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# Journal Pre-proofs

Family Accommodation in Children and Adolescents with Misophonia

Eric A. Storch, Andrew G. Guzick, Johann D'Souza, Jane Clinger, Daphne Ayton, Minjee Kook, Conor Rork, Eleanor E. Smith, Isabel A. Draper, Nasim Khalfe, Catherine E. Rast, Nicholas Murphy, Marijn Lijfijjt, Wayne K. Goodman, Matti Cervin

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#### **Abstract**

Family accommodation (e.g., reassurance, modifying routines, assisting avoidance) has not been explored among youth with misophonia but may have important clinical and intervention implications. We examined family accommodation in 102 children and adolescents with interview-confirmed misophonia and compared its frequency and content to family accommodation in 95 children and adolescents with anxiety disorders. Findings showed that family accommodation was ubiquitous in pediatric misophonia and may be even more frequent than in youth with anxiety disorders. Assisting the child, participating in misophonia-related behaviors, and modifying family routines were endorsed by more than 70% of parents of children with misophonia. Further, compared to parents of children with anxiety disorders, parents of children with misophonia more frequently reported child distress and anger when they did not accommodate. Family accommodation was a moderate to strong predictor of misophonia severity even when accounting for co-occurring internalizing and externalizing symptoms and sociodemographic factors. This first study of family accommodation in pediatric misophonia suggests accommodation may be an important clinical feature oand a potential candidate to target in interventions.

**Keywords:** Misophonia; Children; Family accommodation; Anxiety; Treatment

#### Introduction

Misophonia is characterized by selective sound sensitivity to a variety of triggers (Swedo et al., 2021). Triggers may evoke anger, irritation, or disgust, and are avoided or endured with significant distress (Schröder, Vulink, & Denys, 2013). Common triggers include sounds from others breathing, eating, talking, or humming, and the distress is often exacerbated when triggered by family members or close friends (Schwartz, Leyendecker, & Conlon, 2011). The exact prevalence of misophonia is unclear (Wiese, Wojcik, & Storch, 2021) with current estimates ranging from 6% to 20% (Naylor et al., 2021; Kılıç et al., 2021; Wu et al., 2014; Zhou, Wu, & Storch, 2017; Yektatalab et al., 2022). While research has begun to show that individuals with misophonia often have psychiatric co-morbidities and that misophonia symptoms can cause substantial impairment (Claiborn et al., 2020; Rinaldi et al., 2022; Rosenthal et al., 2022; Wu et al., 2014; Yektatalab et al., 2022), less is known about the effects of misophonia on everyday life, especially in the context of children and their families.

Family accommodation is characterized by the extent and manner in which family members take part in an individual's symptoms. This could include actions such as modifying behaviors, removing/reducing demands, and/or providing reassurance. While this has never been studied systematically in misophonia, family accommodation has been extensively studied in obsessive-compulsive and anxiety disorders, which are also characterized by heightened emotional reactions to specific stimuli (Iniesta-Sepulveda et al., 2021; Lebowitz, Panza, & Bloch, 2016; Kitt et al., 2022). A recent meta-analysis found that family accommodation for children with anxiety is very common (86-100%) with most parents endorsing daily accommodation (61-81%; Iniesta-Sepulveda et al., 2021). Rates of accommodation are similar among youth with obsessive-compulsive disorder (OCD; Wu et al., 2016). More family accommodation is associated with more severe symptoms in youth with anxiety and OCD (Lebowitz, Scharfstein, & Jones, 2014) and is with a poorer treatment response in OCD (Garcia et al., 2010; Peris et al., 2012). The extent of family accommodation in youth with misophonia has never been examined, but clinical accounts indicate that, similar to anxiety and OCD, family accommodation may be common (Wu et al., 2014).

Examining family accommodation among misophonic youth is important for several reasons. First, the causal link between accommodation and symptom maintenance has been well supported in the literature. While not in samples of individuals with misophonia, studies in adults with OCD and in children with anxiety and OCD have found that family accommodation may mediate the relation between symptom severity and functional impairment, although these results are based on cross-sectional results (La Buissonnière-Ariza et al., 2022; de Barros et al., 2020; Storch et al., 2007). Second, there are potential treatment implications, as accommodation is an important target in the treatment of anxiety and OCD in youth (Lebowitz et al., 2020; Peris et al., 2017). Third, accommodating the avoidance of triggers is likely to be a maintaining factor for misophonia and several case studies report family accommodation as a prominent feature of misophonia (Dover & McGuire, 2021; Wu & Banneyer, 2020; McGuire, Wu, & Storch, 2015; Johnson et al., 2013); further, preliminary reports suggest that reducing family accommodation may be beneficial (Wu & Banneyer, 2020; Dover & McGuire, 2021). However, the only study to date about family accommodation in children with misophonia included only 4 participants (Johnson et al., 2013), vastly limiting the current knowledge about family accommodation in pediatric misophonia.

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When trying to elucidate the role of family accommodation in pediatric misophonia, the influence of co-occurring mental health problems needs to be considered. Psychiatric comorbidity is common in youth with misophonia (Guzick et al., 2023) and it may be that accommodation is only present or elevated in children struggling with other psychiatric symptoms as emotional outburst and aggressive responses may be more common among these children.

The present study had three major aims. First, we sought to examine the incidence and extent of parent-reported accommodation of misophonia symptoms in children and adolescents with misophonia. Given the high incidence of symptom accommodation in other related conditions, we predicted similarly high rates of accommodation and we included a sample of youth with anxiety disorders for comparison. Second, to inform treatment development, we examined the frequency of specific accommodation behaviors (e.g., modification of family routines, avoiding activities) and again compared youth with misophonia to youth with anxiety disorders. No hypothesis was generated for this aim as this is the first systematic examination of family accommodation in misophonia. Third, we examined whether accommodation was associated with misophonia symptom severity (using both child- and parent-reports of misophonia) while accounting for co-occurring internalizing and externalizing symptoms. In line with the literature on pediatric anxiety and OCD, we predicted that family accommodation would be uniquely associated with the severity of misophonia.

### Method

## **Participants**

Participants included 211 subjects between 8-17 years of age with misophonia or anxiety symptoms. Participants were recruited through a multimedia approach including social media, stakeholder websites, electronic Listservs, referrals from health and mental health professionals, and flyers. Youth were categorized as having either misophonia or an anxiety disorder (AD). No participants in the anxiety disorder sample had clinically significant misophonia symptoms. Core inclusion criteria for both groups included: 1) child 8 to 17 years of age, 2) fluent in English, 3) IQ > 70 as assessed using the KBIT, 4) no documented or suspected history of psychosis, and 5) not actively suicidal. Additional inclusion criteria for the misophonia group included a score > 10 on the Amsterdam Misophonia Scale (A-MISO-S), corresponding with moderate to severe symptoms (Schroder et al., 2013), as well as confirmation on the Misophonia Assessment Interview (Lewin et al., 2021). Additional inclusion criteria for the anxiety disorder sample included: 1) a score  $\leq 4$  on the A-MISO-S, 2) met criteria for an anxiety disorder using the Mini International Neuropsychiatric Interview, Kid Version (MIN-KID, Sheehan et al., 2010), and 3) had elevated anxiety (T-score ≥ 60) assessed using the Multidimensional Anxiety Scale for Children 2<sup>nd</sup> Edition Parent-Report (MASC-2, March, 2013).

Of the 211 participants who originally provided consent, 14 participants (5 Anxiety participants and 9 Misophonia participants) were not assessed (i.e., could not be scheduled). For the misophonia group, of the 112 that were consented, 5 were found ineligible due to too low A-MISO scores, and 4 did not complete the entire study due to difficulty in scheduling. Our screen failure rate is relatively low in comparison to Naylor et al. as they recruited from a general sample. However, our study used a targeted recruitment approach to directly reach those with suspected misophonia. Analyses included 197 parent-child dyads across both groups with 102 subjects in the misophonia group (33.7% male, 67.6% female, 1.0% transgender male, 1.0% transgender female, 2.0% Other; mean age = 13.69 years, SD = 2.51 years) and 95 subjects in the AD group (28.4% male, 57.9% female, 8.0% Other; mean age =

12.43 years, SD = 2.54 years). See Table 1 for participant information across the misophonia and AD groups.

#### **Procedure**

Participants interested in the study were pre-screened for initial eligibility via telephone. After obtaining consent and assent, parent-child dyads took part in a virtual, remote assessment with a trained rater and completed several online self- and parent-report measures and tasks (not included in this report). Training of the rater included reviewing didactics of the MINI-KID, viewing videos of the MINI-KID, achieving concordance with a gold-standard rater, and finally completing administrations under supervision. Regular clinical supervision was held. The child/adolescent and parent were interviewed together for the Misophonia Diagnostic Interview and the MINI-KID. Participants were compensated \$90 for their time.

#### Measures

**Family Accommodation Scale.** The Family Accommodation Scale (FAS) is a 13-item parent-report measure related to participation in symptoms, modification of parental behaviors in response to symptoms, and associated distress and consequences. The scale used in this study was adapted from the Family Accommodation Scale—Anxiety (Lebowitz et al., 2013), itself an adaptation and modification of the Family Accommodation Scale for OCD (Calvocoressi et al., 1999), to reflect misophonia by changing the word "anxiety" to "misophonia" (e.g., "How often did you provide items needed due to their [anxiety/misophonia]?"). The internal consistency of the items of the FAS for misophonia was adequate (a = .76) but somewhat lower for the 9 items examining specific areas of accommodating behaviors (a = .67), indicating that accommodation behaviors in misophonia is a heterogeneous construct. Therefore, we examined not only the total score of the FAS, but also each item, which describes different areas of accommodation.

**Mini Neuropsychiatric Interview for Children.** The Mini Neuropsychiatric Interview for Children (MINI-KID, Sheehan et al., 2010) is a structured, psychometrically validated, interviewer-administered transdiagnostic interview for youth. It assesses the presence of 24 psychiatric disorders, the timeline of symptom presentation, and suicide risk. Clinicians have flexibility to probe further items to ascertain relevant clinical data to make diagnoses.

Amsterdam Misophonia Scale (A-MISO-S). The Amsterdam Misophonia Scale (A-MISO-S) (Schroder et al., 2013) was used to measure overall misophonia severity. The A-MISO-S is a 6-item, self-report assessment based on the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) (Goodman et al., 1989) and assesses the time occupied by misophonia symptoms, interference, level of distress, effort to resist impulses, control over thoughts, and time avoiding misophonia situations over 1 week using a Likert Scale. Anchors for the Likert scale range from None to Extreme for the time occupied, interference, and distress items; Makes an effort to always resist to completely and willingly yields to all obsessions for the Resistance item; Complete to No control for the control over thoughts item; and No deliberate avoidance to Extreme, very extensive avoidance for the time avoiding misophonia situations item. Scores can be characterized as subclinical (0-4), mild (5-9), moderate (10-14), severe (15-19) or extreme (20-24) (Naylor et al., 2020; Rosenthal et al., 2021). This measure has demonstrated high internal consistency as well as good construct validity (Naylor et al., 2020), but empirical work examining the scale in youth indicates that the item assessing effort to resist should be excluded (Cervin et al., under review). More specifically, this item did not load statistically significantly onto the broad single factor. The internal consistency of the remaining five items in the present misophonia sample was adequate (a = .76)

**Misophonia Assessment Questionnaire (MAQ).** The MAQ is a 21-item measure with statements describing how sound sensitivities may affect the responder, including change of thoughts, feelings, behavior and effect on social life. The MAQ was used as a complementary measure of misophonia severity. In MAQ, responses range from 0 (not at all) to 3 (almost all of the time). Scores on each item are summed to assess severity of misophonia. Both parent and child versions of the MAQ were used in the present study. Previous work has shown that the MAQ has a 4-factor structure that together are valid indicators of overall misophonia severity (Cervin et al., 2022). The internal consistency of the items of the parent and child versions was excellent (a = .93 and .94, respectively). Psychometric evaluations have showed that the MAQ assesses partly unique domains of misophonia severity compared to the A-MISO-S (Cervin et al., 2022).

Child Behavior Checklist (CBCL). The CBCL is a 113-item parent-report measure that assesses externalizing and internalizing behaviors in children. Subscales assess broad externalizing and internalizing symptoms, as well as social problems, anxious/depressed symptoms, and aggressive behavior. In the present study, we examined the broadband scales of internalizing and externalizing symptoms and raw scores were used. The internal consistency of the items of the internalizing and externalizing scales was good ( $\alpha$ s = .89 for each subscale).

# **Data Analysis**

All analyses were conducted in SPSS version 27. To compare scores across the misophonia and AD groups, we used independent samples t-tests for continuous variables (age, FAS total score), Mann-Whitney U tests for ordinal variables (FAS item scores), and chi-square tests for frequencies (gender, weekly accommodation). Further, to account for the presence of anxiety disorders in the misophonia sample, we divided the misophonia sample into those with and without anxiety disorders and compared the two groups on family accommodation. To examine whether accommodation was associated with misophonia severity, we ran multivariable linear regression models with A-MISO-S and MAQ as the dependent variables. An *a priori* decision was made to account for age and gender in these models and we also accounted for internalizing and externalizing symptoms (CBCL). An alpha level of .05 was used as an indicator of statistical significance in all models. We did not adjust the alpha since this is the first major study of accommodation in youth with misophonia, since we reported all outcomes, analyzed partially associated outcome variables and did not test a universal null hypothesis.

#### Results

#### Preliminary Analyses

Participants in the misophonia group were statistically significantly older than those in the AD group (t [195] = 3.49, p < .001). There was no statistically significant difference in the proportion self-identifying as girls across groups.

### Frequency of Family Accommodation

In Table 2 are scores for each behavioral accommodation domain rated as part of the FAS, the FAS total score, and the frequency in each group reporting at least weekly accommodation (an item score of 2 or above). Parents of youth with anxiety disorders reported significantly more reassurance than parents of youth with misophonia. Conversely, parents of youth with misophonia reported higher scores and more weekly accommodation for (1) participating in behaviors related to the child's difficulties, (2) assisting the child in avoiding things that might make him/her exhibit symptoms, (3) avoiding activities, and (4)

modifying family routines. The misophonia group also had a higher score for providing items needed due to the child's difficulties, but the frequency of weekly accommodation was not statistically significantly different between the groups for this item. For the four FAS items assessing distress and consequences, non-parametric group comparisons indicated that parents of children with misophonia experienced that their child became distressed or angry/abusive when the parent did not provide assistance significantly more frequently than parents of children with anxiety disorders. The misophonia group also had a statistically significantly higher total FAS score (p < .001) and the difference corresponded to a moderate to large effect size (Cohen's d = 0.84 [0.54 – 1.13]).

A large majority of families in both groups showed at least weekly accommodation for one of the assessed accommodation areas (misophonia: 98.0%; AD: 90.5%) and the difference in frequency across groups was statistically significant. Weekly accommodation for at least three of the assessed accommodation areas was also common (misophonia: 81.4%; AD: 56.8%) and again the difference in frequency across groups was statistically significant.

Accommodation was negatively correlated to age in the misophonia group (r = -.24, p = .01), indicating that there was more accommodation for younger children. Accommodation did not differ statistically significantly between those self-identifying as girls versus those self-identifying as boys (t [95] = 0.28, p = .87).

Fifty-three (51.5%) of the children and adolescents with misophonia also met criteria for one or more anxiety disorders. Those with an anxiety disorder (M = 37.81 [10.65]) did not show significantly different scores on accommodation compared to those without an anxiety disorder (M = 36.03 [8.07]; t[99] = 0.94, p = .35).

Accommodation and Misophonia Severity.

To examine associations between accommodation and misophonia severity, we only analyzed data from the misophonia sample. Zero-order Pearson correlations showed that accommodation was not significantly correlated with internalizing symptoms (r = .16, p = .12), but there was a significant correlation with externalizing symptoms (r = .29, p = .003).

A linear regression model with misophonia severity (A-MISO-S) as the dependent variable and accommodation (FAS total score), age, and gender (girl/boy) as independent variables was conducted. The model was statistically significant (p < .001) and the independent variables explained 21.5% of the variance in misophonia severity. The statistically significant predictors were family accommodation ( $\beta = 0.50$ , p < .001) and age ( $\beta = 0.22$ , p < .001). A model that included accommodation, internalizing symptoms, externalizing symptoms, age, and gender as independent variables and misophonia severity as the dependent variable (A-MISO-S) was statistically significant (p < .001) and explained 23.4% of the variation in misophonia severity. Accommodation ( $\beta = 0.46$ , p < .001) and age ( $\beta = 0.27$ , p = .009) were the only significant predictors.

A model with the child-reported MAQ total score as the dependent variable and accommodation, age, and gender as independent variables was statistically significant (p < .001) and explained 23.5% of the variance in the child-reported MAQ score. All independent variables were statistically significant predictors: accommodation ( $\beta = .39$ , p < .001), age ( $\beta = .35$ , p < .001), and gender (boy vs girl,  $\beta = .20$ , p = .028). A model that included accommodation, internalizing symptoms, externalizing symptoms, age, and gender as independent variables was also statistically significant (p < .001) and explained 26.1% of the

variation in misophonia severity. Accommodation ( $\beta = 0.34$ , p < .001) and age ( $\beta = 0.31$ , p = .002) and internalizing symptoms ( $\beta = 0.21$ , p = .045) were significant predictors.

A model with the parent-reported MAQ as the dependent variable and accommodation, age, and gender as independent variables was also statistically significant (p < .01) and explained 11.7% of the variance in the parent-reported MAQ score; the only statistically significant predictor was accommodation ( $\beta = .32, p < .01$ ). A model that included accommodation, internalizing symptoms, externalizing symptoms, age, and gender as independent variables was also statistically significant (p = .004) and explained 12.6% of the variation in misophonia severity. Accommodation ( $\beta = 0.28, p = .009$ ) was the only significant predictor.

#### Discussion

This study is the first to examine family accommodation in youth with misophonia. Rates of accommodation were significantly higher in misophonic youth relative to youth with anxiety disorders overall, and in several specific behaviors including participating in behaviors related to the child's difficulties, assisting the child in avoiding things that might make him/her exhibit symptoms, avoiding activities, and modifying family routines. Families with misophonic youth were significantly more likely to accommodate in at least three different ways per week compared to anxiety disorder controls. There were increased instances of accommodating relative to anxious youth by providing additional items to help the distressed child. Parents of children with misophonia were also more likely than parents of anxious children to report their child becoming distressed or angry when the parent did not provide assistance. These data suggest the impact misophonia has on family functioning and may reflect efforts of family members to support or foster adaptive living of the affected child, especially in younger children, for whom accommodation rates were highest. Accommodation, however, may have problematic secondary consequences by limiting engagement in important life activities, reinforcing problematic and maladaptive behavioral responses to stressors, and lowered ability to regulate emotions.

Family accommodation is a key target in psychological therapy for OCD and anxiety (Lebowitz et al., 2020; Peris et al., 2017). The frequency and impact of accommodation in pediatric misophonia indicated in this study suggest it could be a similarly critical target in psychological treatment development for youth with misophonia. For example, reducing avoidance of triggers and provision of tangible items are likely important clinical targets given their reinforcing nature. Encouraging misophonic youth to align their values with actions may be one method of reducing avoidance. Similarly, helping parents develop methods of verbally (i.e., supporting adaptive actions) or tangibly (e.g., reward systems) supporting their child besides taking on responsibilities for providing assistance/items or modifying routines may be useful. It is important to note that our findings suggest that the specific targets in treatment may differ somewhat between misophonic versus anxious youth. Reducing the degree to which families support avoidance, modify family routines, or assist with daily activities may be particularly salient for misophonic youth, whereas reassurance seeking may be a salient target for anxious youth.

Consistent with findings in childhood OCD and anxiety (Iniesta-Sepúlveda et al., 2021; Lebowitz et al., 2012, 2016; Stewart et al., 2008; Storch et al., 2007), higher levels of family accommodation were associated with increased misophonia symptom severity. This finding was robust across three assessments of misophonia severity and remained when controlling for other relevant variables, including co-occurring internalizing and externalizing

symptoms, age, and gender. These findings suggest that as the child's misophonia increases in severity, family members are more likely to engage in accommodating actions to mitigate the child's distress. We expect that this relationship is bidirectional, in that accommodation does not allow a child to develop effective independent strategies to manage or overcome triggers, which should be investigated in future work. Somewhat surprisingly, externalizing behaviors were only weakly related to family accommodation and not a significant predictor of misophonia severity when accommodation was accounted for, suggesting that there is a particularly strong link between misophonia severity and accommodation. The frequency of accommodation, intense anger or distress when accommodation is not provided, and the observation that accommodation is associated with symptom severity suggest that children with misophonia experience difficulty self-regulating emotions when faced with triggers and instead rely on (or demand that) family members make changes to minimize exposure to triggers. It will be important for interventions to consider how to both address accommodation as well as to provide methods for the child to cope with distressing triggers.

There are several study limitations. First, the sample was predominantly Caucasian and the caregiver completing the parent forms was predominantly the mother. Second, the sample of youth with misophonia responded to advertisements specific to this condition and may represent those with more severe presentations. Third, the study was cross-sectional in nature, which precludes directional inferences. Fourth, the A-MISO-S has several psychometric limitations including the lack of a clearly established cut-off point and clarity on the optimal method of administration (self-report versus clinician administered). Fifth, the present study used an existing measure of accommodation revised for misophonia symptoms; however, as evidenced by the modest internal consistency of the scale, modifications may be in order with regards to item content (e.g., specificity of reassurance, nature of family modifications). Finally, given the early nature of this work, no statistical correction was used.

Within these limitations, this study has several implications. First, the importance of considering family accommodation when assessing youth with misophonia is highlighted given the frequency of occurrence and its clear association with severity. Indeed, specific familial behaviors may be maintaining maladaptive behavioral patterns and compound impairment. Future research should focus on optimal ways of engaging parents of youth with misophonia in treatment and examine whether reducing accommodation results in improvement in symptoms and impairment. Second, like in other psychological conditions (e.g., anxiety disorders, OCD), the present study suggests that family accommodation may be a mechanistic target for maintaining symptoms, which should be incorporated into emerging conceptual models of misophonia. Interventions that include components targeting maintaining variables, such as accommodation, as well as components that help the child develop abilities to effectively cope with and overcome misophonic triggers are advised.

 Table 1. Participant characteristics.

Variable	Misophonia Group	Anxiety Disorders Group	
N	102	95	
Gender			
Girl, n (%)	69 (67.6%)	55 (57.9%)	
Boy, n (%)	32 (33.7%)	29 (28.4%)	
Other, n (%)	2 (2.0%)	8 (8.4%)	
Transgender male, n (%)	1 (1.0%)	0 (0%)	
Transgender female, n (%)	1 (1.0%)	0 (0%)	
Age, M(SD)	13.69 (2.51)	12.43 (2.54)	
Parent Postgraduate Degree, n (%)	34 (33.3%)	34 (35.8%)	
Parent Currently Employed, n (%)	70 (68.6%)	77 (70.5%)	
Race			
Black/African American, n (%)	0 (0%)	5 (5.3%)	
Asian, n (%)	3 (2.9%)	7 (7.4%)	
White, n (%)	99 (97.1%)	82 (86.3%)	
American Indian or Alaskan Native, n (%)	3 (2.9%)	1 (1.1%)	
Other, n (%)	1 (1.0%)	3 (3.2%)	

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Hispanic/Latino, n (%)	6 (6.1%)	13 (13.8%)

**Table 2.** Scores on the Family Accommodation Scale (FAS) in misophonia and anxiety disorders (ADs) and the frequency of parents who reported at least weekly accommodation. Differences for the item scores were examined using Mann-Whitney U tests, for the total score using an independent samples t test, and for frequencies using chi-square tests. Statistically significant differences are highlighted in bold.

Family Accommodation Scale	M (SD)	M(SD)	p for Difference	% Weekly	% Weekly	p for Difference
	Misophonia	ADs		Misophonia	ADs	
Item 1. Reassurance	3.32 (1.58)	4.03 (1.12)	.002 **	62.4%	88.2%	<.001***
Item 2. Provide items	2.85 (1.81)	2.15 (1.48)	.006 **	45.5%	34.4%	.114
Item 3. Participate in behaviors	3.94 (1.56)	3.14 (1.36)	<.001 ***	78.2%	63.4%	.023*
Item 4. Assist	4.00 (1.46)	2.27 (1.24)	<.001 ***	81.2%	37.6%	<.001***
Item 5. Avoid activities	2.39 (1.58)	1.68 (1.00)	.004 **	38.6%	20.4%	.006**
Item 6. Modify family routines	3.83 (1.69)	2.09 (1.55)	<.001 ***	74.3%	30.1%	<.001***
Item 7. Do things for child	1.64 (1.23)	1.80 (1.12)	.104	19.8%	29.0%	.134
Item 8. Modify work schedule	1.57 (1.31)	1.58 (1.15)	.308	14.9%	16.1%	.806
Item 9. Modify leisure activities	1.79 (1.22)	1.69 (1.18)	.418	22.8%	20.4%	.692

Total Score FAS	<b>36.97 (9.51)</b> 29.37 (8.54)	<.001***	4.60	
1 or more accommodations weekly			98.0% 90.5%	.022*
3 or more accommodations weekly			81.4% 56.8%	<.001***

#### References

- Calvocoressi, L., Mazure, C. M., Kasl, S. V., Skolnick, J., Fisk, D., Vegso, S. J., Van Noppen, B. L., & Price, L. H. (1999). Family accommodation of obsessive-compulsive symptoms: Instrument development and assessment of family behavior. Journal of Nervous and Mental Disease, 187, 636–642.
- Cervin, M., Guzick, A., Clinger, J., Smith, E., Draper IA, Goodman WK, Lijffijt, M., Murphy, N., Rast, C., Schneider, S., & Storch, E. A. (2023). Measuring misophonia in youth: A psychometric evaluation of child and parent measures. *Journal of Affective Disorders*, *338*, 180–186.
- Claiborn, J. M., Dozier, T. H., Hart, S. L., & Lee, J. (2020). Self-Identified Misophonia and Phenomenology, Impact, and Clinical Correlates. *Psychological Thought*, 13(2), 349-375. <a href="https://doi.org/10.37708/psyct.v13i2.454">https://doi.org/10.37708/psyct.v13i2.454</a>
- Dover, N., & McGuire, J. F. (2021). Family-Based Cognitive Behavioral Therapy for Youth with Misophonia: A Case Report. *Cognitive and Behavioral Practice*.
   <a href="https://doi.org/10.1016/j.cbpra.2021.05.005">https://doi.org/10.1016/j.cbpra.2021.05.005</a>Feinberg, L., Kerns, C., Pincus, D. B., & Comer, J. S. (2018). A Preliminary Examination of the Link Between Maternal Experiential Avoidance and Parental Accommodation in Anxious and Non-anxious Children. *Child Psychiatry and Human Development*, 49(4), 652–658. <a href="https://doi.org/10.1007/s10578-018-0781-0">https://doi.org/10.1007/s10578-018-0781-0</a>
- Garcia, A. M., Sapyta, J. J., Moore, P. S., Freeman, J. B., Franklin, M. E., March, J. S., & Foa, E. B. (2010). Predictors and moderators of treatment outcome in the Pediatric Obsessive Compulsive Treatment Study (POTS I). *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(10), 1024–1033; quiz 1086. <a href="https://doi.org/10.1016/j.jaac.2010.06.013">https://doi.org/10.1016/j.jaac.2010.06.013</a>
- Guzick, A., Cervin, M., Smith, E., Clinger, J., Draper, I., Goodman, W., Lijffijt, M., Murphy, N., Lewin, A., Schneider, S., & Storch, E. (2023). Clinical characteristics, impairment, and psychiatric morbidity in 102 youth with misophonia. *Journal of affective disorders*, 324, 395-402.
- Iniesta-Sepúlveda, M., Rodríguez-Jiménez, T., Lebowitz, E. R., Goodman, W. K., & Storch, E. A. (2021b). The Relationship of Family Accommodation with Pediatric Anxiety Severity: Meta-analytic Findings and Child, Family and Methodological Moderators. *Child Psychiatry and Human Development*, *52*(1), 1–14. https://doi.org/10.1007/s10578-020-00987-6
- Johnson, P. L., Webber, T. A., Wu, M. S., Lewin, A. B., Murphy, T. K., & Storch, E. A. (2013). When selective audiovisual stimuli become unbearable: A case series on pediatric misophonia. *Neuropsychiatry*, *3*(6), 569–575. <a href="https://doi.org/10.2217/npy.13.70">https://doi.org/10.2217/npy.13.70</a>
- Kerns, C. E., Pincus, D. B., McLaughlin, K. A., & Comer, J. S. (2017). Maternal emotion regulation during child distress, child anxiety accommodation, and links between maternal and child anxiety. *Journal of Anxiety Disorders*, 50, 52–59. https://doi.org/10.1016/j.janxdis.2017.05.002
- Kılıç, C., Öz, G., Avanoğlu, K. B., & Aksoy, S. (2021). The prevalence and characteristics of misophonia in Ankara, Turkey: Population-based study. BJPsych Open, 7(5), e144. https://doi.org/10.1192/bjo.2021.978

- Kitt, E. R., Lewis, K. M., Galbraith, J., Abend, R., Smith, A. R., Lebowitz, E. R., Pine, D. S., & Gee, D. G. (2022). Family accommodation in pediatric anxiety: Relations with avoidance and self-efficacy. *Behaviour Research and Therapy*, 154, 104107. https://doi.org/10.1016/j.brat.2022.104107
- La Buissonnière-Ariza, V., Guzik, A. G., Schneider, S. C., Cepeda, S. L., Goodman, W. K., & Storch, E. A. (2022). Family Accommodation of Symptoms in Adults With Obsessive-Compulsive Disorder: Factor Structure and Usefulness of the Family Accommodation Scale for OCD-Patient Version. *Journal of Psychiatric Practice*, *28*(1), 36–47. https://doi.org/10.1097/PRA.0000000000000597
- Lebowitz, E. R., Marin, C., Martino, A., Shimshoni, Y., & Silverman, W. K. (2020). Parent-Based Treatment as Efficacious as Cognitive-Behavioral Therapy for Childhood Anxiety: A Randomized Noninferiority Study of Supportive Parenting for Anxious Childhood Emotions. *Journal of the American Academy of Child and Adolescent Psychiatry*, *59*(3), 362–372. https://doi.org/10.1016/j.jaac.2019.02.014
- Lebowitz, E. R., & Omer, H. (2013). *Treating Childhood and Adolescent Anxiety: A Guide for Caregivers*. John Wiley & Sons.
- Lebowitz, E. R., Panza, K. E., & Bloch, M. H. (2016). Family accommodation in obsessive-compulsive and anxiety disorders: A five-year update. *Expert Review of Neurotherapeutics*, *16*(1), 45–53. https://doi.org/10.1586/14737175.2016.1126181
- Lebowitz, E. R., Panza, K. E., Su, J., & Bloch, M. H. (2012). Family accommodation in obsessive—compulsive disorder. Expert Review of Neurotherapeutics, 12(2), 229–238. https://doi.org/10.1586/ern.11.200
- Lebowitz, E. R., Scharfstein, L. A., & Jones, J. (2014). Comparing family accommodation in pediatric obsessive-compulsive disorder, anxiety disorders, and nonanxious children. *Depression and Anxiety*, 31(12), 1018–1025. https://doi.org/10.1002/da.22251
- Lebowitz, E. R., Woolston, J., Bar-Haim, Y., Calvocoressi, L., Dauser, C., Warnick, E., Scahill, L., Chakir, A. R., Shechner, T., Hermes, H., Vitulano, L. A., King, R. A., & Leckman, J. F. (2013). Family Accommodation in Pediatric Anxiety Disorders. Depression and Anxiety, 30(1), 47–54. https://doi.org/10.1002/da.21998
- Lewin, A. B., Dickinson, S., Kudryk, K., Karlovich, A. R., Harmon, S. L., Phillips, D. A., Tonarely, N. A., Gruen, R., Small, B., & Ehrenreich-May, J. (2021). Transdiagnostic cognitive behavioral therapy for misophonia in youth: Methods for a clinical trial and four pilot cases. *Journal of Affective Disorders*, 291, 400–408. <a href="https://doi.org/10.1016/j.jad.2021.04.027">https://doi.org/10.1016/j.jad.2021.04.027</a>
- Macul Ferreira de Barros, P., Polga, N., Szejko, N., Miguel, E. C., Leckman, J. F., Silverman, W. K., & Lebowitz, E. R. (2020). Family accommodation mediates the impact of childhood anxiety on functional impairment. *Journal of Anxiety Disorders*, 76, 102318. https://doi.org/10.1016/j.janxdis.2020.102318

- March, J. S. (2013). Multidimensional Anxiety Scale for Children–2nd edition: Technical manual. Toronto, Ontario, Canada: Multi-Health Systems
- McGuire, J. F., Wu, M. S., & Storch, E. A. (2015). Cognitive-behavioral therapy for 2 youths with misophonia. *The Journal of Clinical Psychiatry*, 76(5), 573–574. https://doi.org/10.4088/JCP.14cr09343
- Naylor, J., Caimino, C., Scutt, P., Hoare, D. J., & Baguley, D. M. (2021). The Prevalence and Severity of Misophonia in a UK Undergraduate Medical Student Population and Validation of the Amsterdam Misophonia Scale. Psychiatric Quarterly, 92(2), 609–619. https://doi.org/10.1007/s11126-020-09825-3
- Peris, T. S., Sugar, C. A., Bergman, R. L., Chang, S., Langley, A., & Piacentini, J. (2012). Family factors predict treatment outcome for pediatric obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology*, 80(2), 255–263. https://doi.org/10.1037/a0027084
- Rinaldi, L. J., Smees, R., Ward, J., & Simner, J. (2022). Poorer well-being in children with misophonia: Evidence from the sussex misophonia scale for adolescents. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.808379
- Rosenthal, M. Z., McMahon, K., Greenleaf, A. S., Cassiello-Robbins, C., Guetta, R., Trumbull, J., Anand, D., Frazer-Abel, E. S., & Kelley, L. (2022). Phenotyping misophonia: Psychiatric disorders and medical health correlates. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.941898
- Schröder, A., Vulink, N., & Denys, D. (2013). Misophonia: Diagnostic criteria for a new psychiatric disorder. *PloS One*, 8(1), e54706. <a href="https://doi.org/10.1371/journal.pone.0054706">https://doi.org/10.1371/journal.pone.0054706</a>
- Schwartz, P., Leyendecker, J., & Conlon, M. (2011). Hyperacusis and misophonia: The lesser-known siblings of tinnitus. *Minnesota Medicine*, *94*(11), 42–43.
- Sheehan, D. V., Sheehan, K. H., Shytle, R. D., Janavs, J., Bannon, Y., Rogers, J. E., Milo, K. M., Stock, S. L., & Wilkinson, B. (2010). Reliability and validity of the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID). The Journal of Clinical Psychiatry, 71(3), 313–326. <a href="https://doi.org/10.4088/JCP.09m05305whi">https://doi.org/10.4088/JCP.09m05305whi</a>
- Stewart, S. E., Beresin, C., Haddad, S., Egan Stack, D., Fama, J., & Jenike, M. (2008). Predictors of Family Accommodation in Obsessive-Compulsive Disorder. Annals of Clinical Psychiatry, 20(2), 65–70. https://doi.org/10.3109/10401230802017043
- Storch, E. A., Geffken, G. R., Merlo, L. J., Jacob, M. L., Murphy, T. K., Goodman, W. K., Larson, M. J., Fernandez, M., & Grabill, K. (2007). Family Accommodation in Pediatric Obsessive—Compulsive Disorder. Journal of Clinical Child & Adolescent Psychology, 36(2), 207–216. https://doi.org/10.1080/15374410701277929Swedo, S. E., Baguley, D. M., Denys, D., Dixon, L. J., Erfanian, M., Fioretti, A., Jastreboff, P. J., Kumar, S., Rosenthal, M. Z., Rouw, R., Schiller, D., Simner, J., Storch, E. A., Taylor, S., Werff, K. R. V., Altimus, C. M., & Raver, S. M. (2022). Consensus Definition of Misophonia: A Delphi Study. *Frontiers in Neuroscience*, *16*, 841816. https://doi.org/10.3389/fnins.2022.841816

- Wiese, A. D., Wojcik, K. D., & Storch, E. A. (2021). Assessment and Intervention for Individuals With Misophonia. *Journal of Health Service Psychology*, 47(1), 51–60. https://doi.org/10.1007/s42843-021-00025-6
- Wu, M. S., & Banneyer, K. N. (2020). Chapter 1 Chew on this: Considering misophonia and obsessive-compulsive disorder. In E. A. Storch, D. McKay, & J. S. Abramowitz (Eds.), *Advanced Casebook of Obsessive-Compulsive and Related Disorders* (pp. 1–19). Academic Press. <a href="https://doi.org/10.1016/B978-0-12-816563-8.00001-2">https://doi.org/10.1016/B978-0-12-816563-8.00001-2</a>
- Wu, M. S., Lewin, A. B., Murphy, T. K., & Storch, E. A. (2014). Misophonia: Incidence, phenomenology, and clinical correlates in an undergraduate student sample. *Journal of Clinical Psychology*, 70(10), 994–1007. <a href="https://doi.org/10.1002/jclp.22098">https://doi.org/10.1002/jclp.22098</a>
- Wu, M. S., McGuire, J. F., Martino, C., Phares, V., Selles, R. R., & Storch, E. A. (2016). A meta-analysis of family accommodation and OCD symptom severity. Clinical Psychology Review, 45, 34-44.
- Yektatalab, S., Mohammadi, A., & Zarshenas, L. (2022). The Prevalence of Misophonia and Its Relationship with Obsessive-compulsive Disorder, Anxiety, and Depression in Undergraduate Students of Shiraz University of Medical Sciences: A Cross-Sectional Study. International Journal of Community Based Nursing & Midwifery, 10(4), 259–268. https://doi.org/10.30476/ijcbnm.2022.92902.1888
  - Zhou, X., Wu, M. S., & Storch, E. A. (2017). Misophonia symptoms among Chinese university students: Incidence, associated impairment, and clinical correlates. *Journal of Obsessive-Compulsive and Related Disorders*, *14*, 7–12. <a href="https://doi.org/10.1016/j.jocrd.2017.05.001">https://doi.org/10.1016/j.jocrd.2017.05.001</a>
  - Dover, N., & McGuire, J. F. (2021). Family-Based Cognitive Behavioral Therapy for Youth with Misophonia: A Case Report. *Cognitive and Behavioral Practice*.
  - Johnson, P. L., Webber, T. A., Wu, M. S., Lewin, A. B., Murphy, T. K., & Storch, E. A. (2013). When selective audiovisual stimuli become unbearable: a case series on pediatric misophonia. *Neuropsychiatry*, *3*(6), 569-575.
  - Lebowitz, E. R., & Omer, H. (2013). *Treating childhood and adolescent anxiety: A guide for caregivers*. John Wiley & Sons.
  - Lewin, A. B., Storch, E. A., & Murphy, T. K. (2001). From the Experts.
  - Wiese, A. D., Wojcik, K. D., & Storch, E. A. (2021). Assessment and intervention for individuals with misophonia. *Journal of Health Service Psychology*, 47(1), 51-60.
  - Wu, M. S., & Banneyer, K. N. (2020). Chew on this: considering misophonia and obsessive-compulsive disorder. In *Advanced Casebook of Obsessive-Compulsive and Related Disorders* (pp. 1-19). Academic Press.

Zhou, X., Wu, M. S., & Storch, E. A. (2017). Misophonia symptoms among Chinese university students: Incidence, associated impairment, and clinical correlates. *Journal of Obsessive-Compulsive and Related Disorders*, *14*, 7-12.

# Highlights

- Family accommodation has not been explored in youth with misophonia.
- Accommodation was common and as or more frequent than in anxious youth.
- Family accommodation directly predicted misophonia severity.
- Accommodation may be an important intervention target.