



Family accommodation in pediatric anxiety: Relations with avoidance and self-efficacy

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ABSTRACT

Pediatric anxiety disorders are common, impairing, and chronic when not effectively treated. A growing body of research implicates family accommodation in the maintenance of pediatric anxiety. The present study aimed to quantify previously untested relations among family accommodation and two theoretically linked constructs: avoidance and self-efficacy. Eighty youths between ages 8 and 17 (53 with anxiety disorders, 27 non-anxious controls) completed measures of family accommodation and self-efficacy. In addition, avoidance was assessed using two distinct measures of avoidance: a clinician rating of real-world behaviors and a laboratory task-based index. As predicted, youths with anxiety disorders reported greater family accommodation than non-anxious controls. Across the sample, greater family accommodation was associated with greater avoidance, as measured using both clinician rating and the laboratory task, as well as with lower self-efficacy. In an exploratory mediation model, self-efficacy partially mediated the relation between family accommodation and clinician-rated avoidance; however, it did not mediate the relation between family accommodation and task-based avoidance. Considering the robust association between family accommodation and anxiety in youths, this addition to our understanding of related cognitive and behavioral factors provides important preliminary insight, which can guide future research on potential targets for early identification and intervention for pediatric anxiety.

1. Family accommodation in pediatric anxiety: relations with avoidance and self-efficacy

Anxiety disorders are highly common among children and adolescents and are associated with significant impairment across numerous domains, such as school performance and social functioning (Costello et al., 2003; Kessler et al., 2005; Wood, 2006; World Health Organization, 2017). When not effectively addressed in childhood, these disorders can persist and predict further problems, including the onset of additional psychopathology (Compton et al., 2004). The early age of onset and the potential for a chronic course underscore the importance of understanding mechanisms underlying the maintenance of pediatric anxiety disorders to improve early detection and to point to specific targets for treatment.

1.1. Family accommodation in pediatric anxiety

A growing body of research implicates family accommodation (FA) in the maintenance of pediatric anxiety. In this context, FA refers to changes that family members make to their own behaviors and schedules to lessen or prevent distress experienced by their child (Lebowitz et al., 2013). For example, a parent might remove a phobic stimulus for a child with specific phobia or sleep next to a child with separation anxiety disorder to diminish their distress (Benito et al., 2015; Lebowitz et al., 2016). Previous research has established that FA is common in families with anxious youths (Benito et al., 2015; Lebowitz et al., 2013; Thompson-Hollands et al., 2014). Although FA often arises out of family members' best intentions to help their child with anxiety, it may contribute to the maintenance and worsening of anxiety symptoms (Iniesta-Sepúlveda et al., 2020; La Buissonnière-Ariza et al., 2018). For example, by reducing opportunities for youths to face feared situations, FA may limit youths' ability to temper their fear associated with

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threatening stimuli or settings or to learn through experience that they will be able to tolerate their anxiety. A growing body of research has found that higher levels of FA are associated with greater symptom severity and increased functional impairment (Benito et al., 2015; Iniesta-Sepúlveda et al., 2020; Storch et al., 2015; Thompson-Hollands et al., 2014). In fact, a recent study found that FA mediated the association between pediatric anxiety and functional impairment (de Barros et al., 2020). Furthermore, parent-based treatments specifically targeting FA have been shown to effectively reduce pediatric anxiety (Lebowitz et al., 2014, 2020). Considering the importance of this association between FA and anxiety symptoms in youths, understanding related behavioral and cognitive factors could provide important insight into ways to further optimize interventions that target FA.

1.2. Putative behavioral correlate: Avoidance

Current theory suggests that FA in the form of parental facilitation of avoidance relates to youth behavior through increased avoidance across settings and even in the absence of a parent (Lebowitz, 2017). Disproportionate or maladaptive avoidance is a key feature of anxiety and has been linked with maintenance of anxiety and worsened overall functioning (Elliot et al., 2013; Treanor & Barry, 2017). Addressing maladaptive avoidance behavior through exposure therapy plays a central role across several treatments for pediatric anxiety with established efficacy (Kendall et al., 2008; Lebowitz et al., 2014). Nevertheless, little research to date has measured this theoretical association between FA and youths' avoidance. A recent study found that FA moderated the relation between youths' anxiety symptoms and their behavioral avoidance (Lebowitz, 2017). However, the precise relations between FA and avoidance are still not fully understood.

Importantly, research exploring the association between FA and behavioral avoidance must account for measurement factors. Past research has quantified youths' behavioral avoidance using numerous measures, varying from clinician ratings based on real-world behaviors to laboratory-based behavioral tasks (Kryptos et al., 2015). However, it remains unclear to what degree these metrics capture the same construct (Kryptos et al., 2018). In light of this possible discrepancy, it is important to consider both methods in an attempt to bridge the gap between empirical findings and clinical utility (Kryptos et al., 2015; LeDoux & Pine, 2016). This is particularly imperative in the context of FA, as the clinical utility of findings is of the utmost importance. Further investigating the relation between FA and avoidance behaviors and, in particular, exploring individual differences that might mediate this relation could improve our understanding of potential targets for intervention.

1.3. Putative cognitive correlate: Self-efficacy

In addition to avoidance behavior, FA has also been hypothesized to relate to cognitive factors such as reduced self-efficacy in youths. Self-efficacy refers to an individual's belief in their own capability to attain a desired result through their actions (Bandura, 1977). Recent work has found that youths with anxiety disorders report significantly lower self-efficacy than non-anxious controls (Lewis et al., 2020). FA has been posited to be associated with reduced youth self-efficacy, perhaps due to suggestions of the family's lack of confidence in the youth's ability to cope with their anxiety without familial interference (Ginsburg et al., 2004). Despite this theoretical grounding, the association between FA and self-efficacy has not been investigated. Recent findings have demonstrated that self-efficacy predicted post-treatment anxiety following cognitive behavioral therapy, thus indicating the importance of examining self-efficacy as a treatment target for pediatric anxiety (Lewis et al., 2020). Refining our understanding of self-efficacy in the context of related familial and behavioral factors could therefore have important treatment implications.

1.4. Exploring directional relations among family, behavioral, and cognitive factors

Quantitatively examining the pairwise associations between FA and, separately, youth avoidance and self-efficacy marks an important step toward empirically testing hypothetical associations between anxiety-related familial, behavioral, and cognitive factors. However, in order to maximize the clinical utility of this work, it will also be essential to explore the interplay among all three factors. Once the pairwise relations among these anxiety-related factors have been empirically examined, continued exploration of the directional or causal pathways among these factors may point to potential targets for intervention. The theory-driven model in which FA influences youths' self-perception presents an intriguing possible pathway linking maladaptive family patterns, self-concept, and behavior in pediatric anxiety. According to self-efficacy theory, beliefs about one's own capability are proposed to play a key role in behavioral patterns (Bandura & Adams, 1977; Maddux & Stanley, 1986). Considering that current theory suggests that FA may contribute to reduced self-efficacy in youths, an integrated theoretical model might suggest that individual differences in self-efficacy mediate the impact of FA on youth avoidance. Refining our understanding of the directional interrelations among these anxiety-linked constructs might reveal specific targets for intervention that would maximally disrupt the onset and maintenance of pediatric anxiety.

1.5. The present study

The goal of the present study was to elucidate associations among FA, avoidance, and self-efficacy in youth with and without anxiety disorders in order to inform our understanding of behavioral and cognitive processes relating to FA. First, we aimed to replicate prior studies linking FA with anxiety diagnoses and symptom severity. We hypothesized that youth with anxiety disorders would report greater FA compared to non-anxious controls. Furthermore, we predicted that increased symptom severity would be linked with a greater degree of accommodation across the sample. Second, as the associations between FA and these two theoretically linked processes have not previously been directly assessed, we aimed to empirically test whether FA was related to youths' behavioral avoidance and self-efficacy, as suggested by our theoretical model. We predicted that, across the sample, greater FA would be associated with greater behavioral avoidance, as measured by both clinician ratings of avoidance and an objective measure of behavioral avoidance in the laboratory. We also hypothesized that greater FA would be associated with lower youth self-efficacy. Finally, after examining the pairwise relations among these constructs, we assessed an exploratory model, selected a priori and grounded in the theoretical mechanisms of pediatric anxiety, in which the association between FA and behavioral avoidance was mediated by self-efficacy (Lebowitz, 2017; Lewis et al., 2020). We predicted that youth self-efficacy would mediate the relation between FA and youth avoidance, as measured by both clinician-rated avoidance and the laboratory-based behavioral measure. By specifying the associations between FA, behavioral avoidance, and self-efficacy, this study thus provides early insight into familial, cognitive, and behavioral factors underlying pediatric anxiety.

2. Method

2.1. Participants

Data were attained from a subset of participants in a larger randomized controlled trial at the National Institute of Mental Health (NIMH; Linke et al., 2019). Eighty participants between the ages of 8 and 17 completed a measure of FA (see below). Of these participants, 53 were treatment-seeking youths with anxiety disorders (31 female, 22 male; $M_{\text{age}} = 13.08$ years, $SD = 2.78$) and 27 were non-anxious controls

free of any current or past psychiatric disorder (16 female, 11 male; $M_{\text{age}} = 13.30$ years, $SD = 2.77$; see Table 1 for descriptive statistics). This pooled sample of youths with anxiety disorders and non-anxious controls permitted both group-based and dimensional analyses across a wide range of anxiety symptoms. The two groups did not differ in sex, $\chi^2(1) < 0.01$, $p > .99$, or age, $t(78) = -0.34$, $p = .73$. Current anxiety symptoms (see below) were significantly higher in youths with anxiety disorders, $t(75) = 11.35$, $p < .001$.

Diagnoses were determined over the course of two screening visits. Trained clinicians interviewed all participants and their parents using the Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version (KSADS-PL; Kaufman et al., 1997). A senior child and adolescent psychiatrist confirmed all diagnoses in a separate visit. Anxious participants received a primary diagnosis of generalized, social, and/or separation anxiety disorder. The majority (67.92%) of anxious participants received a diagnosis of more than one anxiety disorder. Forty-six participants (86.79% of anxious participants) were diagnosed with generalized anxiety disorder, 35 (66.04%) with social anxiety disorder, and 14 (26.42%) with separation anxiety disorder. Control participants did not meet criteria for any psychiatric disorder.

Across groups, exclusionary criteria included an IQ below 70 (as assessed using the Wechsler Abbreviated Scale of Intelligence; Wechsler, 1999), a neurological disorder, significant medical illness, or use of a psychoactive substance within 3 months of participation. Further exclusionary criteria were a diagnosis of autism spectrum disorder, posttraumatic stress disorder, schizophrenia, obsessive compulsive disorder, major depressive disorder, or attention-deficit/hyperactivity disorder of sufficient severity to require treatment.

All participants received monetary compensation for their participation. Anxious participants also received treatment at the NIMH as part

Table 1
Demographic information by group.

	Anxious Participants	Non-anxious Controls	Test of Group Difference
N	53	27	
Sex [N (%)]			$\chi^2(1) < .01$, ns
Female	31 (58.49)	16 (59.26)	
Male	22 (41.51)	11 (40.74)	
Age [years, M (SD)]	13.08 (2.78)	13.30 (2.77)	$t(78) = -.34$, ns
Race [N (%)]			$\chi^2(5) = 8.55$, ns
American Indian or Alaskan Native	1 (1.89)	0 (0.00)	
Asian	5 (9.43)	1 (3.70)	
Black or African American	3 (5.66)	4 (14.81)	
White	37 (69.81)	19 (70.37)	
Multiple Races	7 (13.21)	1 (3.70)	
Unknown	0 (0.00)	2 (7.41)	
Ethnicity [N (%)]			$\chi^2(2) = 1.39$, ns
Hispanic or Latino	9 (16.98)	2 (7.41)	
Not Hispanic or Latino	42 (79.25)	24 (88.89)	
Unknown	2 (3.77)	1 (3.70)	
Household Income [N (%)]			$\chi^2(7) = 9.13$, ns
< \$24,999	1 (1.89)	1 (3.70)	
\$25,000-\$59,999	1 (1.89)	4 (14.81)	
\$60,000-\$89,999	5 (9.43)	2 (7.41)	
\$90,000-\$179,999	25 (47.17)	10 (37.04)	
> \$180,000	19 (35.85)	9 (33.33)	
Unknown	2 (3.77)	1 (3.70)	
IQ [M (SD)] ^a	111.15 (12.64)	115.48 (12.73)	$t(76) = -1.41$, ns
SCARED-C [M (SD)] ^b	31.92 (14.37)	6.05 (5.82)	$t(75) = 11.35^{***}$

ns = non-significant; *** $p < .001$.

^a IQ was assessed using the Wechsler Abbreviated Scale of Intelligence (WASI). Data were missing for 2 participants.

^b SCARED-C = The Screen for Child Anxiety Related Emotional Disorders-Child Version. Data were missing for 1 participant.

of the larger randomized controlled trial. Participants provided their written assent, and their parents provided written consent. All procedures were reviewed and approved by the NIMH Institutional Review Board.

2.2. Self-report measures

Anxiety symptom severity. In addition to examining differences across groups (anxious versus control participants), anxiety symptom severity was assessed dimensionally across diagnostic groups and used in dimensional analyses. We used the Screen for Child Anxiety Related Emotional Disorders – Child Version (SCARED-C) to assess anxiety symptom severity in the current study (Birmaher et al., 1997). The SCARED-C is a 41-item self-report measure querying youths' recent experiences of anxiety symptoms on a 3-point Likert-type scale ranging from 0 to 2 ("Not True or Hardly Ever True" to "Very True or Often True"), with possible scores ranging from 0 to 82. The SCARED-C has established internal consistency, discriminant validity, and test-retest reliability (Behrens et al., 2019; Birmaher et al., 1999; Etkin et al., 2020; Hale et al., 2011). When up to two items were missing, the mean of completed items was used to prorated these scores. Scores were considered missing when more than two items were missing or when the measure was not completed due to experimenter error; one participant in the current sample was missing a SCARED-C score. Cronbach's alpha was .96 in the present sample.

Family accommodation. Family accommodation was assessed using the Family Accommodation Scale for Anxiety – Child Report (FASA-CR; Lebowitz et al., 2013). The FASA-CR is a 16-item child-report measure that assesses parental accommodation of pediatric anxiety. The first 9 items measure the frequency of parental accommodation using a 5-point Likert-type scale ranging from 0 to 4 ("Very Rarely" to "Very Often"). These 9 items are summed to calculate a total accommodation score, which was the metric of interest in this study. Possible scores ranged from 0 to 36. Missing items were prorated using the mean of completed items in cases of up to 2 missing items. The FASA-CR includes 7 additional items assessing short-term consequences of not being accommodated, perception of parental distress associated with the accommodation, and beliefs about the accommodation. These additional items were not used in the current study. The FASA-CR has established satisfactory convergent validity, divergent validity, and test-retest reliability (Lebowitz et al., 2019). In the current sample, Cronbach's alpha was .84.

Self-efficacy. We measured youths' self-reported ratings of self-efficacy in order to examine the relation between FA and self-efficacy. For this purpose, we used the Self-Efficacy Questionnaire for Children (SEQ-C), a 24-item self-report measure that assesses youths' perceptions of their self-efficacy (Muris, 2001). Youths were asked to rate their competence across 24 items assessing social, emotional, and academic self-efficacy on a 5-point Likert-type scale ranging from 1 to 5 ("Not at All" to "Very Well"). All 24 items were summed to calculate a total self-efficacy score, with possible scores ranging from 24 to 120. The mean value of completed items was substituted for up to three missing values in order to compute a prorated sum score. The SEQ-C has demonstrated good criterion validity, external validity and internal consistency (Muris, 2001; Suldo & Shaffer, 2007). Cronbach's alpha was .75 in the present sample.

2.3. Avoidance measures

In order to examine the specificity of clinician-determined and laboratory-based assessments of avoidance, two separate measures of behavioral avoidance were used in the current study: a clinician rating and a behavioral avoidance task. As this was the first study exploring both clinician- and task-based behavioral avoidance in the context of FA and self-efficacy, both measures were included and considered in isolation in order to provide a nuanced examination of how each of the

two metrics relate to the other constructs of interest.

Clinician-rated avoidance. The Pediatric Anxiety Rating Scale (PARS) was included as a clinician-rated measure of youths' behavioral avoidance (Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002). The PARS is an interview-based measure of anxiety symptom severity and impairment that consists of 50 items querying youths' symptoms of anxiety over the past 2 weeks before the clinical interview. Clinicians integrate information obtained from both the youth and the parent to rate each item on a 6-point Likert-type scale. Among several other dimensions of anxiety severity, clinicians use collective information from both informants to rate youths' avoidance from 0 to 5 ("none" to "extreme"), with a score of 3 or above indicating a clinically significant level of severity. This measure has good internal consistency, adequate test-retest reliability, and satisfactory convergent and divergent validity (Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002).

Behavioral avoidance task. We used the Yale Interactive Kinetic Environment Software (YIKES) task as a laboratory-based measure of youths' behavioral avoidance of threatening stimuli (Lebowitz & François, 2018). During this task, participants' images were dynamically embedded within a virtual environment on a large television screen (76 cm × 137 cm) using Kinect motion-tracking technology (Microsoft, Washington, USA). Participants were instructed to physically move from left to right in order to catch randomly presented falling targets (uniformly distributed across the width of the screen) for points. After briefly practicing the game, participants completed two separate runs of the task. During the full game runs, pairs of task-irrelevant stimuli were continuously present on either side of the screen (see Fig. 1). The task-irrelevant stimuli on either side of the virtual environment varied between the two runs of the task. To measure avoidance of spiders, one run used an image of a spider and a spider-like neutral stimulus (e.g., a starfish; the "spiders run"). To measure avoidance of phobic social stimuli, the other run used pictures of the same individual's face with an angry and a neutral expression (the "faces run"). Within each run, six separate stimulus pairs were presented for a minute each, with the threatening stimulus alternating between sides of the screen. The order of the two runs was randomized for each participant. The YIKES task has good convergent, discriminant, and ecological validity, as well as good test-retest reliability (Lebowitz & François, 2018). Furthermore, a growing body of research has found that the YIKES task elicits avoidance behavior across youths with different anxiety disorders (e.g., Abend et al., 2021; Lebowitz & François, 2018).

Behavioral avoidance index. Kinect motion-tracking technology allowed for continuous measurement of participants' motion in relation to threatening and neutral stimuli throughout the YIKES task. These continuous measurements were then used to calculate a behavioral avoidance index for each participant. First, we calculated the average distance at which participants turned away from either stimulus type

(the "turning point;" Abend et al., 2021). In line with prior research, the additive inverse of the average turning point away from the threatening stimulus was then subtracted from the average turning point away from the neutral stimulus to derive the final index that was isolated as the metric of interest for this study (Lebowitz & François, 2018; Lebowitz et al., 2015). Past research has demonstrated that this avoidance index has good test-retest reliability, as participants' avoidance indices at two timepoints (six weeks apart) have been found to be highly correlated ($r = 0.7, p < .001$; Lebowitz & François, 2018). To increase the interpretability of this avoidance index, these scores were scaled up by a factor of 100 (i.e., each value was multiplied by 100). Thus, in interpreting the avoidance index, higher positive numbers indicate greater avoidance of the phobic stimulus.

2.4. Procedure

The constructs of interest (FA, avoidance, and self-efficacy) were assessed across several study visits. The clinician-reported measure of behavioral avoidance was obtained during the initial screening visit. After completing the two screening visits, participants completed a battery of baseline self-report measures to assess the constructs of interest. These baseline questionnaires were completed either during the second screening visit or shortly thereafter at a future research visit. Fifty-four participants additionally completed a behavioral avoidance task at a separate research visit. The length of time between self-report questionnaire completion and the behavioral task varied across participants. All but one participant completed the behavioral avoidance task before the start of their first treatment session; this participant was excluded from analyses involving the behavioral avoidance index. Furthermore, four participants completed the self-report measures and behavioral task more than 60 days apart and thus were excluded from analyses involving the behavioral avoidance index (resulting days between self-report measures and behavioral task: $M = 16.64, SD = 15.94$, range: 0–58, resulting $n = 50$ for these analyses).

2.5. Data analysis

For all analyses, the two measures of avoidance were considered separately. Within analyses involving the behavioral avoidance task, the two game runs (spiders and faces) were similarly examined independently. Across measures, outliers were determined as having a value more extreme than 3 standard deviations away from the mean. The FA score was determined to be an outlier for a single anxious participant; thus, this participant was excluded from further analyses (resulting $n = 79$ for these analyses). All analyses used an alpha of .05 and all tests were two-sided.

To address our first aim of replicating prior studies linking FA with pediatric anxiety, we first used a Student's t-test to examine group

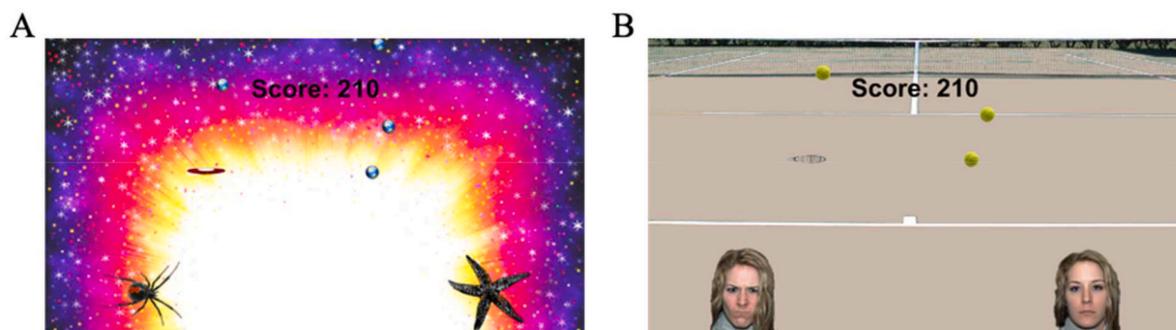


Fig. 1. The Yale Interactive Kinetic Software (YIKES) Task

During the YIKES task, participants' images are dynamically embedded in these virtual environments (Lebowitz & François, 2018). Participants are tasked with physically moving to catch falling targets for points while task-irrelevant stimuli are displayed on the sides of the screen. Participants complete two runs of the task: A) the spiders run and B) the faces run.

differences in FA between youths with and without anxiety disorders. We then examined this relation dimensionally by computing the Pearson's correlation between FA and anxiety symptom severity across the full sample.

To address our second aim of testing the relation of FA to the other two constructs of interest, we computed the correlations between FA and, separately, clinician-rated avoidance, laboratory-based avoidance, and self-efficacy. As this study was the first to empirically examine these relations, we were particularly interested in exploring potential nuances in these correlations. Therefore, in addition to these primary analyses, we also elected to re-run these analyses while controlling for baseline anxiety symptom severity to begin to parse the degree to which detected correlations might reflect unique relations between constructs versus broader associations with overall anxiety symptom severity.

Finally, to address our third aim of investigating self-efficacy as a potential mediator of the relation between FA and avoidance, we conducted two separate exploratory mediation analyses using the *mediation* R package and based on 1000 bootstrapped samples (Tingley et al., 2014). In order to examine specificity of avoidance indices, we ran separate mediation models for the clinician rating and laboratory-based avoidance index.

3. Results

3.1. Anxiety-Related Differences in FA

There was a significant difference between groups in FA, $t(77) = 6.01$, $p < .001$, $d = 1.43$ (Fig. 2A; see Table 2 for descriptive statistics of all constructs of interest across diagnostic groups). Youths with anxiety disorders reported significantly more FA ($M = 9.96$, $SD = 4.33$) than youths without anxiety disorders ($M = 3.85$, $SD = 4.19$). Furthermore, across the combined sample, there was a significant, positive correlation between anxiety symptom severity (using the SCARED-C) and FA, $r = .47$, $p < .001$ (Fig. 2B), such that youths with greater symptom severity reported higher levels of FA (see Table 3 for pairwise correlations across constructs).

3.2. Relation of FA with avoidance and self-efficacy

3.2.1. Main analyses

Avoidance. FA was significantly positively correlated with clinician-rated youth avoidance, $r = .54$, $p < .001$ (Fig. 3A). Youths with greater clinician-rated avoidance reported greater FA. FA was also

Table 2
Constructs of interest by group.

	Anxious Participants	Non-anxious Controls	Test of Group Difference
Family Accommodation [M (SD)] ^a	9.96 (4.33)	3.85 (4.19)	$t(77) = 6.01^{***}$
Clinician-Rated Avoidance [M (SD)] ^b	3.02 (0.99)	0.27 (0.70)	$t(56) = 13.22^{***}$
Laboratory-Based Avoidance [M (SD)] ^c	-0.50 (1.53)	-0.81 (1.66)	$t(47) = 0.66$, ns
Self-Efficacy [M (SD)] ^d	72.96 (12.98)	103.24 (9.70)	$t(68) = -9.59^{***}$

ns = non-significant; $***p < .001$.

^a Family Accommodation = Family Accommodation Scale for Anxiety – Child Report.

^b Clinician-Rated Avoidance = Pediatric Anxiety Rating Scale.

^c Laboratory-Based Avoidance = avoidance index derived from the spiders run of the Yale Interactive Kinetic Software Task.

^d Self-Efficacy = Self-Efficacy Questionnaire for Children.

significantly positively correlated with the behavioral avoidance index derived from the spiders run of the behavioral avoidance task, $r = .36$, $p = .01$ (Fig. 3B). However, we did not detect a significant correlation between FA and the behavioral avoidance index derived from the faces run of the laboratory task, $r = -.15$, $p = .29$ (Fig. 3C). The measure of clinician-rated avoidance was not significantly correlated with the measures of behavioral avoidance during either run; spiders run: $r = .15$, $p = .34$, faces run: $r = .10$, $p = .50$.

Self-efficacy. We detected a significant, negative correlation between FA and youth self-efficacy, $r = -.37$, $p = .002$ (Fig. 3D), such that higher levels of FA were associated with lower self-efficacy.

Sensitivity analyses. The main analyses were re-run while controlling for baseline self-reported anxiety symptom severity to explore possible nuances in the relations among these variables.

Avoidance. When controlling for baseline anxiety symptom severity, FA remained significantly, positively correlated with clinician-rated avoidance, $r = .32$, $p = .01$. Similarly, FA remained significantly, positively correlated with the laboratory-based index derived from the spiders run of the task, $r = .29$, $p = .04$. We did not detect a significant correlation between FA and the laboratory-based index of behavioral avoidance derived from the faces run of the task when controlling for anxiety symptom severity, $r = -.22$, $p = .13$.

Self-efficacy. We did not detect a significant correlation between FA

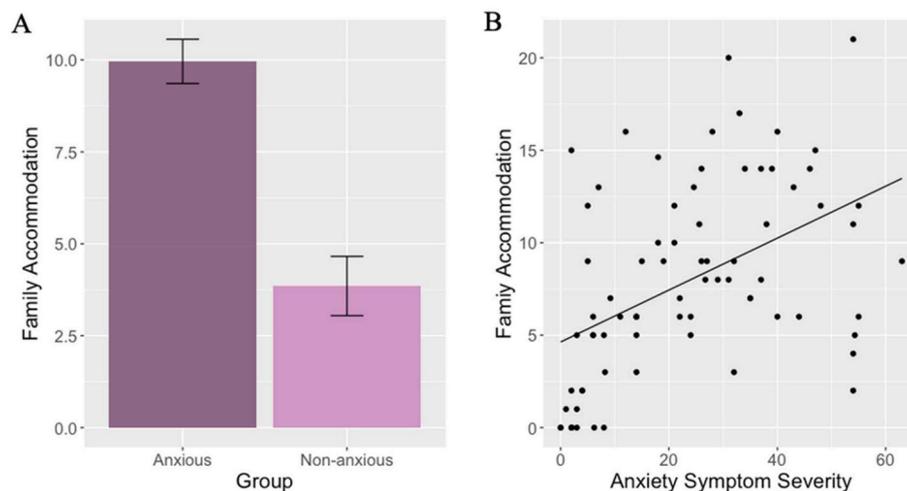


Fig. 2. Anxiety-Related Differences in Family Accommodation (FA)
A. Participants with anxiety disorders reported significantly greater FA than non-anxious controls.
B. Self-reported anxiety was significantly positively correlated with FA.

Table 3
Pairwise correlations among constructs of interest.

	Anxiety Symptom Severity	Family Accommodation	Clinician-Rated Avoidance	Laboratory-Based Avoidance	Self-Efficacy
Anxiety Symptom Severity ^a	–	.47***	.65***	.23	-.74***
Family Accommodation ^b	.47***	–	.54***	.36*	-.37**
Clinician-Rated Avoidance ^c	.65***	.54***	–	.15	-.60***
Laboratory-Based Avoidance ^d	.23	.36*	.15	–	-.12
Self-Efficacy ^e	-.74***	-.37**	-.60***	-.12	–

* $p < .05$; ** $p < .01$; *** $p < .001$.

^a Anxiety Symptom Severity = The Screen for Child Anxiety Related Emotional Disorders-Child Version.

^b Family Accommodation = Family Accommodation Scale for Anxiety – Child Report.

^c Clinician-Rated Avoidance = Pediatric Anxiety Rating Scale.

^d Laboratory-Based Avoidance = avoidance index derived from the spiders run of the Yale Interactive Kinetic Software Task.

^e Self-Efficacy = Self-Efficacy Questionnaire for Children.

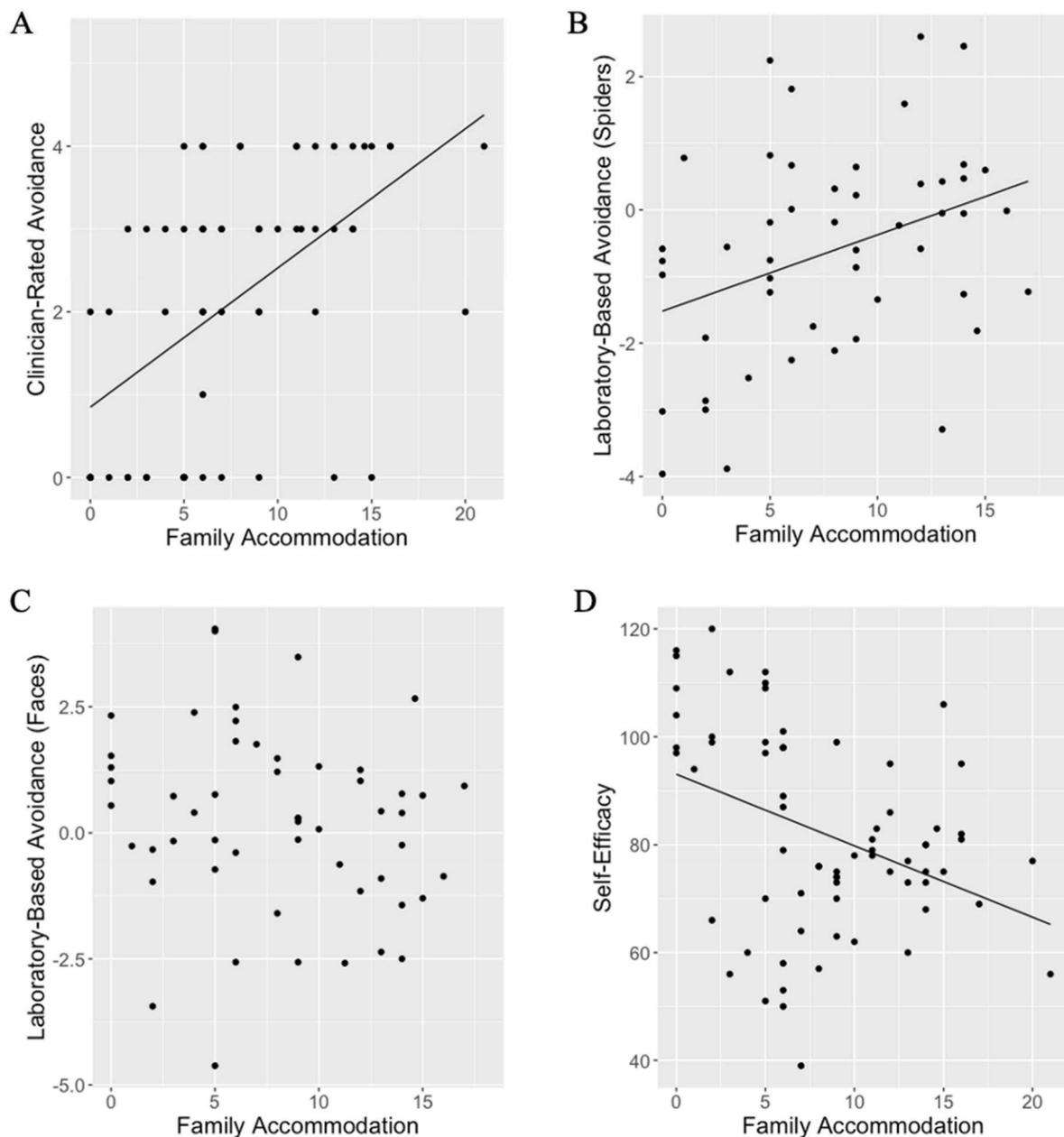


Fig. 3. Relation of Family Accommodation (FA) with Avoidance and Self-Efficacy

A. FA was significantly positively correlated with clinician-rated avoidance.

B. FA was significantly positively correlated with the behavioral avoidance index from the spiders run of the laboratory task.

C. FA was not significantly correlated with the behavioral avoidance index from the faces run of the laboratory task.

D. FA was significantly negatively correlated with self-efficacy.

and self-efficacy when controlling for anxiety symptom severity, $r = -.09, p = .44$.

3.3. Self-efficacy as a mediator of the relation between FA and avoidance: Exploratory analyses

The relation between FA and clinician-rated avoidance was partially mediated by self-efficacy (Fig. 4A). The total effect of FA on clinician-rated avoidance was significant at $0.17, p < .001$. The bootstrapped unstandardized indirect effect was $0.05, 95\% \text{ CI} = [0.02, 0.10], p = .01$. Self-efficacy mediated 31.2% of the effect of FA on clinician-rated avoidance.

Because FA was only significantly associated with the behavioral avoidance index calculated during the spiders run, we ran the mediation analysis only for this run of the laboratory task. The relation between FA and behavioral avoidance was not significantly mediated by self-efficacy (Fig. 4B). The total effect was significant at $0.14, p = .004$. The bootstrapped unstandardized indirect effect was $-0.006, 95\% \text{ CI} = [-0.05, 0.04], p = .75$.

4. Discussion

These results provide important preliminary insight into behavioral and cognitive factors related to FA in the context of pediatric anxiety. Three main findings arose from the current study. First, we detected positive associations between FA and anxiety in both categorical and dimensional analyses. Second, across participants, higher levels of FA were associated with higher levels of avoidance and lower levels of self-efficacy. Third, in an exploratory mediation analysis, self-efficacy partially mediated the relation between FA and clinician-rated avoidance.

In line with previous research, children with anxiety disorders reported higher levels of FA and, across the sample, greater FA was associated with greater anxiety symptom severity. Of note, our sample included youths with generalized, social, and separation anxiety disorders. In light of the high rates of comorbidity across pediatric anxiety

disorders (Kendall et al., 2001), such cross-anxiety disorder trends hold important clinical utility for these populations. Nevertheless, FA may differentially relate to specific anxiety disorders (Lebowitz et al., 2013). Although the current study was underpowered to test our main hypotheses in subgroups of participants with distinct anxiety disorders, we provide exploratory analyses in the Supplementary Material for hypothesis-generating purposes. These findings indicate that FA is significantly, positively correlated with anxiety symptom severity specific to the three primary anxiety disorders (generalized, social, and separation anxiety), although we do not currently see significant relations among the constructs of interest within the small subgroups of participants with specific anxiety disorders. Future research could be designed to test relations of FA with distinct anxiety disorders; this will be important to maximize the clinical significance of this work.

In the current study, higher levels of FA were linked with increased clinician-rated avoidance. This result remained significant when controlling for baseline anxiety symptom severity, thus suggesting an association between FA and clinician-rated avoidance over and above the role of anxiety symptom severity. In a similar pattern, FA correlated with the avoidance index derived from the spiders run of the task, though not with the index derived from the faces run of the task. These results remained consistent when controlling for baseline anxiety symptom severity. Of note, the discrepancy between spider and face stimuli may reflect a distinction in FA across settings. In circumstances of phobic stimuli, FA may be more likely to manifest as facilitation of physical avoidance or distancing from the phobic stimulus. On the other hand, in the context of feared social stimuli, FA may be more likely to manifest as parental engagement with the social situation on the youth's behalf. Thus, the accommodation associated with these two stimulus types may evoke differential types of avoidance, with the spider stimuli more closely linked to the physical distancing measured by the YIKES task.

Another plausible explanation for this discrepancy between runs of the laboratory task relates to the potency of stimuli. The stimuli presented in the spiders run of the task may have presented a more potent phobic stimulus and thus optimally evoked avoidance behavior across participants. While mounting evidence suggests that the spider and face

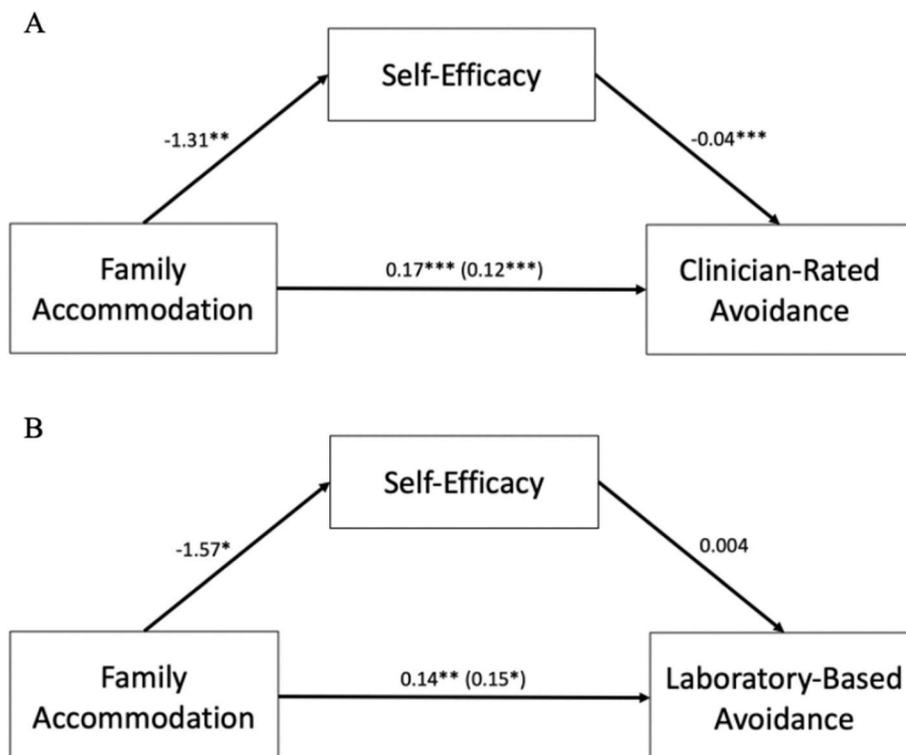


Fig. 4. Exploratory Mediation Analyses
 Note: Mediation analyses denote unstandardized beta weights. Values in parentheses reflect the beta weights between family accommodation (FA) and avoidance controlling for self-efficacy.
 A. Self-efficacy partially mediated the relation between FA and clinician-rated avoidance.
 B. Self-efficacy did not mediate the relation between FA and laboratory-based avoidance.
 * $p < .05$; ** $p < .01$; *** $p < .001$.

stimuli reliably evoke avoidance behavior across specific anxiety disorders (e.g., Abend et al., 2021; Lebowitz & François, 2018), this discrepancy also raises the question of whether different stimuli would have affected our outcomes.

The fact that the laboratory-based indices of avoidance were not significantly correlated with the clinician rating may shed additional light on these findings. These two methods for measuring avoidance were strategically included to examine potential differences between clinician ratings and laboratory-based measures of avoidance (Krypotos et al., 2018). We did not detect a significant association between the two metrics of avoidance in this study. This could indicate that the two measures may capture distinct components of a broader construct of youth avoidance. Although often considered as a unitary construct, the broad category of avoidance encompasses a heterogeneous array of behaviors and tendencies (Krypotos et al., 2015). A notable example includes the distinction between active and passive avoidance. Whereas active avoidance involves engaging in a specific response that prevents an aversive outcome, passive avoidance involves *inhibiting* a specific response linked with an aversive outcome (Binti Affandi et al., 2021; Boeke et al., 2017; Krypotos et al., 2015). These two types of avoidance are likely reflected, to varying degrees, in the avoidance indices captured by both the clinician and laboratory measures used in the current study. Without distinguishing between these types of avoidance, we could be missing an important source of information regarding the specific avoidant tendencies captured by each measure. This heterogeneity within the broad category of avoidance could have important implications for our understanding of individual differences in avoidance behavior and, consequently, for the effective treatment of pediatric anxiety disorders. However, the significant dearth in research bridging the gap between clinician measures of real-world behaviors and carefully controlled laboratory tasks has limited progress in both empirical and clinical domains (Krypotos et al., 2018). Building on this initial insight, research examining different components of avoidance captured by distinct metrics and tasks could provide essential information to optimize our methodologies and deepen our understanding of this central construct. The current results highlight the importance of considering both clinician- and laboratory-based measures of avoidance, particularly as future research will be critical to characterize the overlap and divergence between these two manners of assessing avoidance in youths.

Importantly, both measures of avoidance have previously been linked with anxiety and have established good psychometrics (Abend et al., 2021; Lebowitz & François, 2018; Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002). However, an alternative explanation for the lack of correlation between the two measures of avoidance could be that the laboratory task did not capture a valid index of avoidance in the current sample. We do not see evidence that youths in our current sample, on average, significantly avoided the phobic stimulus (spider or angry face) compared to the neutral stimulus (Table 2), although we do see evidence of increased avoidance of spider stimuli compared to neutral stimuli in youths with higher levels of FA (Fig. 2). Moreover, in the current sample, we did not detect a difference in laboratory-based avoidance indices between children with and without anxiety disorders (Table 2). It is possible that children with anxiety disorders would have shown greater avoidance of the spider stimuli if we had specifically recruited a sample with spider phobia. Furthermore, it is possible that youths with social anxiety disorder might view any face stimulus, including the stimulus with the neutral expression, as threatening. Thus, we might better capture avoidance related to social anxiety disorder with a comparison of face versus non-face stimuli, rather than comparing faces with different expressions. The specificity of these findings to spider-related stimuli, this particular laboratory-based avoidance task, or this sample of youths should be examined in future research.

In line with our predictions, we detected a significant, negative correlation between FA and self-efficacy. Across youths with anxiety

disorders and non-anxious controls, youths that reported higher levels of FA endorsed lower levels of self-efficacy. As the first test of the relation between FA and self-efficacy, this provides important insight into the connection between family dynamics and youths' self-perception. Interestingly, the relation between FA and self-efficacy was not significant when controlling for baseline anxiety symptom severity. This sensitivity analysis suggests a nuanced reading of the relation detected in our main analysis and indicates the importance of considering the role of anxiety symptom severity in further work characterizing this relation. For instance, it will be important to continue disentangling the specific relation between self-efficacy and FA versus the influence of overall anxiety severity on both variables. Future research should continue to examine the interconnected ties between FA, self-efficacy, and anxiety symptom severity as the field continues to explore the connections between these central constructs.

By demonstrating links between FA and both avoidance and self-efficacy, these results begin to inform hypotheses on mechanisms through which FA might impact youth outcomes. To start exploring possible pathways among these measures and gather data to shape these hypotheses for future research, we tested one possible model in which self-efficacy mediated the relation between FA and avoidance on statistical grounds. This model was selected a priori based on theoretical suggestions that FA may contribute to reduced self-efficacy and, separately, that changes in self-efficacy may impact behavior (Bandura & Adams, 1977). We found that self-efficacy, on statistical grounds, partially mediated the relation between FA and clinician-rated youth avoidance. Greater FA predicted reduced self-efficacy, which in turn predicted greater avoidance behavior. These results support a possible pathway between family dynamics, youth self-perception, and youth behavior relating to anxiety. Although exploratory and cross-sectional in nature, this finding suggests that interventions addressing FA may have downstream effects on both self-efficacy and avoidance behavior and offers a foundation for future lines of research.

In contrast to these findings involving clinician-rated avoidance, self-efficacy did not mediate the relation between FA and laboratory task-based avoidance on statistical grounds in our exploratory mediation analyses. As described above, this finding further highlights the importance of considering both clinician- and laboratory-based measurements of youth avoidance behavior. FA is a multifaceted construct which may be expected to impact youth behavior through a variety of mechanisms. This is supported by our partial mediation findings in clinician-rated avoidance – self-efficacy partially, but not fully, accounted for the relation between FA and avoidance. Furthermore, as previously discussed, the clinician rating and laboratory task may capture distinct components of the larger construct of youth avoidance, with the laboratory task specifically measuring behavioral avoidance through physical distancing from a stimulus. It is possible that this physical component of avoidance is less sensitive to self-efficacy, whereas the broader clinician rating of avoidance captures components that are more affected by FA. Based on these findings, clarifying the dynamics between these common approaches to measuring avoidance in youth remains an important goal for future research. Maladaptive avoidance represents a treatment target across several therapeutic approaches (Kendall et al., 2008; Lebowitz et al., 2014). Characterizing the nuances in youths' avoidance, as well as identifying familial and cognitive mechanisms that may contribute to distinct components of avoidance, could enhance our understanding of how best to effectively treat youths across a range of unique presentations of avoidance.

These results should be interpreted in the context of several specific limitations entailed by the preliminary nature of this work. First, the cross-sectional nature of our dataset precludes us from drawing conclusions regarding causal relations between the assessed variables (Maxwell & Cole, 2007). Our sensitivity analyses further point towards the importance of examining these constructs in longitudinal contexts with rich characterization of potentially interrelated variables, such as anxiety symptom severity. Importantly, we employed our

cross-sectional mediation models as purely exploratory analyses, and the results should be interpreted as such. Furthermore, our collection of the measures of interest in the current study did not follow the temporal sequencing that would be required to examine causal mediation (e.g., collecting the measure of family accommodation prior to all measures of avoidance). In the current study, both avoidance measures were collected within a span of a few weeks, and these measures have been shown to be stable over this timeframe (Lebowitz & François, 2018; Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002). Nevertheless, the lack of temporal precedence of family accommodation reflects a limitation in our current study. Despite these limitations of relying on data of this nature, findings based in cross-sectional data can offer valuable information for advancing theoretical models (Shrout, 2011). Our findings identify patterns of covariance among these constructs of interest, and our exploratory model informs hypotheses for future longitudinal models. Building upon these findings, future longitudinal research will be important to continue refining theoretical models of FA in pediatric anxiety.

Second, the mediational pathway we explored reflects only one possible model of the relations between the constructs. We made an a priori, theory-driven decision to test whether self-efficacy mediated the relation between FA and avoidance. If supported in longitudinal studies, this model would suggest a directional relation by which FA leads to reduced self-efficacy, which in turn affects avoidance behavior. Such a model would highlight the importance of targeting FA and, in particular, its impact on youth self-efficacy, in treatments aimed at reducing maladaptive youth avoidance. Given the lack of existing data on the interplay between these three constructs, additional models could be constructed. As emphasized above, the mediation models presented here are intended to serve as guides for future research by providing initial evidence for the interplay among these three constructs. It is our hope that future studies specifically designed to test these models of interactions among FA, self-efficacy, and avoidance will examine and compare a multitude of pathways in order to maximize our understanding of these clinically relevant patterns.

Third, our results should be interpreted in the context of the limited variation in the demographic composition of our sample. Considering the deleterious implications of limited inclusion of historically underrepresented racial and ethnic populations in clinical research, it is especially important to examine these findings in increasingly representative samples before making clinically relevant recommendations (Pina et al., 2019). The lack of racial/ethnic and socioeconomic diversity in our sample may limit the generalizability of these findings, and it is essential that future research explore these initial findings in more representative samples.

In conclusion, these findings demonstrate a pattern of relations among familial, cognitive, and behavioral factors associated with pediatric anxiety. While past research has individually linked FA, avoidance, and self-efficacy to pediatric anxiety, this study is the first to provide evidence supporting ties among these three anxiety-related processes. These findings lay the foundation for future research and may have important theoretical and clinical implications. As the first study to explore FA, avoidance, and self-efficacy together, this study provides early insight into patterns of relations among these anxiety-related factors and lays the groundwork for future research to continue exploring these models. Continuing to refine models of FA will build an increasingly granular understanding of potential targets for early identification and intervention for pediatric anxiety.

Declarations of interest

The authors declare no conflict of interest.

CRediT authorship contribution statement

Elizabeth R. Kitt: Conceptualization, Methodology, Formal

analysis, Writing – original draft, Visualization. **Krystal M. Lewis:** Conceptualization, Methodology, Writing – review & editing. **Jordan Galbraith:** Formal analysis, Data curation, Writing – review & editing. **Rany Abend:** Conceptualization, Writing – review & editing. **Ashley R. Smith:** Conceptualization, Writing – review & editing. **Eli R. Lebowitz:** Conceptualization, Methodology, Resources, Writing – review & editing. **Daniel S. Pine:** Conceptualization, Methodology, Resources, Writing – review & editing, Supervision, Funding acquisition. **Dylan G. Gee:** Conceptualization, Methodology, Writing – review & editing, Supervision.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.brat.2022.104107>.

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