *74*(9), 875–884. https://doi.org/10.1001/jamapsychiatry.2017.2164

Bilek, E. L., & Ehrenreich-May, J. (2012). An open trial investigation of a transdiagnostic group treatment for children with anxiety and depressive symptoms. *Behavior Therapy*, *43*(4), 887–897. https://doi.org/10.1016/j.beth.2012.04.007

Bloch, M. H., & Storch, E. A. (2015). Assessment and management of treatment-refractory Obsessive-Compulsive Disorder in children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *54*(4), 251–262. doi:10.1016/j.jaac.2015.01.011

Boswell, J. F., Thompson-Hollands, J., Farchione, T. J., & Barlow, D. H. (2013). Intolerance of uncertainty: A common factor in the treatment of emotional disorders. *Journal of Clinical Psychology*, *69*(6), 630–645. https://doi.org/10.1002/jclp.21965

Carleton, R. N. (2016a). Fear of the unknown: One fear to rule them all? *Journal of Anxiety Disorders*, *41*, 5–21. https://doi.org/10.1016/j.janxdis.2016.03.011

Carleton, R. N. (2016b). Into the unknown: A review and synthesis of contemporary models involving uncertainty. *Journal of Anxiety Disorders*, *39*, 30–43. https://doi.org/10.1016/j.janxdis.2016.02.007

Cartwright-Hatton, S., McNally, D., Field, A. P., Rust, S., Laskey, B., Dixon, C., Gallagher, B., Harrington, R., Miller, C., Pemberton, K., Symes, W., Caroline, W., & Woodham, A. (2011). A new parenting-based group intervention for young anxious children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *50*(3), 242–251. https://doi.org/10.1016/j.jaac.2010.12.015

Chu, B. C., Crocco, S. T., Esseling, P., Areizaga, M. J., Lindner, A. M., & Skriner, L. C. (2016). Transdiagnostic group behavioral activation and exposure therapy for youth anxiety and depression: Initial randomized controlled trial. *Behaviour Research and Therapy*, *76*, 65–75. https://doi.org/10.1016/j.brat.2015.11.005

Comer, J. S., & Kendall, P. C. (2005). High-end specificity of the children's depression inventory in a sample of anxiety-disordered youth. *Depression and Anxiety*, *22*(1), 11–19. https://doi.org/10.1002/da.20059

Comer, J. S., Roy, A. K., Furr, J. M., Gotimer, K., Beidas, R. S., Dugas, M. J., & Kendall, P. C. (2009). The intolerance of uncertainty scale for children: A psychometric evaluation. *Psychological Assessment*, *21*(3), 402–411. https://doi.org/10.1037/a0016719

Craske, M. G., Liao, B., Brown, L., & Vervliet, B. (2012). Role of inhibition in exposuretherapy. *Journal of Experimental Psychopathology*, *3*(3), 322–345. https://doi.org/10.5127/jep.026511

Cuthbert, B. N., & Insel, T. R. (2013). Toward the future of psychiatric diagnosis: The seven pillars of RDoC. *BMC Medicine*, *11*, 126. https://doi.org/10.1186/1741-7015-11-126

Dugas, M. J., Gagnon, F., Ladouceur, R., & Freeston, M. H. (1998). Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research Therapy*, *36*(2), 215–226. https://doi.org/10.1016/S0005-7967(97)00070-3

Ezpeleta, L., Keeler, G., Erkanli, A., Costello, E. J., & Angold, A. (2001). Epidemiology of psychiatric disability in childhood and adolescence. *Journal of Child Psychology and Psychiatry and allied disciplines*, *42*(7), 901–914. https://doi.org/10.1111/1469-7610.00786

Freeman, J., Garcia, A., Frank, H., Benito, K., Conelea, C., Walther, M., & Edmunds, J. (2014). Evidence base update for psychosocial treatments for pediatric obsessive-compulsive disorder. *Journal of Clinical Child & Adolescent Psychology*, *43*(1), 7–26. https://doi.org/10.1080/15374416.2013.804386

Gillette, C. B., Bilek, E. L., Hanna, G. L., & Fitzgerald, K. D. (2018). Intolerance of uncertainty in youth with obsessive-compulsive disorder and generalized anxiety disorder: A transdiagnostic construct with implications for phenomenology and treatment. *Clinical Psychology Review*, *60*, 100–108. https://doi.org/10.1016/j.cpr.2018.01.007

Ginsburg, G. S., Kendall, P. C., Sakolsky, D., Compton, S. N., Piacentini, J., Albano, A. M., Walkup, J. T., Sherrill, J., Coffeey, K. A., Rynn, M. A., Keeton, C. P., McCracken, J. T., Berkman, L. I., Birhamer, B, S., & March, J. (2011). Remission after acute treatment in children and adolescents with anxiety

disorders: Findings from the CAMS. *Journal of Consulting and Clinical Psychology*, *79*(6), 806–813. https://doi.org/10.1001/jamapsychiatry.2013.4186

Higa-mcmillan, C. K., Francis, S. E., Rith-Najarian, L., & Chorpita, B. F. (2015). Evidence base update: 50 years of research on treatment for child and adolescent anxiety. *Journal of Clinical Child & Adolescent Psychology*, *45*(2), 1–23. https://doi.org/10.1080/15374416.2015.1046177

Hong, R. Y., & Cheung, M. W. L. (2015). The structure of cognitive vulnerabilities to depression and anxiety: Evidence for a common core etiologic process based on a meta-analytic review. *Clinical Psychological Science*, *3*(6), 892–912. https://doi.org/10.1177/2167702614553789

Kendall, P. C., Norris, L. A., Rabner, J. C., Crane, M. E., & Rifkin, L. E. (2020). Intolerance of uncertainty and parental accommodation: Promising targets for personalized intervention for youth anxiety. *Current Psychiatry Reports*, *22*(9). Article 49. https://doi.org/10.1007/s11920-020-01170-3 .

Langley, A. K., Bergman, L., McCracken, J., & Piacentini, J. C. (2004). Impairment in childhood anxiety disorders: Preliminary examination of the Child Anxiety Impact Scale–Parent Version. *Journal of Child and Adolescent Psychopharmacology*, *14*, 105–114. doi:10.1089/104454604773840544

Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., Benjet, C., Georgiades, K., & Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: Results from the national comorbidity survey replication–adolescent supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*(10), 980–989. https://doi.org/10.1016/j.jaac.2010.05.017

Oar, E. L., Farrell, L. J., Waters, A. M., Conlon, E. G., & Ollendick, T. H. (2015). One session treatment for pediatric blood-injection-injury phobia: A controlled multiple admission study trial. *Behaviour Therapy and Research*, *73*, 131–142. https://doi.org/10.1016/j.brat.2015.08.002

Ollendick, T. H., Ost, L. G., Reuterskiöld, L., Costa, N., Cederlund, R., Sirbu, C., Davis, T. E., 3rd, & Jarrett, M. A. (2009). One-session treatment of specific phobias in youth: A randomized clinical trial in the United States and Sweden. *Journal of Consulting and Clinical Psychology*, *77*(3), 504–516. https://doi.org/10.1037/a0015158

Osmanagaoglu, N., Creswell, N., & Dodd, H. F. (2018). Intolerance of uncertainty, anxiety, and worry in children and adolescents: A meta-analysis. *Journal of Affective Disorders*, *225*, 80–90. https://doi.org/10.1016/j.jad.2017.07.035

Ost, L., & Ollendick, T. H. (2017). Brief, intensive and concentrated cognitive behavioral treatments for anxiety disorders in children: A systematic review and meta-analysis. *Behavior Therapy and Research*, *97*, 134–145. https://doi.org/10.1016/j.brat.2017.07.008

Palitz, S. A., Rifkin, L. S., Norris, L. A., Kneply, M., Fleischer, N. J., Steinber, L., & Kendall, P. (2019). But what will the results be? Learning to tolerate uncertainty is associated with treatment-produced gains. *Journal of Anxiety Disorders*, *68*, 102146. https://doi.org/10.1016/j.janxdis.2019.102146

Pozza, A., Albert, U., & Dettore, D. (2019). Perfectionism and intolerance of uncertainty are predictors of OCD symptoms in children and early adolescents: A prospective cohort, one-year, follow-up study. *Clinical Neuropsychiatry*, *16*(1), 53–61.

Santucci, L. C., Ehrenreich, J. T., Trosper, S. E., Bennett, S. M., & Pincus, D. B. (2009). Development and preliminary evaluation of a one-week summer treatment program for separation anxiety disorder. *Cognitive and Behavioral Practice*, *16*(3), 317–331. https://doi.org/10.1016/j.cbpra.2008.12.005

Spence, S. H. (1997). A measure of anxiety symptoms among children. *Behaviour Research and Therapy*, *36*, 545–566. doi:10.1016/s0005-7967(98)00034-5

Sperling, J., Boger, K., & Potter, M. (2020). The impact of intensive treatment for pediatric anxiety and obsessive-compulsive disorder on daily functioning. *Clinical Child Psychology and Psychiatry*, *25*(1), 133–140. https://doi.org/10.1177/1359104519871338

Storch, E. A., Gefken, G. R., Merlo, L. J., Mann, G., Duke, D., Munson, M., Adkins, J., Grabill, K. A., Murphy, T. K., & Goodman, W. K. (2007). Family-Based cognitive-behavioral therapy for pediatric obsessive-compulsive disorder: Comparison of weekly and intensive approaches. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*(4), 469–478. https://doi.org/10.1097/chi.0b013e31803062e7