Psychological Thought
psyct.swu.bg | 2193-7281
South-West University "Neofit Rilski"

Research Article

Self-Identified Misophonia Phenomenology, Impact, and Clinical Correlates

James M. Claiborn[a], Thomas H. Dozier*[b], Stephanie L. Hart[c], and Jaehoon Lee[d]

[a] Independent practice, South Portland, USA

[b] Misophonia Institute, Livermore, USA

[c] Educational Psychology & Leadership, Texas Tech University, USA

[d] Texas Tech University Health Science Center, Baylor College of Medicine, USA

Abstract

Misophonia is a newly recognized condition involving adverse emotional reactions to environmental sounds, most often produced by other people. This study reports results of a survey describing the phenomenology of misophonia based on a large sample. Survey data were collected from individuals self-identified as having misophonia. A total of 1,061 individuals reported specific distressing reactions to sounds, and responses indicating severity of misophonia and perceived comorbidity. Over 82% of respondents were female. The average age of the study participants was 37.49 years (*SD* = 12.24; range from 18 to 72). Most respondents reported multiple triggers and adverse emotional reactions, as well as multiple coping responses. The majority of respondents reported comorbid diagnoses. Misophonia severity is described, as well as impact on quality of life. A minority of respondents had some experience with treatment and most reported no change in symptoms. Treatments reported for misophonia were typically ineffective, and once developed, misophonia symptoms persist. The results of the study showed that misophonia is a newly recognized condition that appears to have important impact on people's lives. It typically develops in early life, and is associated with a reduced quality of life, substantial comorbidity, negative emotional experiences, and behaviors that are likely to impact interpersonal relationships.

Keywords: misophonia, anger, comorbidity, phenomenology, impairment

Table of Contents

Psychological Thought, 2020, Vol. 13(2), 349-375, https://doi.org/10.37708/psyct.v13i2.454
Received: 2020-06-15. Accepted: 2020-08-01. Published(VoR):2020-10-31
Handling Editors: Irina Ronkaglia, The National Autistic Society (NAS), Lodon, United Kingdom; Natasha Angelova, South-West University "Neofit Rilski", Blagoevgrad, Bulgaria.
*Corresponding author at: Misophonia Institute, Livermore, USA : E-mail: tdozier@misophoniainstitute.org

Misophonia is a newly recognized and little-studied condition characterized by extreme emotional reactions to normal volume environmental sounds. The term, coined by Jasterboff and Jasterboff (2002), literally means ‘hatred of sound’. Individuals with this condition are typically negatively affected by sounds produced by other individuals, or, less commonly, by mechanical sounds. The most common triggers appear to be mouth sounds, such as chewing, crunching and lip smacking, and sounds related to breathing, including sniffing and loud breathing. Other commonly reported triggers are man-made mechanical sounds, including keyboard noises and pen clicking. Some people with misophonia also find that certain visual stimuli associated with trigger sounds or repetitive motions not associated with any sounds will produce the responses ordinarily elicited by sounds (Bernstein et al., 2013; Dozier, 2015a, 2015b, 2015c; Edelstein et al., 2013; Johnson et al., 2013; Schröder et al., 2013). Typical responses to triggering sounds (triggers) include aversive emotional reactions, such as disgust, anger, or rage (Schröder et al., 2013), and sometimes physical reflex responses (Dozier, 2015a, 2015b, 2015c; Dozier & Morrison, 2017; Dozier et al., 2020; Rouw & Erfanian, 2018). The reaction to the sounds also typically includes an impulse to confront the person making the sound or to escape from the sound. These reactions may cause impairment in functioning, which impacts performance at work and disrupts relationships.

Previous studies have described misophonia variously as reflecting a conditioned reflex (Dozier, 2015b, 2015c; Dozier & Morrison, 2017; Dozier, et al., 2020; Jasterboff & Jasterboff, 2002, 2014; Schröder et al., 2013); as related to neural processing of sound (Schwartz et al., 2011); as a symptom of obsessive-compulsive disorder (OCD), generalized anxiety disorder, or schizotypal personality disorder (Cavanna, 2014; Ferreira et al., 2013); as associated with "just right" OCD and Tourette's disorder (Neal & Cavanna, 2013); and as a discrete disorder on the obsessive compulsive spectrum (Schröder et al., 2013). The correlation between OCD and misophonia (Ferreira et al., 2013; Schröder et al., 2013; Webber et al., 2014) suggests that misophonia may share phenomenological characteristics with OCD, anxiety, and depressive disorders, but does not necessarily indicate that these symptoms are rooted in a common condition (Wu et al., 2014). Indeed, variable phenomena including excessive response to sound are also characteristic of some neurodevelopmental disorders, such as tic disorders, ADHD, and autism spectrum disorders (Cavanna & Seri, 2015; Crossley & Cavanna 2013).

Despite being first described in the literature over 15 years ago, there are few published investigations of misophonia prevalence and pathogenesis. Most of the studies that do exist have been based on small cohorts, and have used different approaches to assessment, and different definitions of misophonia, leading to some confusion in the field. The impact of misophonia on quality of life has not been studied.

Schröder et al. (2013) assessed 42 patients with misophonia symptoms recruited from a hospital website. Assessment included a psychiatric interview, measures of depression, a symptom checklist, a structured interview (SCID-II) and the Amsterdam Misophonia Scale (A-MISO-S) severity scale. The A-MISO-S was developed by Schröder et al.(2013) based on the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). All reported trigger sounds were made by humans, and the most common triggers were related to eating and breathing sounds. Other common triggers included clicking noises produced by keyboards or pens. All patients reported avoidance behaviors and daily stress or discomfort and anticipated exposure to triggers. The prevalence of comorbid psychiatric disorders was reported as within expected ranges, except for a very high prevalence of obsessive-compulsive personality disorder (OCPD). Schröder et al. (2013) have suggested that misophonia could be considered as a distinct psychiatric condition.

Wu et al. (2014) surveyed 483 undergraduates from a pool of students taking psychology courses. Their sample was predominately female and ranged in age from 18 to 54. Measures

included *The Misophonia Questionnaire*, developed by the authors, measures of sensory defensiveness, self-report of disability, obsessive-compulsive symptoms, and rage. This group reported that nearly 20% of their sample had clinically significant misophonia symptoms that caused interference in their lives. Wu et al. (2014) reported correlations between misophonia and impairment in a function in multiple domains including school/work and home life. They also found a strong correlation between misophonia and general sensory sensitivities and moderate correlations between misophonia and obsessive-compulsive symptoms, anxiety, and depression. Anxiety was found to be a significant mediator between misophonia and rage. In their study, the most troubling sounds identified were people eating, nasal sounds, and repetitive tapping (Wu et al., 2014).

Edelstein et al. (2013) interviewed 11 individuals recruited from a university campus, from contacts with their lab and from a misophonia support group. In this cohort, the age of onset was typically in childhood, the most common triggers were eating sounds and low frequency bass sounds, and reactions to trigger sounds included a range of negative emotional responses including anxiety, panic anger and rage. Edelstein et al. (2013) then evaluated the skin conductance responses to stimuli (*YouTube videos and lab recorded stimuli*) in 6 of the original subjects compared to 5 control subjects. The stimuli were selected based on interview data from the subjects with misophonia and included sounds expected to produce emotional responses. Misophonic subjects and controls similarly identified stimuli as aversive, but misophonic subjects showed greater skin conductance responses and greater reported subjective responses. Based on these findings, Edelstein et al. (2013) have argued that response to stimuli in individuals with misophonia may represent a quantitative difference from normal neurological function.

Taylor et al. (2014) surveyed 534 individuals who expressed an interest in clinical psychology. This group defined sensory intolerance as a combination of auditory and tactile sensitivity. Auditory intolerance was intolerance to sounds such as alarms, sirens, appliances, or background noises like people talking or ticking clocks, which is inconsistent with the description of typical trigger sounds in other studies (Edelstein et al., 2013; Jasterboff & Jasterboff, 2014; Schröder et al., 2013). Taylor et al. (2014) also evaluated tactile intolerance, which had not previously been reported as a form of sensory sensitivity characteristic of misophonia. Given these inconsistencies in definition of misophonia, the phenomena described in the Taylor et al. (2014) study may represent a different class of sensory experiences.

Recently, Rouw & Erfanian (2017) collected survey data from over 300 people who self-identified as having misophonia from Internet and Facebook sites focused on misophonia. They collected data on phenomenology including physical and emotional responses as well as effect on life and comorbidity. Their sample was predominately female, and most respondents reported onset of symptoms in childhood or teenage years. All subjects reported some emotional response to triggers and most also reported a physical response. Rouw & Erfanian (2017) used the first 3 questions from the A-Miso-S time spent, interference, and distress associated with misophonic sounds (Schröder et al. 2013) to assess impact on life. Half of their respondents reported comorbid psychopathology, with the most common comorbid diagnoses being tinnitus, post-traumatic stress disorder (PTSD) and ADD/ADHD all reported by 12% of their sample. In another category, anxiety and depressive disorders were reported by 13%. Only PTSD was related to severity of misophonia symptoms (Rouw & Erfanian, 2017).

Aims and Hypothesis

The purpose of the current study was to confirm and extend the findings of previous, smaller studies, and address the impact on quality of life and the role of treatment in people with misophonia. This research focuses on sound triggers consistent with the most common descriptions of misophonia; it does not include investigation of visual triggers or other forms of sensory intolerance. Data were collected to clarify the relationship between misophonia and psychopathology to understanding the conceptualization of misophonia as a distinct condition or as a symptom of an underlying disorder.

The hypothesis was that there would be a negative correlation between severity of misophonia symptoms and quality of life.

Method

This study was approved by Texas Tech University Human Rights Protection Program (HRPP).

Sample

A total of 1,381 individuals consented to participate. Responses from minors and those not completing any of the misophonia measures of the survey were not included in further analysis, leaving responses from a total of 1,061 individuals who indicated they had a distressing reaction to ordinary sounds. Over 82% of respondents were female. The average age of the

study participants was 37.49 years (*SD* = 12.24; range from 18 to 72). Over 52% had college level education or beyond.

The survey was conducted on individuals recruited from social media and web sites focused on misophonia. Specifically, participants were recruited from a Yahoo group and Facebook groups focused on misophonia by messages posted inviting people with misophonia to complete the survey. No compensation was provided for participation, but participants were informed the survey would help researchers better understand the condition. Participants were asked to respond to an anonymous survey requiring them to be age 18 or older. Responses were recorded using Survey Monkey. **Answers to questions could be skipped, except for the agreement to informed consent and age. Therefore, the number of respondents to each question varied.**

Procedure

Data were collected on characteristics of individuals who self-identified as suffering from misophonia, including quality of life, psychiatric comorbidity, typical triggers, symptom severity, coping responses, and treatment experiences and effects.

The survey consisted of 23 questions in various formats. Questions included demographic information age, sex and level of education, quality of life, psychiatric comorbidity, and description of misophonia phenomenology, severity, and treatment experience. Quality of life was assessed using the Quality of Life Enjoyment and Satisfaction Questionnaire, short form (*Q-LES-Q-SF*; Endicott et al., 1993). This scale, in either short or long forms, is extensively used in psychiatric research. The social relationship item was inadvertently omitted from the survey form. To assess comorbidity, respondents were asked to check any disorder they had been diagnosed with or believed they had from a list of 12 possible choices, and/or to indicate other diagnoses (see Table 7 for a list of categories). Several of the items on the comorbidity list were selected from the obsessive-compulsive spectrum, as symptoms of misophonia have been associated with obsessive-compulsive symptoms and related phenomenon (Ferreira et al., 2013; Schröder et al., 2013). Tinnitus was included in the comorbidity list as high rates of this comorbidity have been reported (Jasterboff & Jasterboff, 2014).

Trigger sounds were assessed by asking respondents to indicate if they responded by becoming upset, anxious, angry, or disgusted, to a list of eight categories of soft sounds, and to indicate other sounds that produced one of these reactions (see Table 2 for categories).

Examples of items on this list include mouth sounds such as chewing or crunching, joint sounds such as knuckle cracking and foot sounds such as tapping. Categories of triggers were developed from a review of the literature and experience working with individuals with identified misophonia complaints. Age of onset was assessed by asking 'at what age did you first experience this reaction to sounds'. Physical responses (see Table 3) were assessed from a list of five categories based on published literature and clinical experience. Respondents could select multiple responses, with "other" category for write-in responses.

Misophonia severity was assessed with the Amsterdam Misophonia Scale (*A-MISO-S*; Schröder et al., 2013; Table 4). Research on misophonia has yet to establish well-supported measures. The A-Miso-S, adapted by Schröder et al. (2013) from the Yale-Brown Obsessive-Compulsive scale (*Y-BOCS;* Goodman et al., 1989), appears promising, and like the Y-BOCS it is adaptable to self-report or clinician administration. The level of physical discomfort when exposed to triggers was assessed with the Misophonia Physical Sensation Scale (see Table 4). Respondents were asked to check the response that best described their reaction. Possible responses ranged from feeling no physical response to feeling a physical response which is overpowering and is causing physical pain.

Possible treatments sought were listed using vernacular terms such as counseling/talk therapy, cognitive behavioral therapy (CBT) and exposure therapy. The list of treatments was designed to identify treatments people believed they had experienced, and technical definitions of treatment approaches were not provided or asked about. This question instructed respondents to check all that apply and had a fill in other response. Exposure therapy, which may be included as a component of CBT, was listed separately because exposure to trigger stimuli has been reported anecdotally and in the literature (Schröder et al., 2017) to be associated with increased misophonia severity. The effects of treatment on misophonia severity and quality of life were assessed using a 7-step Likert scale from greatly improved to greatly worsened.

Descriptive statistics and bivariate tests (*t*-test, chi-square test, and correlation) were used to demonstrate sample demographics and all study measures, with calculated effect size estimates. Ordered logistic regression analysis was conducted with the treatments for misophonia as the independent variables and the change of misophonia conditions as the dependent variable.

Results

Chi-square test was performed to compare the distribution of age of onset between females and males. The results indicated no significant association between sex and age of onset $\chi^2(7, N = 1{,}061) = 10.93$, $p = .14$, $V = 0.10$. The average yearly rate of onset was calculated as the number of participants reporting onset for a year divided by the number of participants that age or older. Figure 1 shows the average yearly rate of onset for various age ranges. The age ranges were chosen to reduce a self-report artifact, where participants were far more likely to report onset of a multiple of 5 in adulthood (e.g. 25, 30) and twice as likely to report onset of a multiple of 2 in the 7 to 13 age range (e.g. 8, 10, 12). The average age of reported onset was 12.61 years (*SD* = 7.46; range = 0 to 50), and the median age of onset was 11 years.

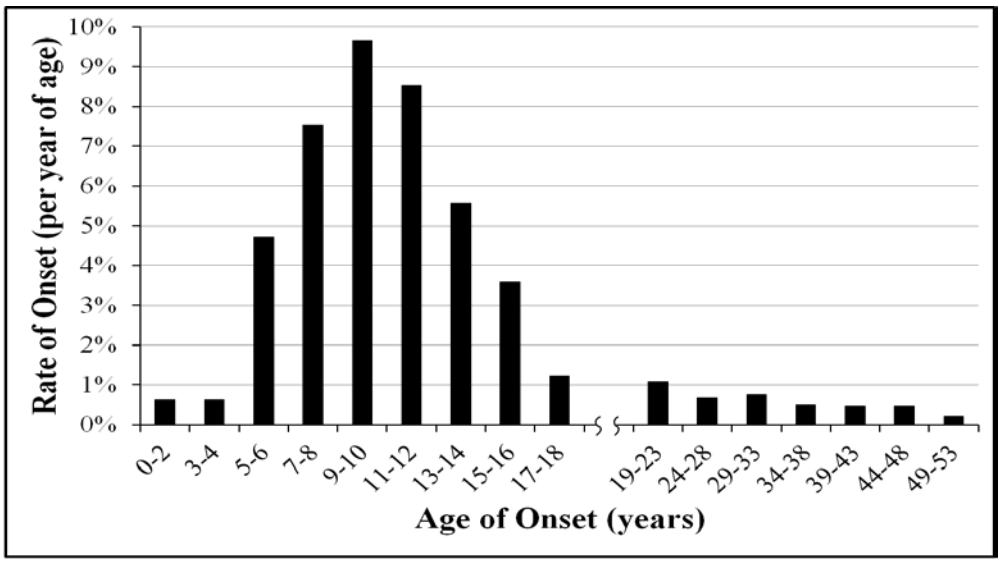

Figure 1**.** *Annual rate of onset of misophonia of study participants (n = 1,042)*

Misophonia severity was assessed using the A-Miso-S (Schröder et al., 2013), which was adapted from a tool used to measure the severity of OCD, the Y-BOCS (Goodman et al., 1989). Similar adaptations of the Y-BOCS have been developed for other obsessive compulsive or impulse control disorders and appear to be valid and reliable measures (Pallanti et al., 2005; Philips et al., 1997).

The A-Miso-S produced scores ranging from 0 to 24. Scores of 0–4 are considered subclinical, 5–9 mild, 10–14 moderate, 15–19 severe, and 20–24 extreme (Schröder et al., 2013). The A-

Miso-S scores in this sample ranged from 2 to 24 with a mean of 12.93 (*SD* = 3.66), which was considered to be moderate (See Table 1). Additionally, most participants (*n* = 528, 51.4%) fell in the moderate range (See Figure 2). The results of *t*-test and chi-square test indicated that both the mean and distribution of misophonia severity were not significantly different between males (*M* = 12.58, *SD* = 3.63) and females (*M* = 13.00, *SD* = 3.67), $t(1,025) = 1.40$, $p = .16$, $d = 0.11$; $\chi^2(4, N = 1,061) = 7.40$, $p=.12$, $V = 0.08$. However, an earlier age of onset was significantly associated with a greater level of misophonia $r(1,007) = –.21$, $p < .001$.

Table 1.

Percentage Distribution in Males (n = 182) and Females (n = 845) from n =1,027 Respondents Scoring A-MISO-S

Level of severity	Total Percents (*n* = 1,027)	Female Percents (*n* = 845)	Male Percents (*n* = 182)
Subclinical (score 0–4)	1.0%	1.0%	1.1%
Mild (score 5–9)	16.2%	15.4%	19.8%
Moderate (score 10–14)	51.4%	52.7%	45.6%
Severe (score 15–19)	27.0%	26.0%	31.3%
Extreme (score 20–24)	4.5%	5.0%	2.2%

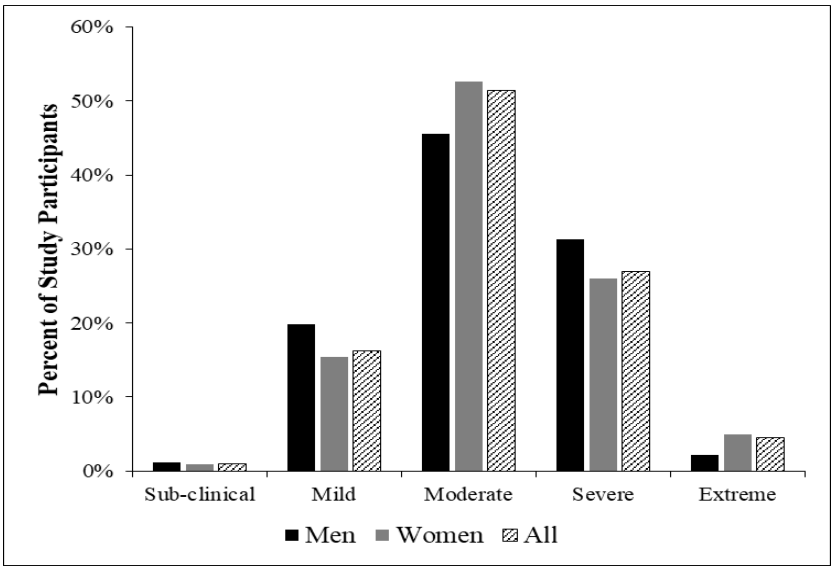

Figure 2. *Percentage distribution in males (n = 182) and females (n = 845) from n =1,027 respondents scoring on A-MISO-S*

Table 2 shows sounds that trigger misophonia and the A-Miso-S scores for participants who experienced emotional distress by particular sounds. Participants indicated they had experienced significant emotional distress in reaction to sounds, including anxiety, disgust, and anger. The most common trigger sounds were mouth sounds (*n* = 1,024, 96.5%) and breathing sounds (*n* = 884, 83.3%). Common responses in the *Other Sounds* category included animal sounds (*n* = 45, 4.2%), bass or sound through walls (*n* = 40, 3.8%), whispering/accents/voice characteristics (*n* = 36, 3.4%), and whistling (*n* = 35, 3.3%). There were many unique responses in this category, such as pencils on paper, card shuffling, bells, items rolling in a car, hiccupping, fire crackling, fast talking at the end of a car commercial, accordion music, and bagpipes. The correlations between emotional distress from sounds (yes/no) and misophonia severity (as assessed by A-Miso-S) were positive and statistically significant (See Table 2). The correlation for mouth sounds was not significant because almost all participants, regardless of their severity level, reported that mouth sounds trigger misophonia.

Table 2.

Percentage Distribution, Means, SD and Correlation (Degree of Freedom) on Common Trigger Sounds with Misophonia Severity in N = 1,061

Trigger sound	Percent (*N* = 1,061)	A-Miso-S score *M* (*SD*)	*r* with A-Miso-S score
Mouth sounds, such as chewing, crunching food, lip smacking, slurping, tongue clicking, or throat clearing	96.5%	12.95 (3.60)	$r(1,025) = .04$, $p = .18$
Breathing sounds, such as gasping, wheezing, sniffing, or other loud, mouth sounds	83.3%	13.18 (3.51)	$r(1,025) = .16$, $p < .001$
Mechanical sounds made by hand, such as keyboard clicking, pen clicking, pencil tapping, crinkling paper, or nail clipping	67.3%	13.41 (3.52)	$r(1,025) = .19$, $p < .001$
Foot sounds, such as tapping, stomping, shuffling, or squeaking shoes	59.5%	13.65 (3.59)	$r(1,025) = .24$, $p < .001$
Hand sounds, such as finger snapping, tapping, or rubbing	58.7%	13.55 (3.53)	$r(1,025) = .21$, $p < .001$
Speech sounds, such as consonant sounds (s, k, p, etc.) or mispronunciation of words	46.0%	13.68 (3.46)	$r(1,025) = .19$, $p < .001$
Mechanical sounds without people involved, such as clock ticking, copy machine noise, or phone ringing	38.3%	13.61 (3.69)	$r(1,025) = .15$, $p < .001$
Joint sounds, such as knuckle cracking	36.9%	13.50 (3.67)	$r(1,025) = .12$, $p < .001$
Other sounds	27.6%	13.15 (3.95)	$r(1,025) = .04$, $p = .22$

Table 3 shows physical reactions to misophonia triggers and the A-Miso-S scores for participants who reported particular reactions. Most participants reported one or more physical reaction(s) to trigger sounds (*n* = 1,038, 97.8%). The most common reactions were facial or body responses, indicating that the person is upset or annoyed (*n* = 912, 86.0%) or has muscle tension (*n* = 879, 82.9%). The participants were also asked to specify other physical reactions not listed in the survey question. This "other" category included 94 responses that are either considered coping behaviors (e.g. put on headphones), emotions (e.g. anger) or not a physical reaction (e.g. not able to concentrate). These responses were excluded from the data reported in Table 3. The remaining 193 "other" responses (18.2%) are shown below. The correlations between physical reactions (yes/no) and misophonia severity (as assessed by A-Miso-S) were all positive and statistically significant (See Table 3), indicating that participants with greater severity were more likely to physically react to trigger sounds.

Table 3.

Percentage Distribution, Means, SD and Correlation (Degree of Freedom) on Physical Reactions to Triggers

Physical reaction	Percent (*N* = 1,061)	A-Miso-S score *M* (*SD*)	*r* with A-Miso-S score
Facial or body responses that may indicate you are upset or annoyed	86.0%	13.12 (3.55)	$r(1,025) = .13$, $p < .001$
Muscle tension	82.8%	13.21 (3.59)	$r(1,025) = .17$, $p < .001$
Gritting teeth or clenching jaw	63.9%	13.30 (3.60)	$r(1,025) = .14$, $p < .001$
Uncomfortable sensations in chest or abdomen	47.8%	13.75 (3.47)	$r(1,025) = .21$, $p < .001$
Jerking, flinching, or twitching	43.9%	13.73 (3.56)	$r(1,025) = .19$, $p < .001$
Other	18.2%	13.97 (3.73)	$r(1,025) = .17$, $p < .001$
Sweating, increased heart rate, feeling hot	6.2%		
Miscellaneous	3.1%		
Fight-or-flight emotions or actions	2.8%		

For the items listed in Table 4, the participants rated the level of physical discomfort when they hear trigger sounds on an 11-point Likert scale ranging from, "no physical sensation," to, "overpowering physical sensation that causes pain." Most participants (*n* = 1,020, 97.1%) described some physical sensations when exposed to trigger sounds. The correlation between physical discomfort and misophonia severity (as assessed by A-Miso-S) was positive $r(1,015) = .51$, $p < .001$, indicating that participants with greater severity felt greater discomfort in response to trigger sounds.

Table 4.

Percentage Distribution on Physical Discomfort upon Hearing Trigger Sounds, n = 1,051

Physical Discomfort	Percent (*n* = 1,051)
I feel no physical sensation	2.9%
I feel minimal physical sensation and can ignore it	3.1%
I feel some physical sensation and can often/always ignore it	6.7%
I feel some physical sensation but have difficulty or cannot ignore it	11.5%
I feel elevated physical sensation and usually cannot ignore it	13.0%
I feel elevated physical sensation and definitely cannot ignore it	20.5%
I feel elevated physical sensation and cannot ignore it. Each incidence has an impact on my life	12.2%
I feel a physical sensation and cannot cope with it	4.6%
I feel a physical sensation, which is best described as emotional pain	17.1%
I feel a physical sensation, which is best described as physical pain	4.9%
I feel a physical sensation, which is overpowering and causing physical pain	3.5%

Table 5 shows treatments sought for misophonia. This includes treatments specifically for misophonia and treatments for other disorders which include possible treatment of misophonia symptoms. Only 24.7% (*n* = 260) reported seeking any treatment specifically for misophonia. Most participants reported little or no benefit from treatments and minimal effects on quality of life (Figure 3).

Table 5.

Percentage Distribution on Treatments Sought for Misophonia, n = 1,053

Treatment	Percents (*n* = 1,053)
No treatment for misophonia	74.9%
Counseling or “talk therapy”	13.7%
Cognitive behavioral therapy (CBT, DBT)	8.2%
Treatment by an audiologist (white noise generators)	5.4%
Herbal/holistic/naturopathic/nutritional	4.4%
Hypnosis or hypnotherapy	2.9%
Exposure therapy (repeated presentation of the sound to habituate responses)	2.0%
Listening therapy (listening to specially modified music)	1.7%
Counter conditioning (Trigger Tamer with or without assistance)	1.5%
Other (all)	11.7%
Medication for anxiety or depression	2.8%

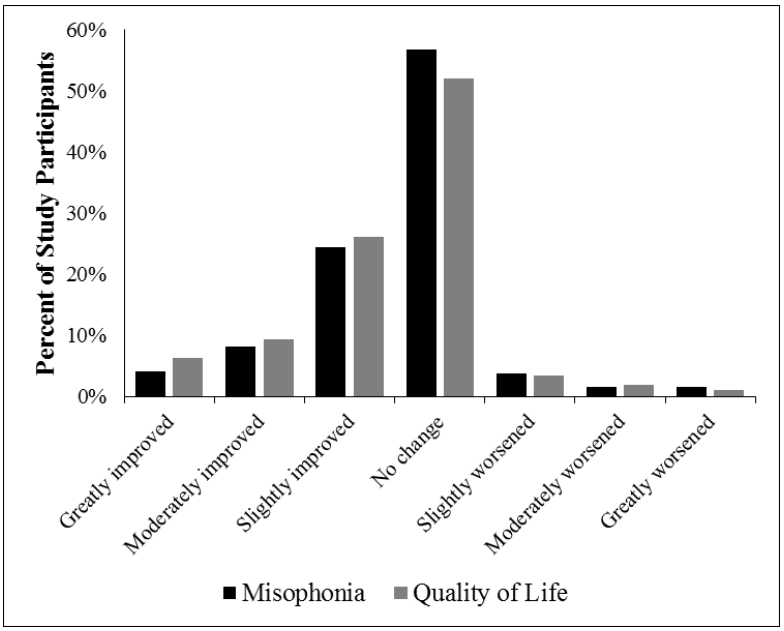

Figure 3. *The Effect of Treatment for Misophonia on Severity and Quality of Life, n = 271.*

Ordered logistic regression analysis was conducted to identify the treatments that have significant effects on misophonia symptoms, ranging from “greatly improved” to “greatly worsened” (See Table 6). The “medication for anxiety or depression” response under the “other” category was included as a distinct treatment into the regression model. The results from ordered logistic regression analysis (Likelihood-ratio χ^2 (11) = 38.86, p < .001; McFadden's pseudo R^2 = 0.06) suggested that counseling/talk therapy was significantly associated with worsening of misophonia symptoms (b = 0.93; p < .001), while medication for anxiety or depression was significantly related to improved misophonia symptoms (b = –1.38; p <.001).

Table 6.

Ordered Logistic Regression Results for the Effect of Treatments on Misophonia, n = 271

Predictor	*b*	*SE*	*p*	Odds ratio
Counseling or "talk therapy"	0.93	0.26	< .001	2.53
Cognitive behavioral therapy	–0.07	0.28	.79	0.93
Treatment by an audiologist	0.09	0.30	.75	1.10
Herbal/holistic/naturopathic/nutritional	–0.61	0.34	.07	0.54
Hypnosis or hypnotherapy	0.19	0.41	.65	1.20
Exposure therapy	0.27	0.48	.57	1.31
Biofeedback or neurofeedback	0.90	0.50	.07	2.47
Listening therapy	–0.56	0.52	.28	0.57
Chiropractic	–0.13	0.50	.79	0.88
Counter conditioning	–0.82	0.50	.10	0.44
Medication for anxiety or depression	–1.38	0.37	< .001	0.25

Table 7 shows comorbid conditions. The participants reported whether they had been diagnosed with other psychiatric disorders or believed that they had other psychiatric disorders. The most commonly reported conditions were mood disorders including depression (*n* = 514, 48.4%) and anxiety disorders (*n* = 463, 43.6%). Only 23.8% (*n* = 252) reported no comorbid psychiatric disorder.

Table 7.

Percentage Distribution on Psychiatric comorbidity, N = 1,061

Comorbid disorder	Percents (*N* = 1,061)
Tinnitus (ringing in the ears)	18.5%
Mood disorder (including depression, clinical depression, dysthymic disorder, major depression, or bipolar disorder)	48.4%
Obsessive-compulsive disorder	20.8%
Hoarding disorder	3.1%
Excoriation (compulsive skin picking)	11.0%
Body dysmorphic disorder (obsessive preoccupation with a defect in appearance)	6.1%
Tourette's disorder	1.2%
Trichotillomania (compulsive hair pulling)	4.2%
Autism spectrum disorder (including Asperger's, autistic disorder, pervasive developmental disorder)	3.6%
Anxiety disorder (including panic disorder, specific phobia, social phobia, or other anxiety disorder)	43.6%
Posttraumatic stress disorder	12.6%
Attention deficit hyperactivity disorder (ADHD)	13.1%
None	23.4%
Other (excluding misophonia)	8.7%

The overall (mean) quality of life scores are reported as percentages of (ratios to) the possible maximum score (i.e., 70%), excluding the "medication leave" and "overall life satisfaction past week" items. The overall reported quality of life had a mean of 71.2% (*SD* = 12.71, range = 30.8% to 100%). Most participants rated quality of life as either "fair" or "good." Community norms for this scale average 83%, while clinical groups have reduced quality of life (Rapaport et al., 2005; See Table 8). The correlation between misophonia severity (as assessed by A-Miso-S) and quality of life (as assessed by Q-LES-Q-SF) showed a modest but clinically significant negative relationship $r(1,023) = -.37$, $p < .001$.

Table 8.

Comparison of Overall Quality of Life to Community Norm and Other Disorders

Group	*n*	*M*	*SD*	Difference (*d***) vs. (2)	Difference (*d***) vs. (3)
(1) Community norm*	67	4.13 (82.6%)	0.81	0.77	1.22
(2) Mild to moderate misophonia (A-Miso-S score 5–14)	693	3.68 (73.6%)	0.56	-	0.68
(3) Severe to extreme misophonia (A-Miso-S score 15–24)	322	3.27 (65.4%)	0.68	–0.68	-
(4) Major depressive disorder*	366	2.88 (57.6%)	0.96	–1.11	–0.46
(5) Posttraumatic stress disorder*	139	2.81 (56.2%)	0.96	–1.35	–0.59

*Data are from Rapaport et al. (2005). For these three groups, the reported means and standard deviations were calculated as averages of means and standard deviations of individual 14 domains.
**Cohen's *d* (in absolute value): 0.20 = small, 0.50 = medium, 0.80 = large.

Discussion

Misophonia is a newly recognized and little studied condition, but research on it has increased recently. This study confirms and extends findings from smaller studies that indicated misophonia is associated with substantial comorbidity and reduced quality of life (Rouw & Erfanian, 2017; Schröder et al., 2013; Wu et al., 2014). Over 97% of the current cohort reported a physical reaction to trigger sounds, indicating that a physical response is a central feature of misophonia. Additionally, these data suggest individuals who struggle with this condition may be unidentified or offered ineffective treatment.

The study sample was recruited from social media sites focused on misophonia. This indicates that the respondents were already aware of the condition, and sufficiently interested in it to be

actively seeking information or otherwise communicating about it. This self-selected group may have more severe complaints than individuals who have some misophonia symptoms but have not self-identified or sought help for the problem. The sample was predominately female (82%) and people under 40, similar in sex and age to the cohort described by Rouw & Erfanian (2017). The age and sex may be influenced by sampling from social media sites, and surveying the membership of the Facebook Misophonia Support Group and the Misophonia Treatment and Management group revealed a similar ratio of women to men. However, the gap in female vs. male usage of social media is less than 10% (Anderson, 2015), so the predominance of women in this study is far greater than can be attributed to sex differences in social media use.

In this study, 80% reported symptom onset by age 15, and a majority with onset by age 11, consistent with age of onset reported elsewhere (Dozier, 2015d; Edelstein et al., 2013; Rouw & Erfanian, 2017; Schröder et al., 2013). However, 10% reported onset of misophonia at age 21 or older, with a maximum of 50 years in this sample. Figure 1 illustrates that onset of misophonia occurs in adulthood at lower rates, with a slowly declining rate of onset after age 24. This is consistent with the findings of Rouw & Erfanian (2017), who reported adult onset in 9% of participants. Onset of misophonia in adulthood has also been reported by other researchers (Dozier 2015b; Schröder et al., 2013), and these occurrences may indicate that misophonia is not a developmental disorder. Indeed, several researchers have proposed that misophonia develops through classical conditioning which could occur at any age (Dozier, 2015b, 2015c, 2015d; Dozier & Morrison, 2017; Jastreboff & Jastreboff, 2014; Schröder et al., 2013). Misophonia can be viewed as a conditioned emotional response (CER) to the trigger stimuli (Dozier et al., 2017; Jastreboff & Jastreboff, 2014; Schröder et al., 2013), or as a conditioned physical (muscle) response to the trigger stimuli and a CER to the combined sensation of the physical response and the trigger stimulus (Dozier, 2015b, 2015c, 2015d; Dozier & Morrison, 2017).

This model proposes that a conditioned physical response elicited by the trigger stimulus is a critical feature of misophonia. Several case studies have shown a relationship between the muscle response to the trigger and muscles that were tensed when the trigger was heard initially, which could be evidence of conditioning of a physical response to the trigger (Dozier, 2015b). The reports of physical responses to triggers by participants in this study support the premise that misophonia includes a physical response (i.e. directly elicited muscle contraction) to a trigger stimulus. In the current sample, 87% of participants reported that they feel a

physical sensation when triggered, which ranged from *difficult to ignore* to *painful* (see Table 4) compared to 75% of the Rouw and Erfanian (2017) sample reporting this level of response. Many participants reported a physical response of muscle movement (jerking, flinching, or twitching) or an uncomfortable sensation in their chest or abdomen, which may be evidence of a conditioned physical reflex response (see Table 3). The genital response reported by a small percentage of participants could also be a directly elicited physical reflex (Dozier & Morrison, 2017). If the physical response is typically distressing and sometimes painful, then its connection to a negative emotional response in the form of a CER is a plausible mechanism for the condition. These data are consistent with the premise that misophonia is a condition where there is both an elicited physical response and an emotional response to a trigger stimulus. The existence of an immediate physical response to trigger stimuli could have important implications about the inherent nature of misophonia. Other responses, such as muscle tension, sweating, and increased heart rate reported by participants may be part of a general physiological distress response to extreme emotions (Dozier, 2015b, 2015c; Dozier et al., 2017; Edelstein et al., 2013; Schröder et al., 2013; Kumar et al., 2017).

The participants in this study had substantially lower levels of quality of life compared to the community norm (Rapaport et al., 2005; Wyrwich et al., 2011; see Table 8). Comorbid anxiety and mood disorders are associated with reduced quality of life score (Barnes et al., 2012; Wyrwich et al., 2011). The reduced quality of life in the current cohort may be attributed to misophonia, anxiety/depression, or both. In this sample, 81.4% had quality of life scores below the mean of the community norm, and 56.3% were 10% or more below the norm mean. Quality of life scores more than 10% below the mean are consistent with at least some mild problems or difficulty in several areas of functioning (Schechter et al., 2007). The reduced quality of life among the participants with misophonia and the negative correlation between misophonia severity and quality of life demonstrate the impact of this condition. Although misophonia is associated with a lower quality of life than reported for a community normative sample, the reduction in quality of life is less pronounced than that found in samples of individuals with major depressive disorder or PTSD reported by Rapaport, et al. (2005) and included in Table 8. The A-MISO-S data describe a distribution of levels of severity, with most participants indicating moderate to severe misophonia. The reported combination of moderate to severe misophonia and corresponding impact on quality of life make this a potentially important condition. The A-Miso-S severity correlates with reports of physical responses, which appears to be an important feature of misophonia. These relationships also support the value of the A-

MISO-S as a severity measure and as having predictive validity. Physical discomfort is possibly related to a conditioned physical reflex included in one model of the disorder (Dozier, 2015b). Severity was greater with the presence of trigger sounds other than mouth sounds. Mouth sounds was not significantly related to severity due to the high occurrence (96.5%) of this trigger. This suggests that the more types of triggers a person has, the broader the effect and greater the misophonia severity. This may also correspond to a history of generalization or exposure to new conditioning of triggers.

Some sources have suggested misophonia is an OCD-related condition, or on a putative OCD spectrum (Ferreira et al., 2013; Neal & Cavanna, 2013). Wu et al. (2014) reported a medium effect size for the relationships between misophonia symptoms and OCD, and a small effect size for depression. Because the current findings on comorbid diagnoses are based on self-report, and the survey question on comorbidity asked if participants believed they had a diagnosable disorder, the accuracy of the comorbidity data may be questioned. The occurrence of comorbidity may also be exaggerated because the questions asked for any lifetime diagnoses rather than current diagnoses. Jastreboff & Jastreboff (2014) noted that many individuals with misophonia exhibit psychological problems, and that psychological disorders such as OCD may affect the negative reactions to sounds as well as susceptibility to developing misophonia. However, Jasterboff & Jasterboff (2014) also reported that in their cumulative experience with hundreds of misophonia patients, only a few had psychiatric problems. Multiple sources have argued that misophonia overlaps in some features with three anxiety disorders (social phobia, OCD, and PTSD) as well as with personality disorders (Ferreira et al., 2013; Schröder et al., 2013; Webber et al., 2014). Rouw & Erfanian (2017) reported the most common comorbid disorders in their sample are anxiety and depressive disorders (13%) and tinnitus, PTSD and ADD/ADHD (12%). Their list of diagnoses included OCPD (8%) but not OCD. The current sample reported similar rates of tinnitus (18.5), ADHD (13.1%) and PTSD (12.6%). Schröder et al. (2013) reported 7.1% of their sample had mood disorders compared to 48.4% in the current sample, and only 2.4% had OCD, compared to 20.8% in this sample. Schröder et al. (2013) reported 2.4% with panic disorder and no other anxiety disorders, while this survey found 43.6% with identified anxiety disorders including panic. Lastly, Schröder et al. (2013) reported over half of their sample met criteria for OCPD. In this study, OCPD was not included in the list of possible comorbid disorders, and although the survey allowed for reporting of other diagnoses, none of the participants reported a diagnosis of OCPD. The large differences in comorbidity may be influenced by a number of factors. This

study asked about disorders respondents believed they had, and did not distinguish between current and lifetime incidence. Rouw & Erfanian (2017) asked if respondents had been diagnosed with any other psychiatric conditions and had a check list and other category of responses. Schröder et al. (2013) assessed subjects with a psychiatric interview, structured interviews and scales to assess anxiety and depression, and a symptom checklist to identify current diagnoses, and concluded that there were critical differences between each disorder and misophonia. The current data lend further support to the identification of misophonia as a distinct condition. The relationship between misophonia and other disorders needs to be studied further.

Notably, the results in the current study showed that most participants had not received treatment for their misophonia (see Table 5). Of those who did, the results were generally disappointing, with 57% reporting no improvement and 7% reporting worsening. The most frequently reported treatment was counseling or talk therapy, which was associated with a worsening of symptoms (see Table 6). Some comments suggested that therapists typically had no concrete suggestions, ignored the concern, or attributed it to another problem. Because there is not an official recognition of misophonia in the DSM-5 or ICD-10 at this time, therapists may think it needs to be conceptualized as a symptom of another disorder. Cavanna (2014) argued there is a dangerous trend to mix symptoms, syndromes, disorders, and illnesses as if they had the same diagnostic importance. Since irritability is a central feature of misophonia, it may be that therapists conceptualize it as a feature of a mood or anxiety disorder, which were the two most commonly reported comorbid diagnostic categories and are often associated with irritability. Unfortunately, this practice may lead to providing treatment that is directed at another disorder rather than addressing the primary complaint. People in this study who reported treatment with medications for anxiety or depression also reported some improvement of misophonia symptoms. One plausible explanation is that treatment for anxiety or depression improved the overall well-being of these individuals, and thereby lessened misophonic severity. Of respondents who sought treatment, some (~33%) reported a positive effect on both misophonia and quality of life, though most reported only a slight improvement (see Figure 3). Only 12% reported moderate or better improvement in misophonia symptoms. In contrast, Schröder et al. (2017) reported an open trial of CBT for misophonia. Using a protocol designed for misophonia they found 48% of the patients showed a clinically significant reduction in misophonia symptoms. That finding, and the 12% in this study who reported that treatment resulted in moderate or better improvement, are evidence of the potential of therapy to address

misophonia. This underscores the need for further research on misophonia and treatment methods to understand how it can be treated effectively, and provides some evidence that misophonia does not have to be a life-long debilitating condition.

Additional research on misophonia is warranted due to the negative impact of this condition on individuals, the apparent prevalence, and the limited body of knowledge. Research should be conducted in three areas. Firstly, there is a need for research that will increase understanding of the fundamental nature of the misophonic response and the underlying mechanism of misophonia. Specifically, does misophonia include an immediate physical reflex response to the trigger stimulus, and what is the relationship between the trigger, physical reflex, and emotional response? Secondly, the current study indicates that a relatively small percentage of individuals with misophonia have experienced a large reduction in misophonia severity with treatment. A better understanding of treatments for misophonia and factors that contribute to a positive treatment effect are needed. Several cases studies and one open trial have reported successful treatment of misophonia, but controlled treatment trials are needed along with research into factors that influence response to treatment. Finally, there is a need for fundamental research in classical conditioning mechanisms that could allow a misophonic response to be initiated and maintained, including investigation of conditioning with stimulus-response pairing as proposed by Donahoe & Vegas (2004).

Limitations

Participants in this study were recruited from internet groups about misophonia, and therefore were likely to be individuals who currently suffer from this condition. Over 80% of the participants were women, which may reflect influence of sampling from social media and specifically Facebook misophonia groups. There are no well-validated questionnaires to assess misophonia phenomenology and severity. Limited conclusions can be drawn about the effective interventions. Individuals whose symptoms have subsided may be less likely to continue participating in social media groups. This creates a form of self-selection bias where participants who have experienced effective treatments may not have been sampled. Because multiple treatments were reported with only a single outcome response, information about the effect of individual treatments is limited to conclusions derived from regression analysis. Comorbidity data reflect self-report of lifetime diagnoses and may not indicate present comorbidity. Self-report survey responses may be less reliable than data derived from structured clinical interviews.

Conclusion

Misophonia is a newly recognized and understudied condition. Misophonia typically develops early in life but may develop in adulthood. Typical presentations include emotional distress and noticeable physical reactions to triggers. Severity is correlated with the severity of physical reactions and increased severity is associated with a greater range of triggering sounds. Mouth sounds are extremely common, but not universal, with 3.5% of participants not reporting mouth sound triggers. Emotional reactions seen in misophonia are typically dysphoric. Reactions to the sounds are associated with behaviors that are likely to have an adverse impact on interpersonal relationships and task performance. Misophonia is associated with substantial comorbidity and reduced quality of life. Misophonia has been conceptualized as related to or a variation of other disorders such as OCD, however comorbidity data suggest it is a separate condition. Assessment of misophonia is not yet standardized but the A-MISO-S and checklists of trigger sounds and reactions appear to be of value and merit further study. Little is known about treatment and most people who struggle with this condition may be unidentified or offered ineffective treatment. Given that the condition may be common and may have important impact on quality of life and daily function, further research should be encouraged.

Funding/Financial Support
The authors have no funding to report

Other Support/Acknowledgement
The authors wish to acknowledge Kathryn Claiborn for her editorial assistance. The authors have no support to report.

Competing Interests
The authors have declared that no competing interests exist.

References

Anderson, M. (2015). *Men catch up with women on overall social media use.* Retrieved from http://www.pewresearch.org/fact-tank/2015/08/28/men-catch-up-with-women-on-overall-social-media-use

Barnes, A. L., Murphy, M. E., Fowler, C. A., & Rempfer, M. V. (2012). Health-related quality of life and overall life satisfaction in people with serious mental illness. *Schizophrenia research and treatment*, 2012. Retrieved from http://www.hindawi.com/journals/schizort/2012/245103/ https://doi.org/10.1155/2012/245103

Bauman, N. (2015). Misophonia Physical Sensation Scale (MPRS). Retrieved from https://misophoniatreatment.com/misophonia-physical-sensation-scale/

Bernstein, R. M., Angell, K. L., & Dehle, C. M. (2013). A brief course of cognitive behavioural for the treatment of misophonia: a case example. *The Cognitive Behaviour Therapist,* 6, 1-13. https://doi.org/10.1017/S1754470X13000172

Cavanna, A. E., (2014). What is misophonia and how can we treat it? *Expert Review of Neurotherapeutics,* 14, 357-359. https://doi.org/10.1586/14737175.2014.892418

Cavanna, A. E., & Seri, (2015). Misophonia: Current perspectives. *Neuropsychiatric Disease and Treatment,* 11*,* 2117-2123. https://dx.doi.org/10.2147%2FNDT.S81438

Cima, R. F. F., Andersson, G., Schmidt, C. J., & Henry, J. A. (2014). Cognitive-Behavioral treatment for tinnitus: A review of the literature. *Journal of the American Academy of Audiology,* 25, 29-61. https://doi.org/10.3766/jaaa.25.1.4

Crossley, E. & Cavanna A. E., (2013). Sensory phenomena: Clinical correlates and impact on quality of life in adult patients with Tourette syndrome. *Psychiatry Research,* 209, 705-710. https://doi.org/10.1016/j.psychres.2013.04.019

Donahoe, J. W., & Vegas, R. (2004). Pavlovian conditioning: The CS-UR relation. *Journal of Experimental Psychology: Animal Behavior Processes, 30*(1), 17-33. https://psycnet.apa.org/doi/10.1037/0097-7403.30.1.17

Dozier, T. H. (2015a). Counter Conditioning treatment for misophonia. *Clinical Case Studies,* 14, *1-14.* https://doi.org/10.1177%2F1534650114566924

Dozier, T. H. (2015b). Etiology, composition, development and maintenance of misophonia: A conditioned aversive reflex disorder. *Psychological Thought,* 8, 1-*16*. doi: 10.5964/psyct.v8i1.132

Dozier, T. H. (2015c). Treating the initial physical reflex of misophonia with the neural repatterning technique: A counterconditioning procedure. *Psychological Thought, 8*(2), 189–210. doi:10.5964/psyct.v8i2.138

Dozier, T. H. (2015d). *Understanding and Overcoming Misophonia, A Conditioned Aversive Reflex Disorder*. Misophonia Treatment Institute.

Dozier, T.H., Grampp, L., & Lopez, M. (2020). Misophonia: Evidence for an elicited initial physical response. *Universal Journal of Psychology*. doi: 10.13189/ujp.2020.080202

Dozier, T. H., Lopez, M., & Pearson, C. (2017). Proposed diagnostic criteria for misophonia: A multisensory conditioned aversive reflex disorder. *Frontiers in psychology, 8*, 1975. https://doi.org/10.3389/fpsyg.2017.01975

Dozier, T. H., & Morrison, K. L. (2017). Phenomenology of misophonia: Initial physical and emotional responses. *American Journal of Psychology, 130*(4):431-438. https://psycnet.apa.org/doi/10.5406/amerjpsyc.130.4.0431

Edelstein, M., Brang, D., Rouw, R., & Ramachandran, V.S. (2013). Misophonia: Physiological investigations and case descriptions. *Frontiers in Human Neuroscience, 7*(296), 1-11. https://doi.org/10.3389/fnhum.2013.00296

Endicott, J., Nee, J., Harrison, W., & Blumenthal, R (1993). Quality of life enjoyment and satisfaction questionnaire: A new measure. *Psychopharmacology Bulletin*, 29, 321-326.

Ferreira, G. M., Harrison, B. J., & Fontenelle, L. F. (2013). Hatred of sounds: misophonic disorder or just an underreported psychiatric symptom. *Annals of Clinical Psychiatry*, *25*(4), 271-274.

Fitzmaurice. G. (2010). The Misophonia Activation Scale (MAS-1). Retrieved from http://www.misophonia-uk.org/the-misophonia-activation-scale.html

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., ... & Charney, D. S. (1989). The Yale-Brown obsessive-compulsive scale: I. Development, use, and reliability. *Archives of general psychiatry*, *46*(11), 1006-1011. https://doi.org/10.1001/archpsyc.1989.01810110048007

Jasterboff, M. M., & Jasterboff, P. J. (2002). Decreased sound tolerance and tinnitus retraining therapy (TRT). *The Australian and New Zealand Journal of Audiology*, 24, 74-84.

Jastreboff, M.M., & Jastreboff, P.J. (2014). Treatments for decreased sound tolerance (hyperacusis and misophonia). *Seminars in Hearing 35*(2), 105-120. http://dx.doi.org/10.1055/s-0034-1372527

Johnson, P. L., Webber, T. AJ., 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, 1-7.

Kumar S., Tansley-Hancock O., Sedley W., Winston J. S., Callaghan M. F., Allen M., et al. (2017). The brain basis for misophonia. *Current Biology,27*(4), 527-533. https://doi.org/10.1016/j.cub.2016.12.048

Martinez-Devesa, P., Perera, R, Theoudoulou, M, & Waddell, A. (2010). Cognitive behavioural therapy for tinnitus. *Cochrane Database of Systematic reviews*. https://doi.org/10.1002/14651858.cd005233.pub3

McGuire, J. F., Wu, M. A., & Storch, E. A. (2015). Cognitive-Behavioral therapy for 2 youths with misophonia. *Journal of Clinical Psychiatry,* 76, 573-574. https://doi.org/10.4088/jcp.14cr09343

Neal, M., & Cavanna, A. E. (2013). Selective sound sensitivity syndrome (misophonia) in a patient with Tourette's syndrome. *The Journal of Neuropsychiatry and Clinical Neurosciences,* 25, E01-E01. https://doi.org/10.1176/appi.neuropsych.11100235

Pallanti, S., DeCaria, C. M., Grant, J.E., Urpe, M., & Hollander, E. (2005). Reliability and validity of the pathological gambling adaptation of the Yale-Brown Obsessive-Compulsive Scale (PG-YBOCS). *Journal of Gambling Studies*, 21(4), 431–43. https://doi.org/10.1007/s10899-005-5557-3

Philips, K. A., Hollander, E., Rasmussen, S. A., & Aronowitz, B. R. (1997). A severity rating scale for body dysmorphic disorder: Development, reliability, and validity of a modified version of the Yale-Brown Obsessive-Compulsive Scale. *Psychopharmacology Bulletin*, 33 (1), 17–22.

Rapaport, M. H., Clary, C., Fayyad, R., & Endicott, J. (2005). Quality-of-life impairment in depressive and anxiety disorders. *American Journal of Psychiatry*, *162*(6), 1171-1178. https://doi.org/10.1176/appi.ajp.162.6.1171

Rouw, R., & Erfanian, M., (2017). A large-scale study of misophonia. *Journal of Clinical Psychology,* 5, https://doi.org/10.1002/jclp.22500

Schechter, D., Endicott, J., & Nee, J. (2007). Quality of life of 'normal'controls: association with lifetime history of mental illness. *Psychiatry research*, *152*(1), 45-54. https://dx.doi.org/10.1016%2Fj.psychres.2006.09.008

Schröder, A., Vulink, N., & Denys, S. (2013). Misophonia: Diagnostic criteria for a new psychiatric disorder. *PLoS ONE, 8*, e54706. https://doi.org/10.1371/journal.pone.0054706

Schröder, A., Vulink, N., van Loon, A., & Denys, D. (2017). Cognitive behavioral therapy is effective in misophonia: An open trial. *Journal of Affective Disorders, 217, 289-294*. https://doi.org/10.1016/j.jad.2017.04.017

Schwartz, P., Lyendecker, J., & Conlon, M. (2011). Hyperacusis and misophonia: The lesser known siblings of tinnitus. *Minnesota Medicine,94(11), 42-3.* Retrieved from http://www.minnesotamedicine.com/Past-Issues/Past-Issues-2011/November-2011/Hyperacusis-and-Misophonia

Taylor, S., Conelea, C. A., McKay, D., Crowe, K. B., & Abramowitz, J. S. (2014). Sensory intolerance: latent structure and psychopathologic correlates. *Comprehensive psychiatry*, 55(5), 1279-1284. https://dx.doi.org/10.1016%2Fj.comppsych.2014.03.007

Webber, T. A., Johnson, P. L., & Storch, E. A. (2014). Pediatric misophonia with comorbid obsessive–compulsive spectrum disorders. *General hospital psychiatry*, *36*(2), 231-e1. https://doi.org/10.1016/j.genhosppsych.2013.10.018

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, 994-1007. https://doi.org/10.1002/jclp.22098

Wyrwich, K. W., Harnam, N., Revicki, D. A., Locklear, J. C., Svedsater, H., & Endicott, J. (2011). Assessment of quality of life enjoyment and satisfaction questionnaire-short form responder thresholds in generalized anxiety disorder and bipolar disorder studies. *International clinical psychopharmacology*, *26*(3), 121-129. https://doi.org/10.1097/yic.0b013e3283427cd7

About the authors

James Claiborn Ph.D., is a psychologist in clinical practice in South Portland, Maine. He specializes in treating Obsessive-Compulsive Disorder and related disorders using Cognitive Behavioral Therapy (CBT).He has extensive training in CBT and he also provides training and supervision in CBT. He is a Founding Fellow of the Academy of Cognitive Therapy, a Diplomate of the American Board of Professional Psychology, and a member of the Scientific and Clinical Advisory Board of The Obsessive-Compulsive Foundation. He also holds a graduate certificate in Applied Behavior Analysis.

Thomas Dozier, MS, is a Board Certified Behavior Analyst in private, behavioral consultation practice in Livermore, California. He has researched and provided treatment for misophonia for over 7 years. He is the author of *Understanding and Overcoming Misophonia, A Conditioned Aversive Reflex Disorder* and has several published journal articles on misophonia. He developed the conditioned physical reflex theory of misophonia and has applied this theory to develop effective behavioral treatment for misophonia. He is the founder and president of Misophonia Institute, a non-profit organization for promotion of misophonia awareness, research, and treatment.

Stephanie Hart is an Assistant Professor of Practice in Special Education in the Department of Educational Psychology and Leadership at Texas Tech University. She teaches courses in the Graduate Program in Applied Behavior Analysis and in the Undergraduate Teacher Education program. Her current research projects include developing training programs for Behavior Analysts, for instructors who teach courses in Special Education and classroom and behavior management, and for teachers of students with autism. These projects allow collaboration with the TTUHSC Speech-Language and Hearing Clinic; the Burkhart Center for Autism Education and Research; the Institute for Measurement, Methodology, Analysis, and Policy (IMMAP), the Teaching, Learning, and Professional Development Center (TLPDC), and local school districts. Dr. Hart is a certified teacher in general education and special education and a Board Certified Behavior Analyst—Doctoral level.

Jaehoon Lee is an assistant professor of Educational Psychology and Leadership—Research, Evaluation, Measurement, and Statistics (REMS) program at Texas Tech University. He is also a faculty associate of Texas Tech University Health Science Center and an adjunct assistant professor of Baylor College of Medicine. He has a broad background in methodology, with

specific training and expertise in modern research design and advanced statistical methods. His recent research involves evaluating mixture models and Bayesian SEM models with regard to data environments and prior distributions.

Corresponding Author's Contact Address [TOP]

Thomas H. Dozier,
5801 Arlene Way,
Livermore, CA 94550, USA
Email: tdozier@misophoniainstitute.org