Recognizing Misophonia: An Extreme Emotional Response to Common Stimuli

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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

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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

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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

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In the News: April 17, 2015 (ABC, CNN, and Fox News)

Woman booted from flight for stabbing seatmate with pen

Published April 17, 2015 · Fox News

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

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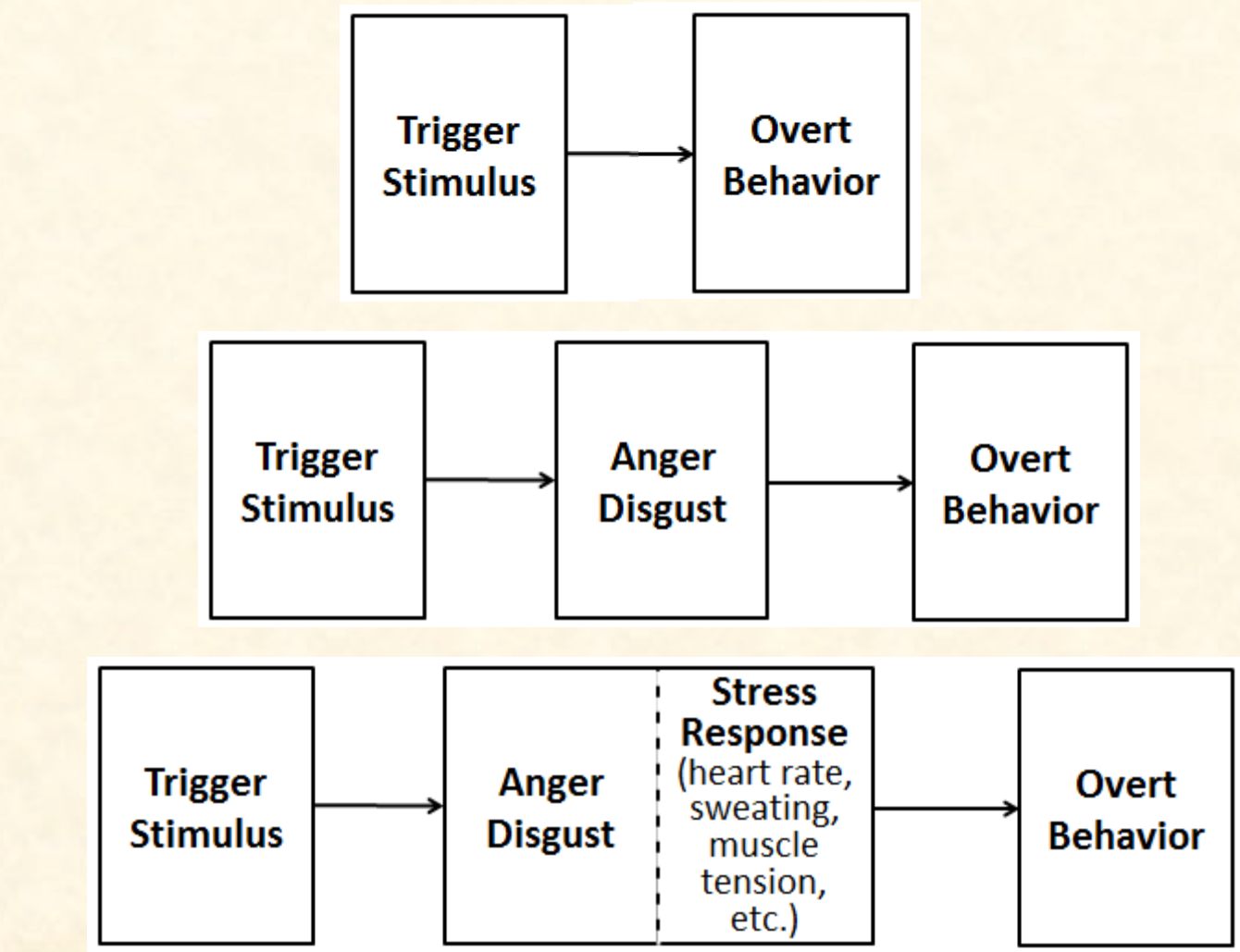
Presenting Condition



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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

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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

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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

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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

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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

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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

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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

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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

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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

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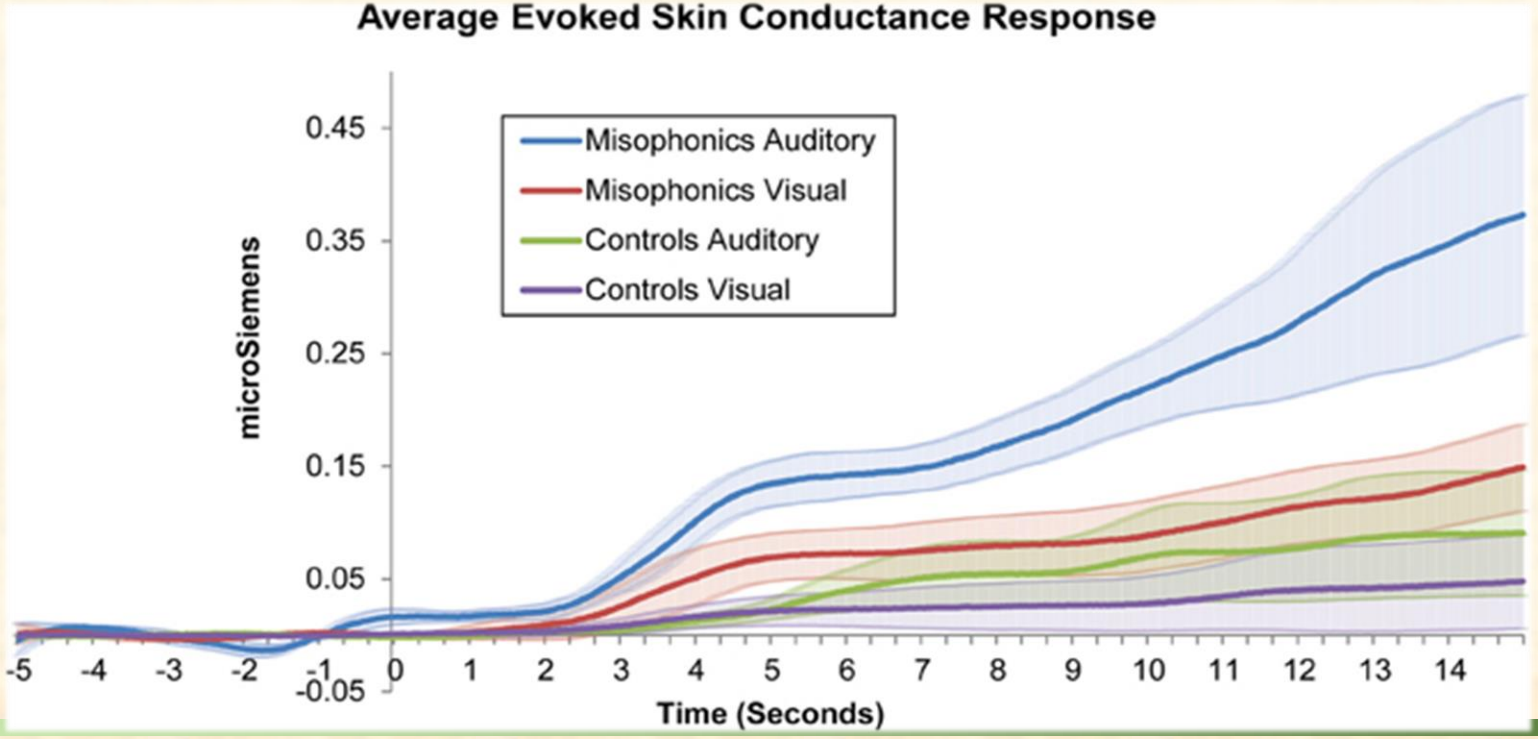
Emotional Responses to Weak Triggers (Dozier & Morrison, 2017)

- 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 Response	Number of People (n=26)	% of People	Number Tests (n=76)	% of Trigger Tests
Anger	24	92.3%	57	75.0%
Anxiety	24	92.3%	32	42.1%
Desire for Escape	14	53.8%	23	30.3%
Disgust	12	46.2%	17	22.4%
Fear	6	23.1%	9	11.8%
Sadness	4	15.4%	5	6.6%
Other	9	34.6%	9	11.8%
None	8	30.8%	15	19.7%

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



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Misophonic Emotions – Kumar

- Sukhbinder Kumar (2015) conference presentation
  - fMRI study
  - Kumar S., et al. (2017). The Brain Basis for Misophonia, *Current Biology*.
- 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 simulus→negative
  - Conditioned Emotional Response (CER)

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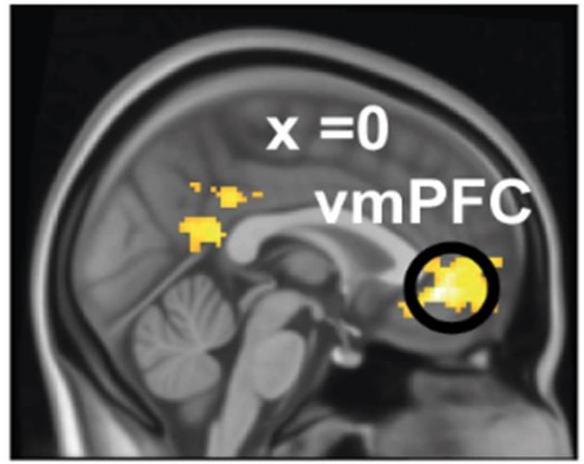
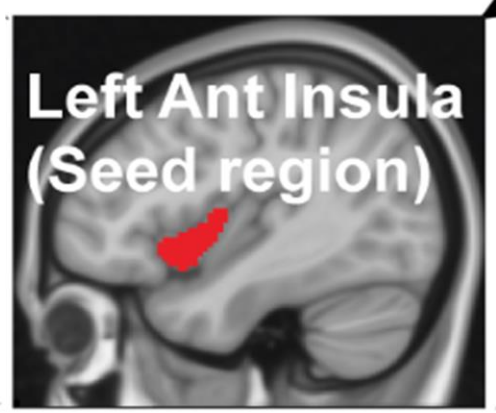
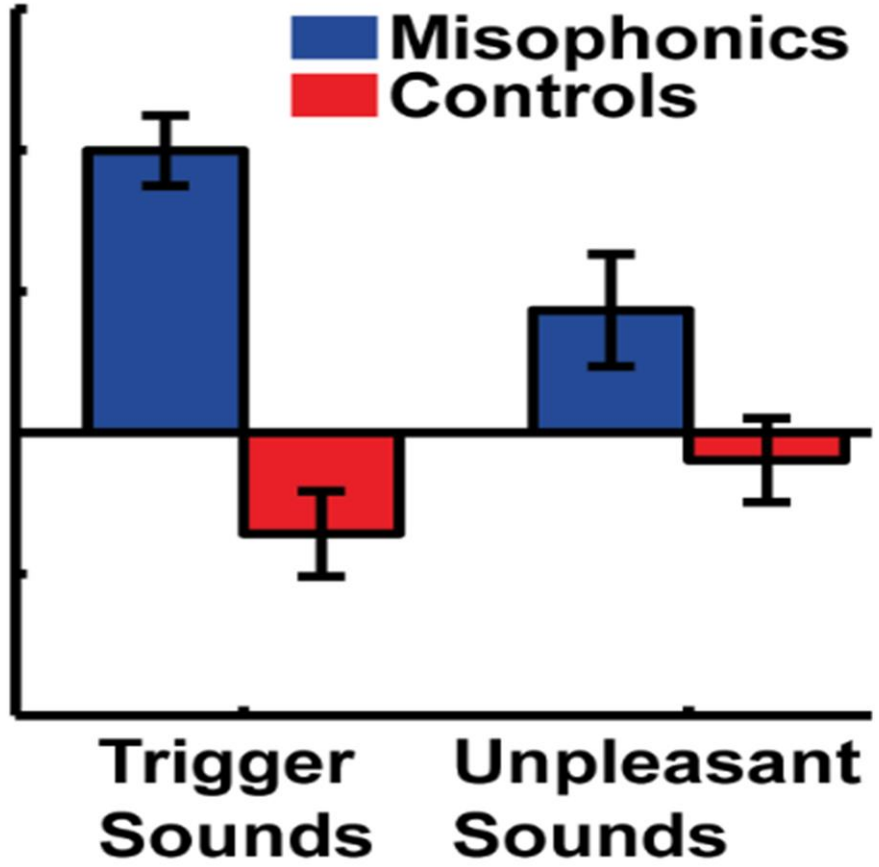
Connection of vmPFC and Anterior Insula

- 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*

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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

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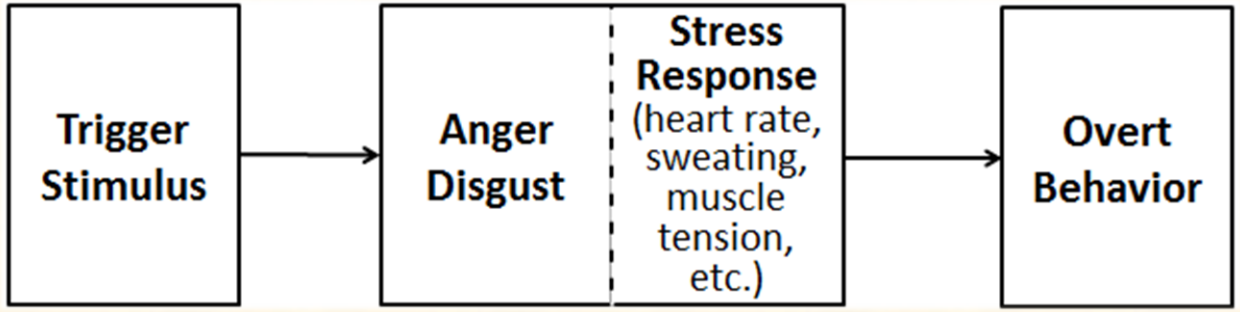
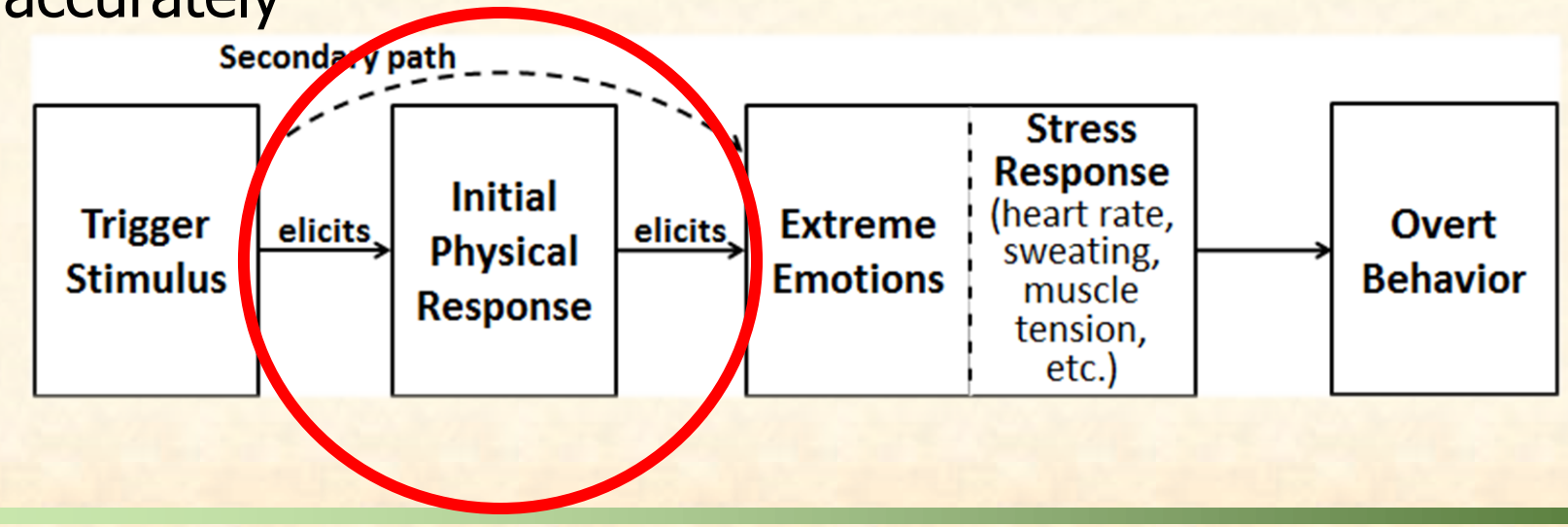
Presenting Condition

- Viewed as an emotional response disorder



- More accurately



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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!

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

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)

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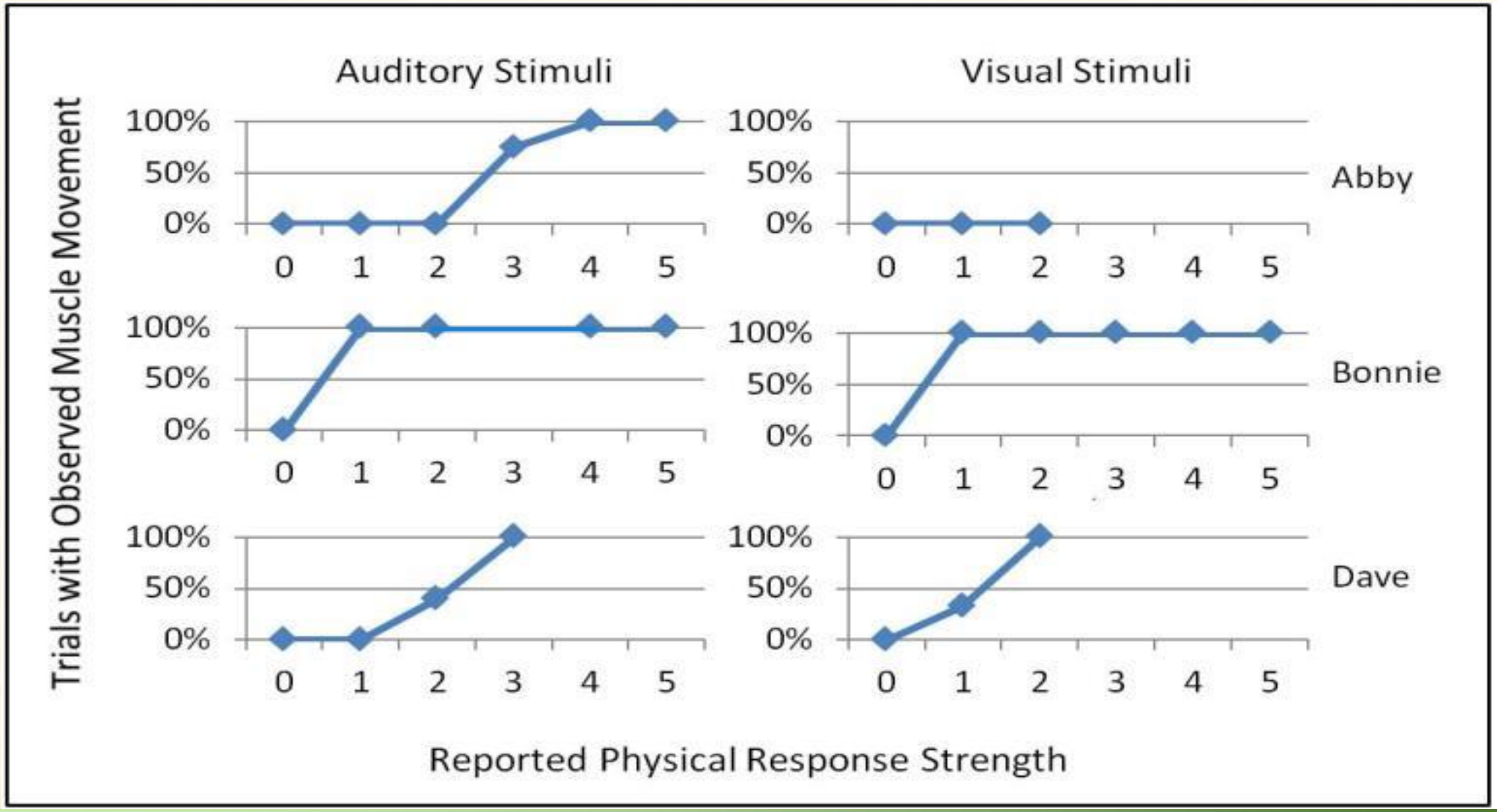
Results



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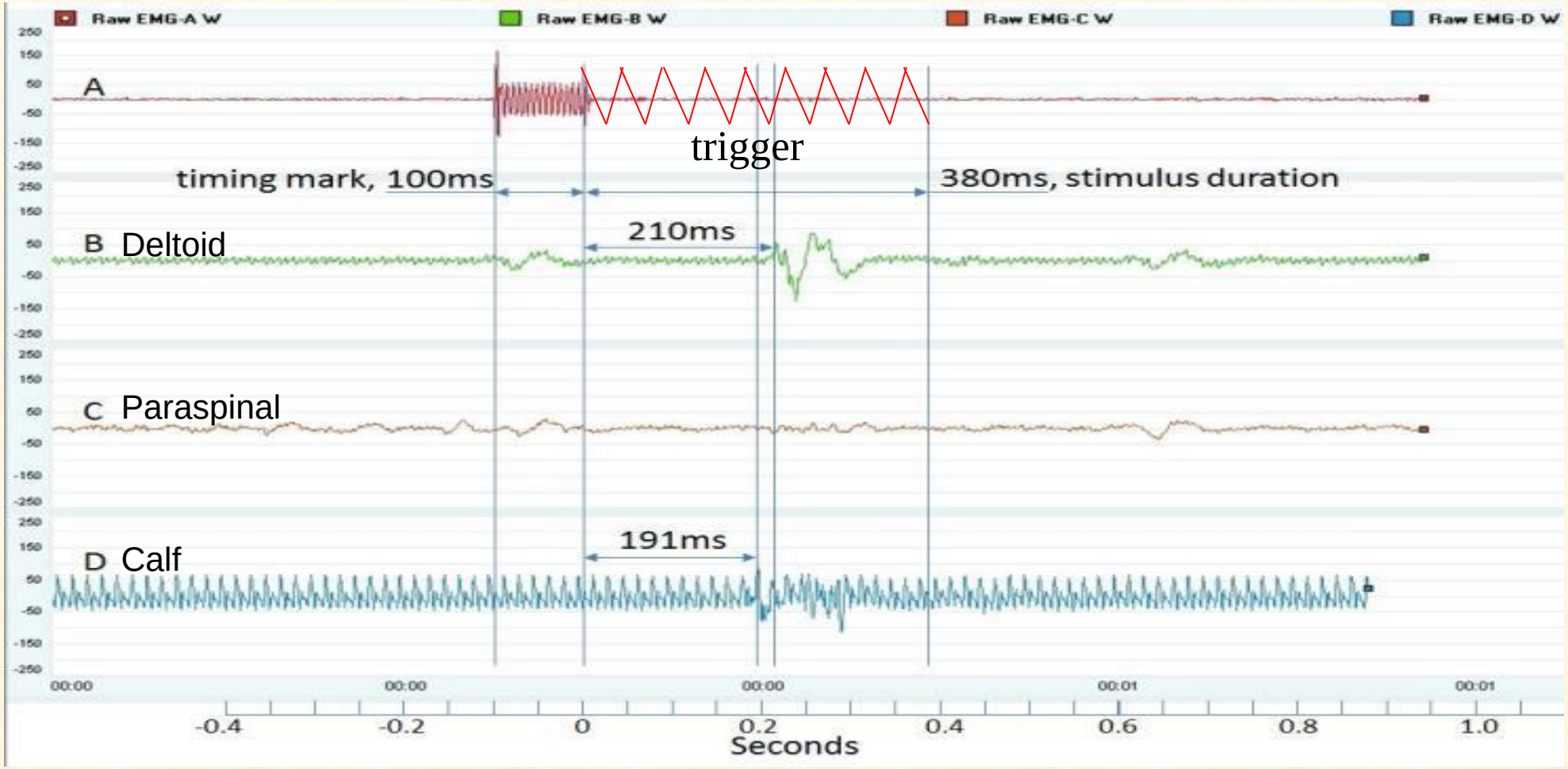
Results – Bonnie, auditory stimulus



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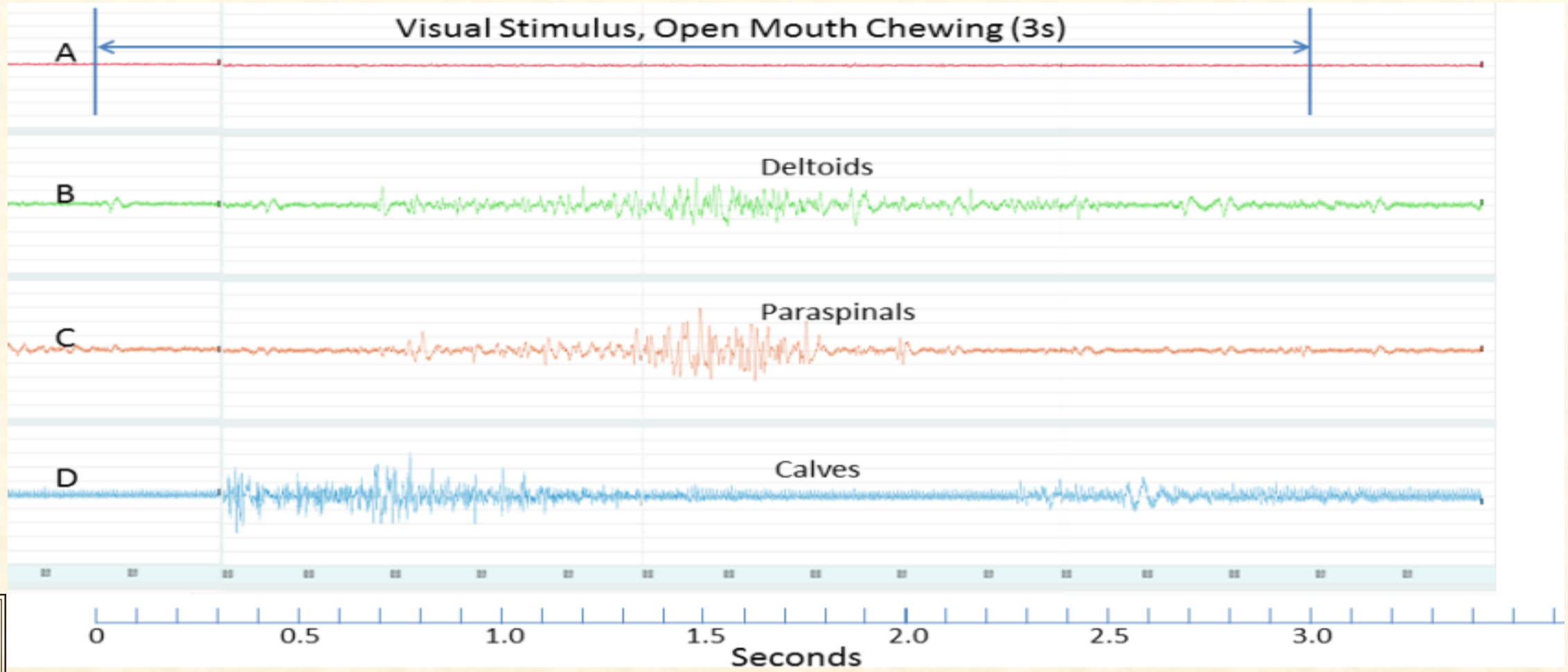
Results – Bonnie, visual stimulus



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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

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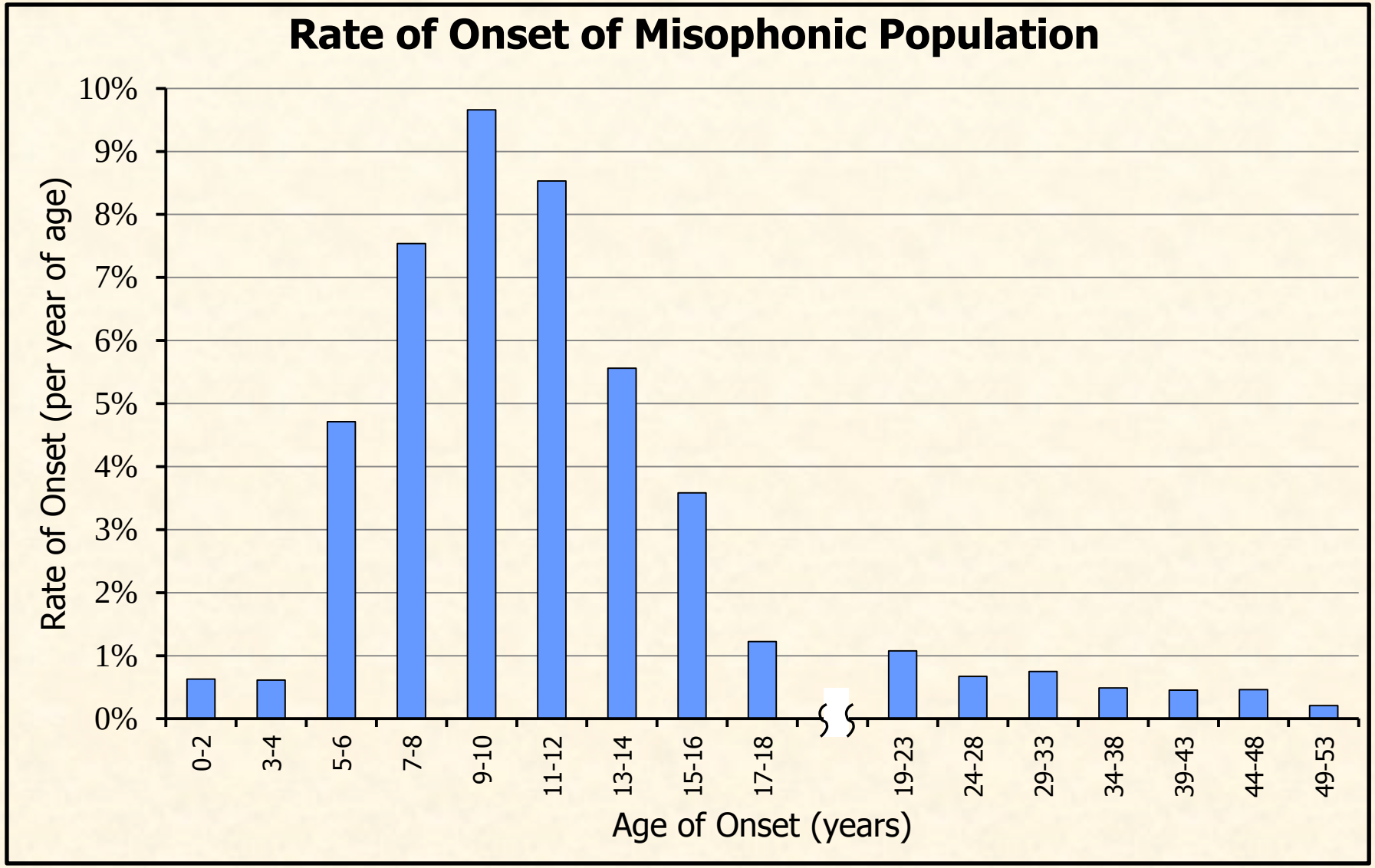
- Survey of individuals with misophonia
- n = 1061
- Recruited online
- Age 18 and older
- 82% female
- No significant difference in male vs. female



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

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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)

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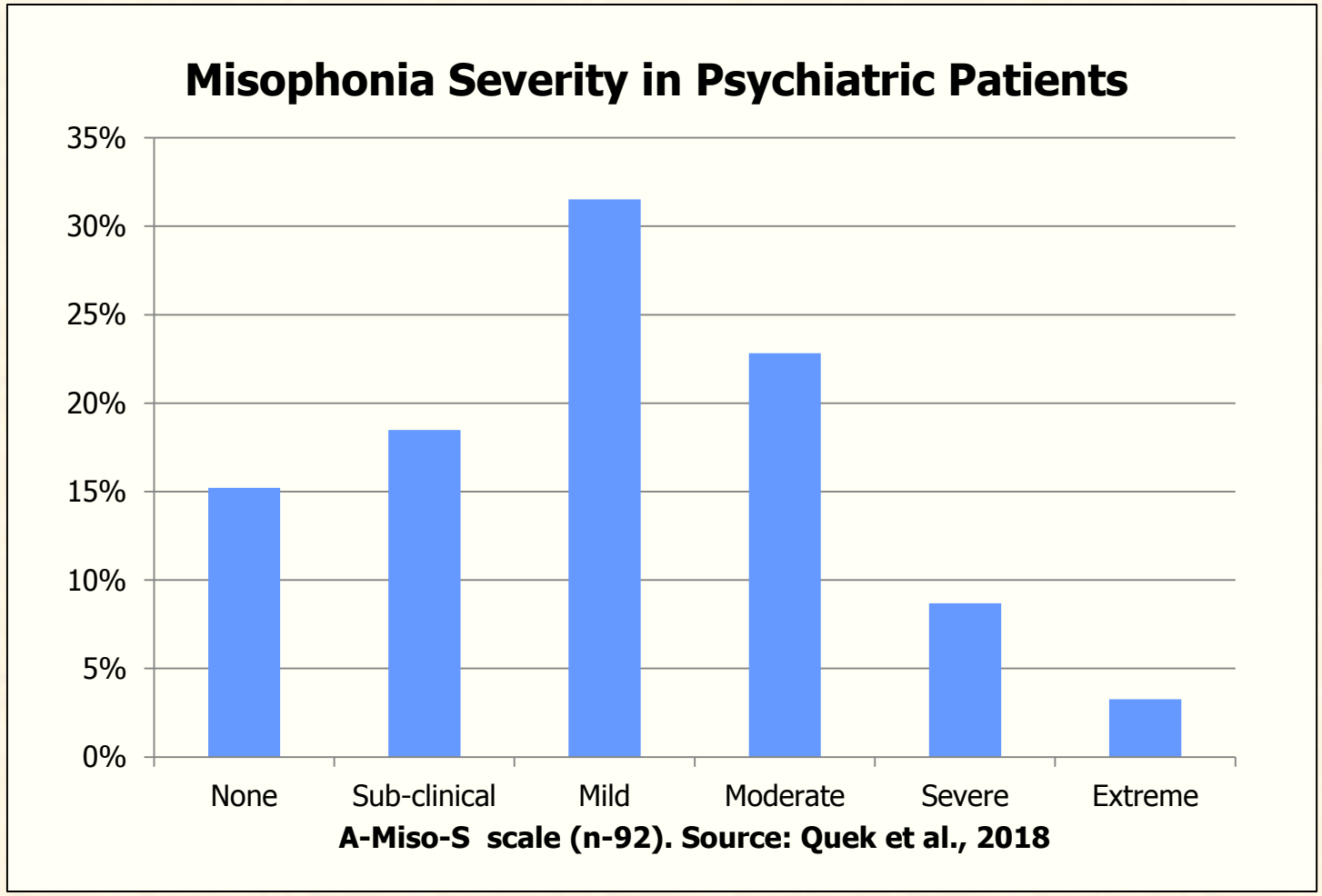
Prevalence of Misophonia



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Reported Lifetime and Present Comorbid Disorders

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

SPD - Sensory Over-Responsivity (Hyperreactivity)

Stimulus type	Sensory Over-Responsivity	Misophonia
Tactile	Tactile is the primary sensitivity	Rarely a misophonic stimulus
Auditory	Strong or persistent stimuli	Weak stimuli with specific context
Visual	Strong stimuli	Weak stimuli with specific context
Food texture	Soft, lumpy, slimy	Not a misophonic stimulus
Learning history	**Minimal / none for initial response to stimuli (innate sensitivity to stimuli)**	**Classical conditioned respondent to specific stimuli (conditioned physical respondent)**

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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

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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"

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Misophonia Management - Noise

- Add background noise
  - "It is so quiet you can hear a pin drop."
  - Reduces perceived volume of triggers
  - Makes triggers less noticable
  - 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)

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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.

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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

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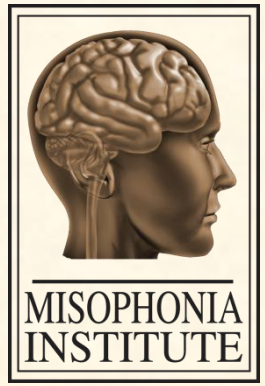
Thank you!



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