Recognizing Misophonia: An Extreme Emotional Response to Common Stimuli

by Thomas Dozier, M.S.
President, Misophonia Institute
Outline

- History
- Presenting symptoms – what we see
- Misophonic trigger stimuli
- Selectivity and intermittent triggers
- Emotions of misophonia
- Initial physical response
- Age of onset, prevalence, comorbidity
- Misophonia vs. other conditions
- Misophonia management
Brief History of Misophonia

- 1997, Audiologist Marsha Johnson (tinnitus treatment clinic)
  - Soft Sound Sensitivity Syndrome or Selective Sound Sensitivity Syndrome (4S)
  - Inability to tolerate specific soft sounds
- 2001/2002, Pawel and Margaret Jastreboff (tinnitus experts)
  - Misophonia
    - Miso – hate or dislike
    - Phonia – sound
- Viewed as an auditory phenomenon – treatment domain of audiologists
- 2011, New York Times Article, “When a Chomp or a Slurp is a Trigger for Outrage”
- 2013,
  - Edelstein et al., Misophonia: Physiological Investigations and Case Descriptions
  - Schroder et al., Misophonia: Diagnostic Criteria for a New Psychiatric Disorder
Presenting Condition

- Unwilling to tolerate specific stimuli (misophonic triggers)
- Hyper-focused on triggers and source of triggers
  - Hear sounds that others cannot hear
- Inability to concentrate when triggered
- Anxiety when entering a setting that may have triggers
- Avoid situations where there may be triggers
- Escape – attempts to terminate triggers or leave situation
  - Endure triggers with distress
- Aggression – verbal demands (physical aggression) to stop triggers
  - Physical aggression is rare with adults
- Behavior when triggered is uncharacteristically harsh
In the News: April 17, 2015 (ABC, CNN, and Fox News)

Woman booted from flight for stabbing seatmate with pen

Lenny Mordarski, 68, attacked by 64-yr-old woman.
Presenting Condition

1. Trigger Stimulus → Overt Behavior
2. Trigger Stimulus → Anger Disgust → Overt Behavior
3. Trigger Stimulus → Anger Disgust → Stress Response (heart rate, sweating, muscle tension, etc.) → Overt Behavior
Auditory Triggers

- 1,000+ solicited from online misophonia groups
  - 96% - Mouth sounds, such as chewing, crunching food, lip smacking, slurping, tongue clicking, or throat clearing
  - 83% - Breathing sounds, such as gasping, wheezing, sniffing, or other loud mouth sounds
  - 67% - Mechanical sounds made by hand, such as keyboard clicking, pen clicking, pencil tapping, crinkling paper, or nail clipping
  - 59% - Foot sounds, such as tapping, stomping, shuffling, or squeaking shoes
  - 59% - Hand sounds, such as finger snapping, tapping, or rubbing
  - 38% - Mechanical sounds without people involved, such as clock ticking, copy machine noise, or phone ringing
  - 37% - Joint sounds, such as knuckle cracking
  - 31% - Speech sounds, such as consonant sounds (s, k, p, etc.) or mispronunciation of words
  - 28% - Other sounds
More on Auditory Triggers

- **Examples**
  - Pencil on paper
  - Flipping page of paper (page in book or single sheet)
  - Sliding of paper on paper
  - Pouring liquid into a glass (gurgle sound or rising pitch as glass fills)
  - Stirring a class of iced tea (tinkling of spoon hitting the glass)
  - Birds chirping
  - Dogs drinking
  - Slight static on radio

- Any sound can be an misophonic trigger
Visual Triggers

• 1,000+ solicited from online misophonia groups
  – 78% - Open mouth chewing
  – 47% - Leg jiggling
  – 41% - Jaw movement (especially gum chewing)
  – 37% - Repetitive hand movement such as twiddling thumbs
  – 23% - Single hand movement such as touching face or pointing
  – 17% - Hair twirling
  – 92% reported visual triggers

• Less common examples
  – Dog licking
  – Rubbing eyes
  – Scrolling the smartphone screen
  – Restroom sign
Other Triggers

• Other
  – Feeling vibration, such as bumping a desk
  – Odors (wintergreen gum, toothpaste, perfume, orange peel)
  – Touch from another person
  – Vibration from bass

• Unusual triggers
  – When people inhale while speaking
  – Incorrect grammar only when close family members
  – Casual singing
  – Foreign voices or strong accents
  – Two televisions being heard simultaneously

• Virtually any repeating sight, sound, or sensation can be a trigger
Triggers Can Be Loud and Irritating Stimuli, but...

- **Crying baby**
  - Can be very loud and irritating
  - Misophonia trigger: soft instance of baby crying will also elicit the miso-response

- **Snoring**
  - Can be very loud and irritating
  - Misophonia trigger: miso-response elicited immediately with loud or soft stimulus

- **Dog barking**
  - Can be very loud and irritating
  - Misophonia trigger: low volume barking elicits miso-response
Context Sensitivity of Triggers

• Triggers are complex stimuli
  – Setting / context
  – Social expectations
  – Auditory/Visual or other stimulus

• Example: MGM lion roar (play video)
  – Sound of brother chewing was a trigger, but sound of others chewing was not
  – Children playing outside vs. other sources of noise

• Triggers at home but not in public
  – Triggers localized to only family members
  – Or, too embarrassing to respond in public
Discrimination and Generality of Triggers

- Subtle stimuli differences
  - “Bill” (name of child) would cause a meltdown, but Billy, or William would have no effect.
  - California mockingbird call is trigger, but not calls of bird from other areas
  - Teen and mom vs. me

- Misophonia usually begins with a single sound, single source, and sometimes a single place

- Usually begins at home

- Misophonia trigger stimuli generalize (or are acquired)
  - Sounds made by other people (usually source and setting)
  - Similar sounds
  - Stimuli accompanying a trigger (visual and auditory)

- Develop triggers to completely unrelated stimuli
Intermittent Responses and Misophonia

• Factors that Decrease Response to Triggers
  – Background noise reduces the perception of triggers
  – Background noise reduces the misophonic response severity
  – Happy, good mood, well rested, low stress, good health
• Factors that Increase Response to Triggers
  – Silence
  – Trapped – cannot move away from trigger
  – Sad, angry, grumpy, tired, stressed, sick, hungry
  – Experience with triggers in a specific place and person
• Triggers to family, but not when friends are there?
  – Probably triggered when friends are there, but no overt response
Emotions of Misophonia

- Anger
- Anxiety
- Desire to escape
- Rage
- Hate the person
- Disgust
- Fear
- Sadness

- Despair or hopelessness
- Guilt
- Resentment
- Offended
- Revenge
- Verbal aggression
- Physical aggression
- Physical harm
Emotions were grouped
  – Anger = aggravation, irritation, annoyance, frustration, anger, or rage

Most emotions were mild
  – Irritation, mild disgust, annoyance

100% reported an emotional response to at least 1 trigger.

### Emotional Responses to Weak Triggers (Dozier & Morrison, 2017)

<table>
<thead>
<tr>
<th>Emotional Response</th>
<th>Number of People (n=26)</th>
<th>% of People</th>
<th>Number Tests (n=76)</th>
<th>% of Trigger Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>24</td>
<td>92.3%</td>
<td>57</td>
<td>75.0%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>24</td>
<td>92.3%</td>
<td>32</td>
<td>42.1%</td>
</tr>
<tr>
<td>Desire for Escape</td>
<td>14</td>
<td>53.8%</td>
<td>23</td>
<td>30.3%</td>
</tr>
<tr>
<td>Disgust</td>
<td>12</td>
<td>46.2%</td>
<td>17</td>
<td>22.4%</td>
</tr>
<tr>
<td>Fear</td>
<td>6</td>
<td>23.1%</td>
<td>9</td>
<td>11.8%</td>
</tr>
<tr>
<td>Sadness</td>
<td>4</td>
<td>15.4%</td>
<td>5</td>
<td>6.6%</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>34.6%</td>
<td>9</td>
<td>11.8%</td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>30.8%</td>
<td>15</td>
<td>19.7%</td>
</tr>
</tbody>
</table>
Validating the Distress Response

- Edelstein, Brang, Rouw, Ramachandran (2013)
- Skin Conductance Response (SCR) to a variety of stimuli (misophonic, neutral, positive)
  - 6 participants, 5 controls
Misophonic Emotions – Kumar

- Sukhbinder Kumar (2015) conference presentation
  - fMRI study

- vmPFC (ventromedial prefrontal cortex)
  - Known to be involved in regulation of emotions
  - Acts as gas pedal or breaks for emotions

- vmPFC – associative learning emotions
  - neutral stimulus → positive, neutral stimulus → negative
  - Conditioned Emotional Response (CER)
Connection of vmPFC and Anterior Insula

- For non-misophonic individuals
  - vmPFC puts breaks on emotions (anterior insula)
- For misophonic individuals
  - vmPFC boosts emotions (anterior insula)

Source: Kumar et al. (2017). The Brain Basis for Misophonia. *Current Biology*
Conclusions – Kumar

• “In misophonic subjects... the connectivity between vmPFC and anterior insula is positive, indicating that vmPFC, rather than regulating, is boosting the activity of anterior insula.”
• “Given the role of vmPFC in learning associations, our data is consistent with the view that aberrant associations represented in vmPFC drive areas involved in emotion processing.”

• Plain English
  – Misophonia emotions are Conditioned Emotional Response
  – They develop through experience with the triggers
  – Emotions are an involuntary response
Presenting Condition

- Viewed as an emotional response disorder

- More accurately
Initial Physical Response

- Dozier & Morrison, 2017
- Study testing the 26 people with weak triggers
- 2 auditory triggers and 1 visual trigger
- Wide variety of responses
- 100% has a physical response to 1 or more triggers
- 30% physical but no emotion
- 15% emotion but no physical
- Reflex is invisible to others!

<table>
<thead>
<tr>
<th>Initial Physical Response</th>
<th>People (n=26)</th>
<th>% of People</th>
<th>Trigger Tests (n=76)</th>
<th>% of Trigger Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulders</td>
<td>13</td>
<td>50.0%</td>
<td>26</td>
<td>34.2%</td>
</tr>
<tr>
<td>Arms/Hands</td>
<td>11</td>
<td>42.3%</td>
<td>24</td>
<td>31.6%</td>
</tr>
<tr>
<td>Neck</td>
<td>9</td>
<td>34.6%</td>
<td>17</td>
<td>22.4%</td>
</tr>
<tr>
<td>Chest</td>
<td>5</td>
<td>19.2%</td>
<td>8</td>
<td>10.5%</td>
</tr>
<tr>
<td>Back</td>
<td>5</td>
<td>19.2%</td>
<td>8</td>
<td>10.5%</td>
</tr>
<tr>
<td>Abdomen</td>
<td>4</td>
<td>15.4%</td>
<td>8</td>
<td>10.5%</td>
</tr>
<tr>
<td>Jaw</td>
<td>3</td>
<td>11.5%</td>
<td>5</td>
<td>6.6%</td>
</tr>
<tr>
<td>Thighs</td>
<td>2</td>
<td>7.7%</td>
<td>4</td>
<td>5.3%</td>
</tr>
<tr>
<td>General tensing</td>
<td>2</td>
<td>7.7%</td>
<td>3</td>
<td>3.9%</td>
</tr>
<tr>
<td>Sexual</td>
<td>2</td>
<td>7.7%</td>
<td>2</td>
<td>2.6%</td>
</tr>
<tr>
<td>Warmth</td>
<td>2</td>
<td>7.7%</td>
<td>5</td>
<td>6.6%</td>
</tr>
<tr>
<td>Toes</td>
<td>2</td>
<td>7.7%</td>
<td>3</td>
<td>3.9%</td>
</tr>
<tr>
<td>Stomach/Nausea</td>
<td>2</td>
<td>7.7%</td>
<td>2</td>
<td>2.6%</td>
</tr>
<tr>
<td>Breath</td>
<td>2</td>
<td>7.7%</td>
<td>2</td>
<td>2.6%</td>
</tr>
<tr>
<td>Torso</td>
<td>2</td>
<td>7.7%</td>
<td>3</td>
<td>3.9%</td>
</tr>
<tr>
<td>Head</td>
<td>2</td>
<td>7.7%</td>
<td>2</td>
<td>2.6%</td>
</tr>
<tr>
<td>Face</td>
<td>1</td>
<td>3.8%</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>Numb sensation</td>
<td>1</td>
<td>3.8%</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>Various</td>
<td>8</td>
<td>30.8%</td>
<td>10</td>
<td>13.2%</td>
</tr>
<tr>
<td>None</td>
<td>4</td>
<td>15.4%</td>
<td>7</td>
<td>9.2%</td>
</tr>
</tbody>
</table>
Validation of Reported Initial Physical Response

- **Misophonia: Evidence for an Elicited Initial Physical Response**
  - Tom Dozier, Leighton Grampp, Michelle Lopez

- **Research objective:**
  - To validate an elicited muscle flinch using direct observation in individuals with misophonia

- **General Methodology:**
  - Expose person to recorded neutral and misophonic stimuli
  - Visual observation of response on person’s body
  - Electromyography recording of muscles (3 channels)
Results

The graphs show the relationship between the number of trials with observed muscle movement and the reported physical response strength for both auditory and visual stimuli across different subjects (Abby, Bonnie, and Dave). The graphs indicate a consistent increase in muscle movement as the reported physical response strength increases.
Results – Bonnie, auditory stimulus

- **Deltoid**
  - Timing mark: 100ms
  - Trigger time: 210ms

- **Paraspinal**
  - Stimulus duration: 380ms
  - Time mark: 191ms

- **Calf**
  - Stimulus duration: 380ms
  - Time mark: 191ms
Results – Bonnie, visual stimulus
Summary of Initial Physical Response Studies

- Misophonia includes a directly elicited physical response (muscle flinch or other sensation) in participants.
- Initial reflex is usually invisible to others.
- Large variety in the initial physical responses - Supports classical conditioning.
- Similar responses for auditory and visual stimuli.
- Muscle response latency: ~200ms auditory stimuli, ~350ms visual stimuli.
- Conceptualize misophonia as an aversive physical and emotional reflex disorder.
Survey of individuals with misophonia

- n = 1061
- Recruited online
- Age 18 and older
- 82% female
- No significant difference in male vs. female

Rate of Onset of Misophonic Population

- Rate of onset per year calculated as #-onset-[age] / #-participants-[age]-or-older
- Plot is average of yearly onset rates for each age range.
Prevalence of Misophonia

• Dozier 2013 Survey Monkey sample (n=300): 15.1%
• Jastreboffs 2014: 3.2% (based on tinnitus prevalence and clinic patients)
• Wu et al. 2014: 19.9% of undergraduate psychology students reported “clinically significant misophonia”
  – Nonsignificant gender effect
• Cash dissertation 2015: 18.4% (undergraduates); 13.5% (community)
  – Nonsignificant gender effect for prevalence
  – Women reported greater severity
• 23andMe.com 2015: “Does the sound of others chewing fill you with rage?”
  – Yes = 19%
  – No = 77%
  – Not sure = 4%
• Quek et al., 2018: 66% of Singapore psychiatric patients (A-Miso-S ≥5)
Prevalence of Misophonia

**Misophonia Severity in Psychiatric Patients**

A-Miso-S scale (n=92). Source: Quek et al., 2018
## Reported Lifetime and Present Comorbid Disorders

<table>
<thead>
<tr>
<th>Comorbid Disorder</th>
<th>Lifetime Formal Diagnosis (N=1101)</th>
<th>Perceived Present Condition (N=1118)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood disorder (depression, clinical depression, bipolar disorder)</td>
<td>45.0%</td>
<td>34.9%</td>
</tr>
<tr>
<td>Anxiety disorder (panic disorder, phobia, other anxiety disorder)</td>
<td>34.2%</td>
<td>36.9%</td>
</tr>
<tr>
<td>Obsessive-Compulsive disorder</td>
<td>12.2%</td>
<td>17.4%</td>
</tr>
<tr>
<td>Tinnitus (ringing in the ears)</td>
<td>11.4%</td>
<td>18.5%</td>
</tr>
<tr>
<td>Post traumatic stress disorder (PTSD)</td>
<td>10.8%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Attention deficit hyperactivity disorder (ADHD)</td>
<td>10.6%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Sensory processing disorder or sensory over-responsivity (SPD)</td>
<td>5.1%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Excoriation (compulsive skin picking)</td>
<td>2.6%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Body Dysmorphic disorder</td>
<td>2.5%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Autism spectrum disorder (including Asperger's and PDD)</td>
<td>2.5%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Trichotillomania (compulsive hair pulling)</td>
<td>1.5%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Tourette's disorder</td>
<td>1.2%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Other</td>
<td>4.7%</td>
<td>3.2%</td>
</tr>
<tr>
<td>None (except misophonia)</td>
<td>38.2%</td>
<td>27.5%</td>
</tr>
</tbody>
</table>
## SPD - Sensory Over-Responsivity (Hyperreactivity)

<table>
<thead>
<tr>
<th>Stimulus type</th>
<th>Sensory Over-Responsivity</th>
<th>Misophonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tactile</td>
<td>Tactile is the primary sensitivity</td>
<td>Rarely a misophonic stimulus</td>
</tr>
<tr>
<td>Auditory</td>
<td>Strong or persistent stimuli</td>
<td>Weak stimuli with specific context</td>
</tr>
<tr>
<td>Visual</td>
<td>Strong stimuli</td>
<td>Weak stimuli with specific context</td>
</tr>
<tr>
<td>Food texture</td>
<td>Soft, lumpy, slimy</td>
<td>Not a misophonic stimulus</td>
</tr>
<tr>
<td>Learning history</td>
<td>Minimal / none for initial response to stimuli (innate sensitivity to stimuli)</td>
<td>Classical conditioned respondent to specific stimuli (conditioned physical respondent)</td>
</tr>
</tbody>
</table>
Anxiety, Compulsive, and Phobias

• Anxiety Disorders
  – Excessive anxiety and worry about various events or activities across different domains (e.g., work/school, social)
    • Misophonia: anxiety/worry is specific to misophonic triggers and avoiding them

• Obsessive Compulsive Disorder
  – Thoughts, images, or urges are repetitive and persistent, and perceived as intrusive and unwanted
    • Misophonia: preoccupation with specific sounds/stimuli or people associated with those sounds

• Specific Phobia
  – Intense fear or anxiety about a specific object or situation
    • Misophonia: emotional response includes anger or disgust or both
Misophonia Management

- Misophonia response increases in severity with real-life experience
  - Emotional response strengthened
  - Physical response strengthened
  - Any repeating stimulus paired with a trigger can become a trigger
  - Any emotion-related stimulus can become a trigger
- If a person “gets tough” with misophonia, misophonia becomes worse
- Avoid situations of enduring misophonia triggers – “misophonia distress”
Misophonia Management - Noise

• Add background noise
  – "It is so quiet you can hear a pin drop."
  – Reduces perceived volume of triggers
  – Makes triggers less noticeable
  – Reduces fidelity of stimulus
  – Reduces misophonic response

• Noise devices
  – Box fan / vent fan
  – Sound machines
  – Open ear headphones and noise app on smartphone
  – Audiologist provided sound generators (hearing aid - masking device)
  – Noise cancelling headphones, e.g. Bose QC20 and QC30 (no benefit for sniffing)
  – Noise isolating headphones, Etymotic MC5 (or MC3 with microphone)
Misophonia Management – Selective Avoidance

- Avoid “misophonia physiological distress”
- Relax into situations with triggers and relax through triggers
- Headphones / noise
- Reduce number of triggers
  - Make a plan
  - Eat separately
  - Preferred seating / special location
- Hearing assisted device (transmitter/receiver and headphones)
- Allow escape from triggers (e.g. leave classroom)
- Qualifies for ADA accommodations

Note: This is not a recommendation to completely avoid misophonic stimuli.
Recognizing Misophonia

- Extreme negative response to specific common innocuous stimuli (triggers)
  - Often mouth or nasal sounds
  - Can be any stimulus
  - Can be any stimulus modality
  - Low intensity misophonic triggers will elicit the response (low volume baby crying)
- Emotion dysregulation - Intense negative emotions in response to triggers
- Attention diverted to misophonic stimuli when triggered
- Physiological arousal – triggers endured with discomfort or distress
- Escape and avoidance of misophonic triggers
- Note: Very unlikely that you will see the initial physical response or that the person will be able to describe that response
Thank you!

Misophonia Institute

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Diagnosing and Assessing Misophonia
6 CE credits
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