Misophonia and Emotion Regulation Program

Overview and Studies

The Misophonia and Emotion Regulation Program
at Duke University

Research

We are currently writing up the findings from these studies for peer review and publication. We also have a literature review that is currently being considered for publication.

The following is a very small preliminary study of adults recruited from Duke Psychiatry clinics. Still, here is what we are finding so far:

1. Misophonia symptom severity is related to higher symptoms of anxiety, depression, and general psychological distress. It also is higher among individuals with more psychiatric

disorder diagnoses. However, misophonia is not related to any one specific psychiatric disorder. Instead, greater misophonia symptom severity is related to a range of different psychiatric disorders. This may indicate that the symptoms of misophonia occur in various psychiatric disorders and/or that misophonia is a risk factor in personality development and disorders. In addition, these preliminary results suggest that misophonia is not related to any specific psychiatric diagnosis.

2. Misophonia symptom severity appears to be related to more general sensory over-responsivity across senses. That is, misophonia severity is associated with higher auditory sensory over-responsivity. However, it is also related to greater over-responsivity to touch, taste, and visual cues. This suggests misophonia may not be uniquely related to sensitivity to sounds.

3. Misophonia symptom severity is related to certain personality features, including the general tendency to feel intense negative emotions, emotional instability, and difficulties regulating emotions when upset. However, misophonia was unrelated to general neuroticism or the tendency to have intense positive emotions. This pattern of findings suggests that those with misophonia may not be more "neurotic" or feel all emotions intensely, but may instead have difficulties with emotional intensity, instability, and emotion regulation. Notably, this study does not tell us if the symptoms of misophonia are a result of emotional dysregulation or if they are causal, or both. Likely misophonia is an interaction of both.

Emotionally related misophonia symptoms include anger, sadness, a feeling of overload, anxiety, disgust, and other responses to trigger sounds. How people regulate these emotions in response to trigger sounds can help with coping skills. To determine the best treatments for misophonia, both neurological and emotional regulation (and ways in which they interact) should be considered.

Education and Training

- Providing free webinars about misophonia to educate sufferers, family members, and clinicians
- Providing day-long clinical training workshops to providers in NC and elsewhere
- Developing coping skills and support training manual for misophonia

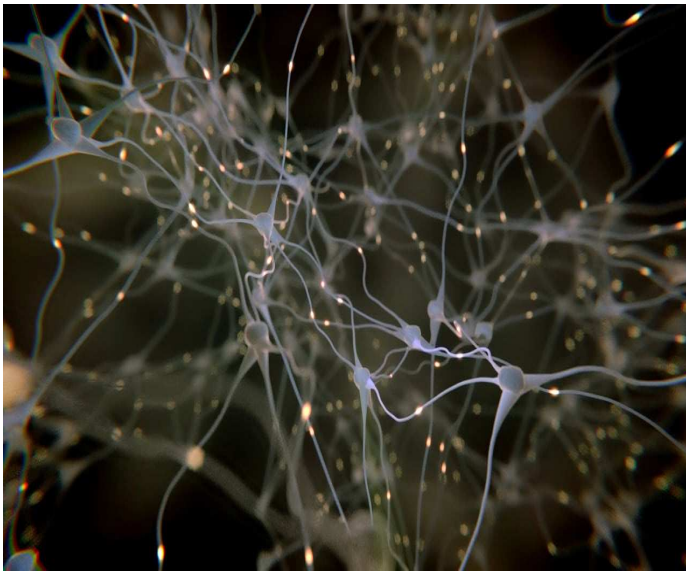
Clinical

- Conducting evaluation and treatment recommendations with patients in Duke Psychiatry
- Developing partnerships with Duke clinics for multi-disciplinary care

Memory Reconsolidation Study

Research of misophonia is in the very early stages. Therefore, misophonia sufferers and their loved ones are without definitive answers to many essential questions about the underlying mechanisms of the disorder, and possible treatment. However, the small amount of research on misophonia provides evidence that misophonic sounds bring about changes in the autonomic nervous system. Like the accelerator pedal in a car, misophonic trigger sounds quickly rev up the engine of our flight/fight system. One reason for this may be that when an individual with misophonia is exposed to certain sounds, their brain misinterprets these sounds as being dangerous, harmful or toxic. As a result, within milliseconds and without conscious thought, the sympathetic nervous system is thrown into high arousal. In other words, in response to trigger sounds, the body is readied for "fight/flight," as hormonal and physiological changes take place. While this neurological and physiological response is meant to protect the body from harm, in misophonia it leads to a cascade of negative emotional, cognitive and behavioral responses. The amygdala is a part of the brain that is involved in mediating the flight/flight response.

Research at the LeDoux Lab at NYU has addressed this reactivity in the amygdala in a rodent sample. In this study, rodents taught to associate a repetitive sound with an unpleasant stimulus. Although all the animals were exposed to the exact same stimuli, their reactions to the repetitive unpleasant sound was very different. Depending on the intensity of the reactions, they were separated into three groups: (1) typical responders, (2) under responsive, and (3) over responsive. The last group of animals demonstrated the strongest autonomic nervous system reaction in association with the repetitive auditory stimuli. By presenting the sound multiple times, researchers attempted to extinguish its unpleasant value . Results showed that the over responsive rodents (those who showed higher responses after the initial presentation of the sound together with the unpleasant stimulus) did not extinguish the physiological response (fight/



flight) induced by the sound, while this responses were lost in the other two groups. This suggests that the animals showing extreme reactions could not "un-learn" the association they had stored in memory. Similar to the over-responsive rodents, misophonic individuals show strong reactivity to auditory stimuli. Since the brain works in a similar way in rodents and in humans, it is possible that misophonics are resistant to extinguish the emotional responses induced by their triggering sounds.

In the LeDoux lab, scientists have also studied a phenomenon often referred to in people as relapse prevention. Relapse is a significant problem in terms of many behavior therapies that attempt to either extinguish a particular response to particular stimuli, and/or make new and more positive associations between stimuli and nervous system responding. Interested in disorders such as anxiety and Post Traumatic Stress Disorder (PTSD), scientists in the LeDoux lab sought ways to re-associate aversive stimuli and high autonomic nervous system arousal in rodent samples, but without relapse. Through a process called memory re-consolidation, scientists at the LeDoux Lab achieved this in rodents, and we propose to translate this into human research, specific to misophonia.

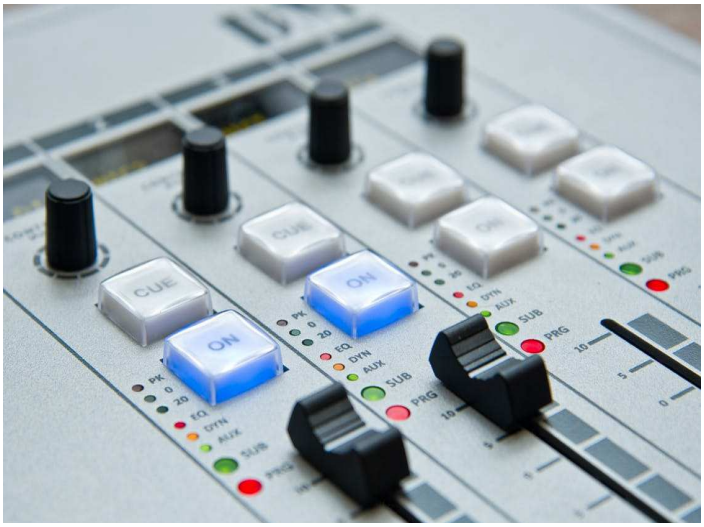
Memory is consolidated when it is moved from our short-term memory into our long-term memory. Once the memory is encoded it is referred to as a memory trace (or engram). [A

memory trace is a way to theoretically describe the physical representation of a memory in the brain] However, contrary to what we may think, recalling memory (or activating a memory trace) is not like watching a recording that replays consistently every time we watch it. Instead, each time we retrieve a memory it alters slightly, as it reconsolidates. In other words, previously consolidated memory are retrieved and then consolidated again. Research on memory reconsolidation has demonstrated that the association between a particular stimuli and high autonomic nervous system arousal can be changed when memory is unstable (at the time of reconsolidation). The result is that while the memory itself is retained, the association between the particular harmful stimulus and the high autonomic arousal is diminished. Using variations of memory reconsolidation–based interventions other researchers have used this for phobias and PTSD. For misophonia sufferers, this approach may result in the development of new associations between trigger sounds and reduced fight/flight activation in the autonomic nervous system. In order to translate this research into those with misophonia, we propose to conduct a clinical trial at Duke University, in consultation with the LeDoux Lab.

Sound Study

Clinicians and researchers familiar with misophonia continue to puzzle over the reasons sufferers typically report being triggered by the same sounds. These sounds are typically pattern-based, or repetitive, and often come from people or animals (but also include non-organic sounds such as motors). Common examples of person-emanated sounds include breathing, sniffling, chewing, throat clearing, and pencil tapping. Why these sounds? Why not other sounds?

In order to understand what it is about these particular sounds that trigger misophonia sufferers, we propose a pilot study, conducted in consultation with Dr. Suhkbinder Kumar of Newcastle University, Dr. Tammy Reigner of Nemours Hospital, and Mercede Efranian of the University of Amsterdam, using software to “deconstruct” these particular sounds



In order to do this, we will use a database of sounds, including typical misophonic sounds, recorded by Efranian. Using advanced software, we will analyze the acoustic properties of these sounds, including frequency/pitch, repetition, and frequency modulation.

The results of the proposed study will aid in determining:

• What acoustically differentiates misophonic sounds from other auditory stimuli

• What is it about these sounds that triggers individuals with misophonia,

• Whether there may be new ways to help people with misophonia based on the acoustic properties of these sounds