

Hearing aid fitting considerations for patients with PTSD

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Purpose: Learner Objectives

1. Identify the effect that trauma and traumatic memories may exert on a patient's sound exposure choices
2. Provide examples of trauma-related sensory experiences with relevance for hearing aid use
3. Interpret clinical data that supports identification of sound intolerance and related AR challenges

Sound

“Neutral Sounds”
Fans, household items,
distant sounds such as
airplanes, traffic,
unidentifiable music

Response

Minimal attention/
resources devoted
to processing, no effect on
emotional valence.

Sound

Response

Perception of a sound is largely unaffected by emotional state:
Neutral sounds

Sounds with value/salience that change emotional state:
identifiable music, infant screaming at close range, rain
that will probably flood the basement

Emotional state as carrying the potential to be modified by stimuli added or subtracted from the environment

Sound

Response

The patient may withdraw or avoid an increasing number of situations; the number of acceptable sounds will by definition become fewer in number in less frequently encountered.

Emotional/trauma memories promote a durable response to a growing and diversifying inventory of sounds and environments associated with, or that resemble, prior trauma, training, learning, experience.

If there is greater overlap between the inventory of sounds that trigger or change emotional valence, then would there be fewer moments in the day a patient did NOT experience distress or discomfort?

PTSD: Diagnostic Markers: DSM-V; 2013

- The criteria for a diagnosis of PTSD include:
 - A: Exposure to traumatic stressor
 - B: Re-experiencing symptoms (flashbacks; traumatic reminders)**
 - note that criterion B expression is increasingly associated with suicide ideation

Avoidance and numbing symptoms split in new version:

C: Evidence of avoidance behaviors

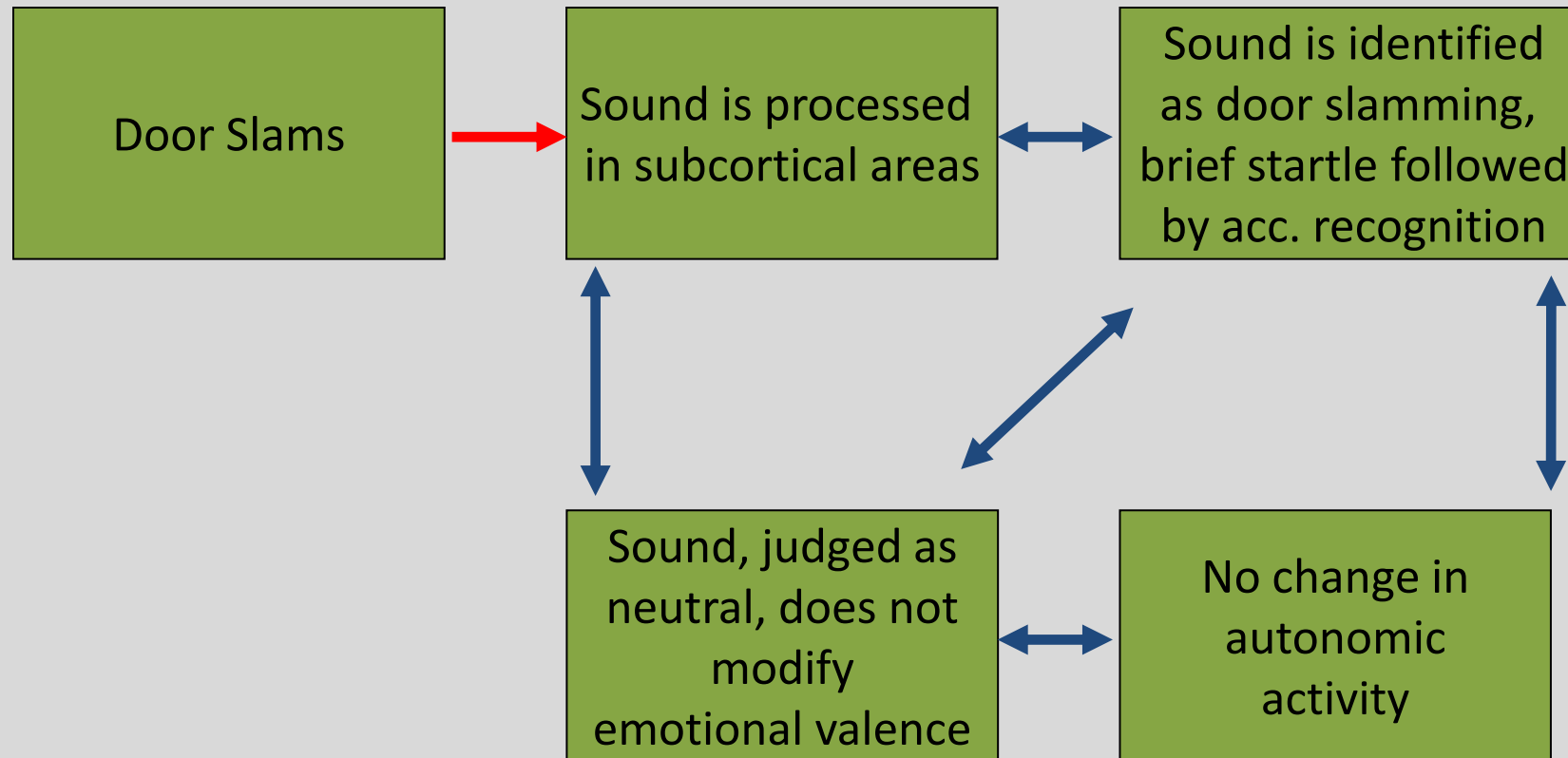
D: Cognitive distortions and mood changes related to trauma and its reminders

E: Symptoms of increased arousal

F: Duration > one month

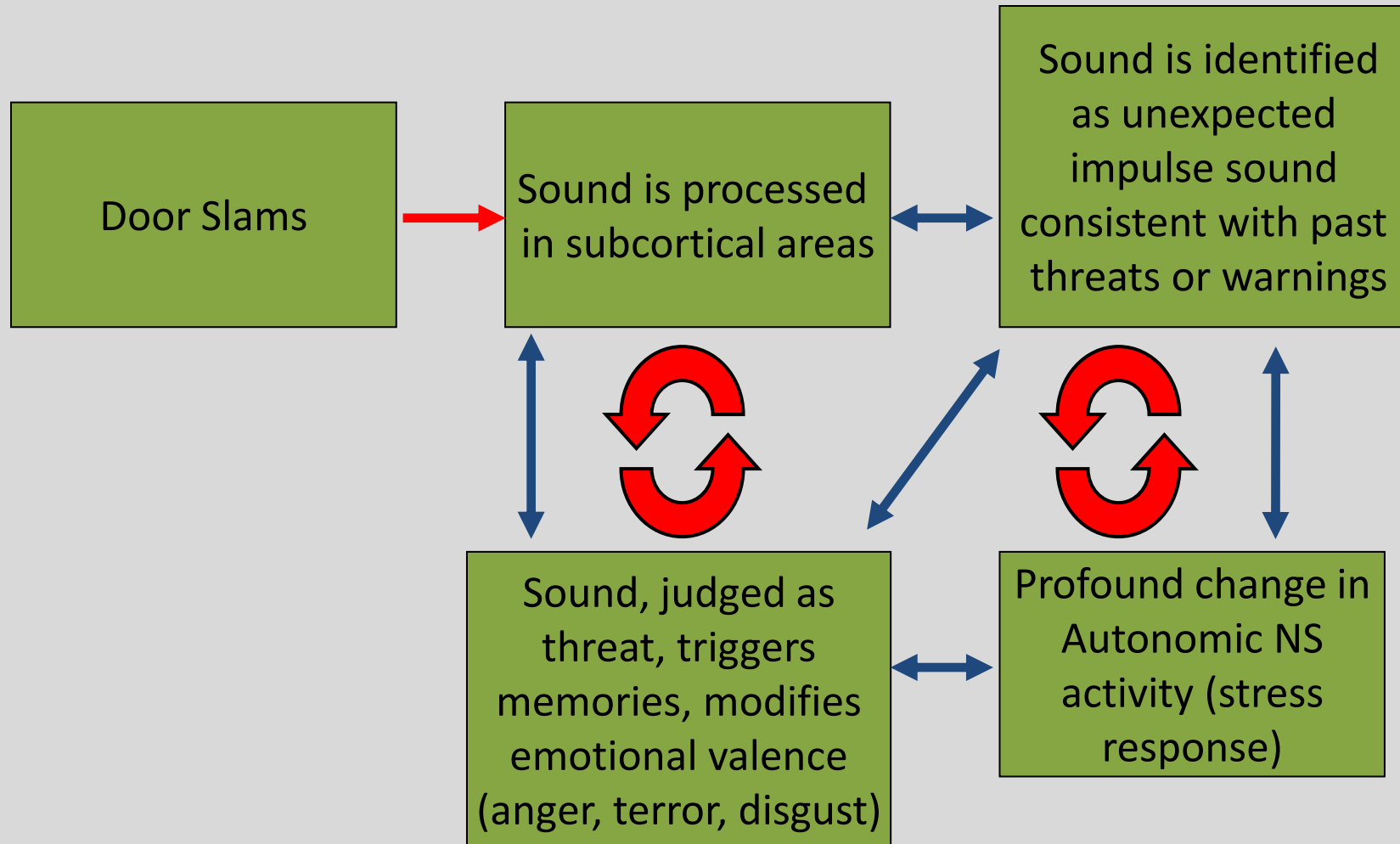
G: Significant distress or impairment of functioning

Sound and Response: accurate



Adapted from McKenna, Baguley, McFerran, 2010

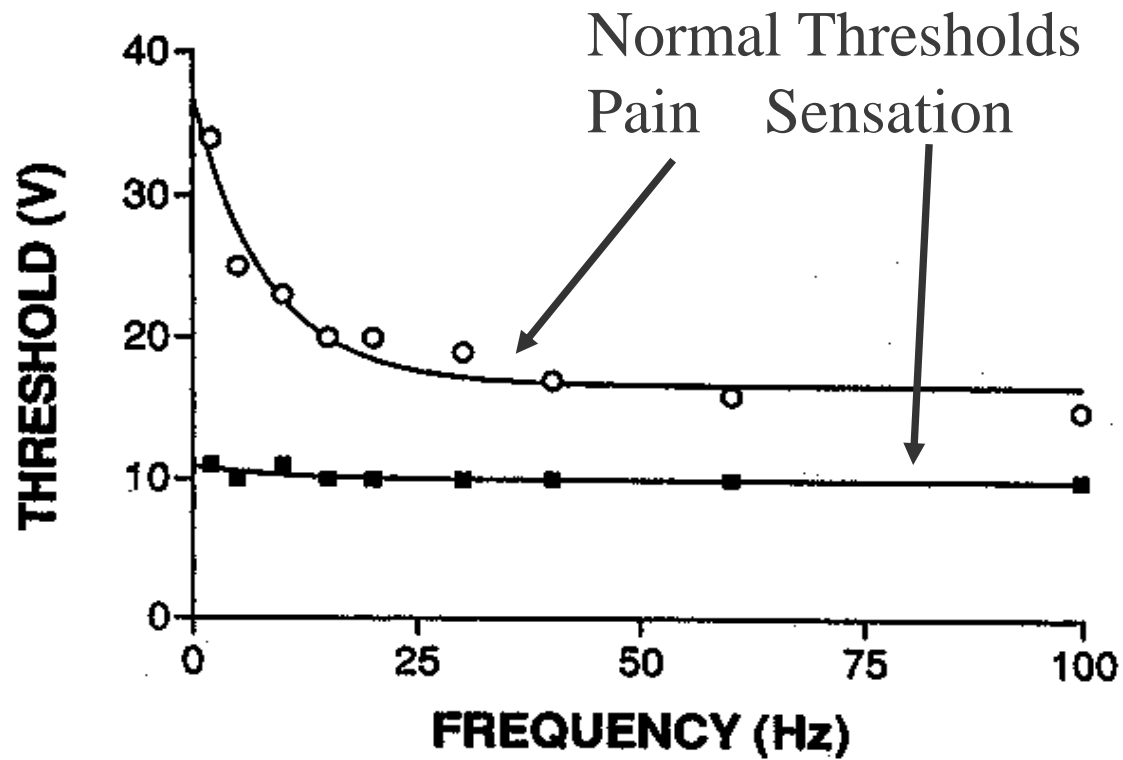
Sound and Response: inaccurate



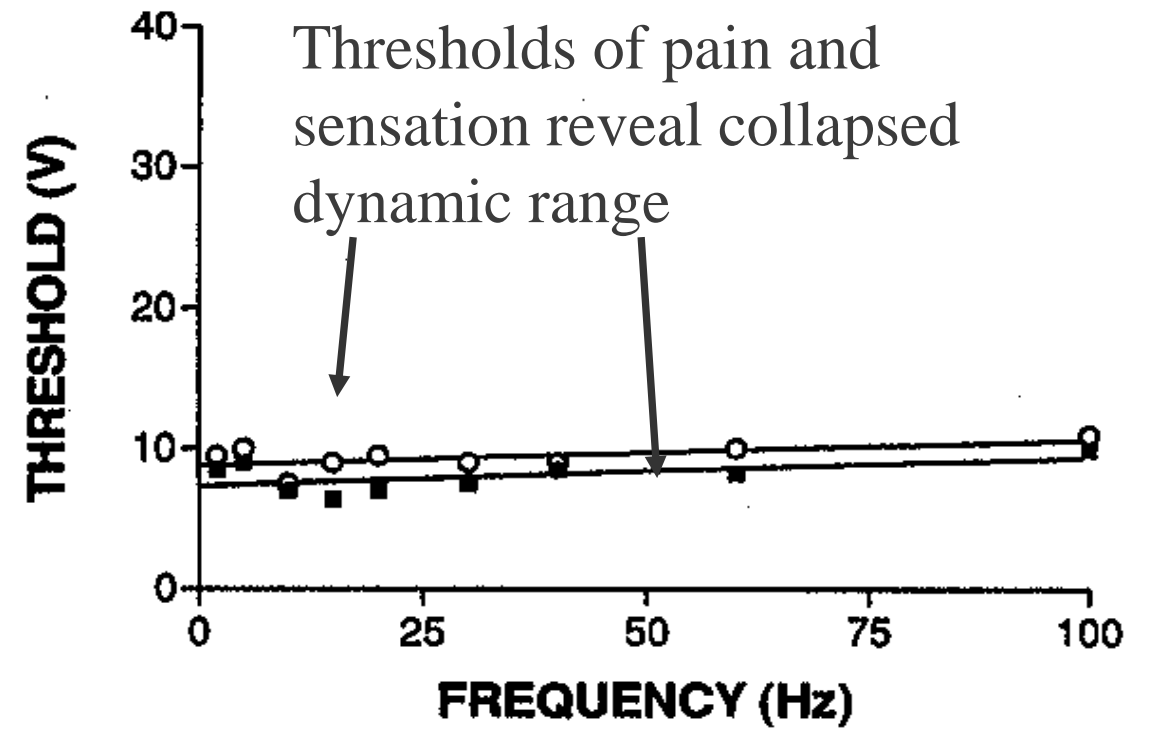
Adapted from McKenna, Baguley, McFerran, 2010

Pain and dynamic range: structures w/ chronic pain

(Møller, 2000)



A

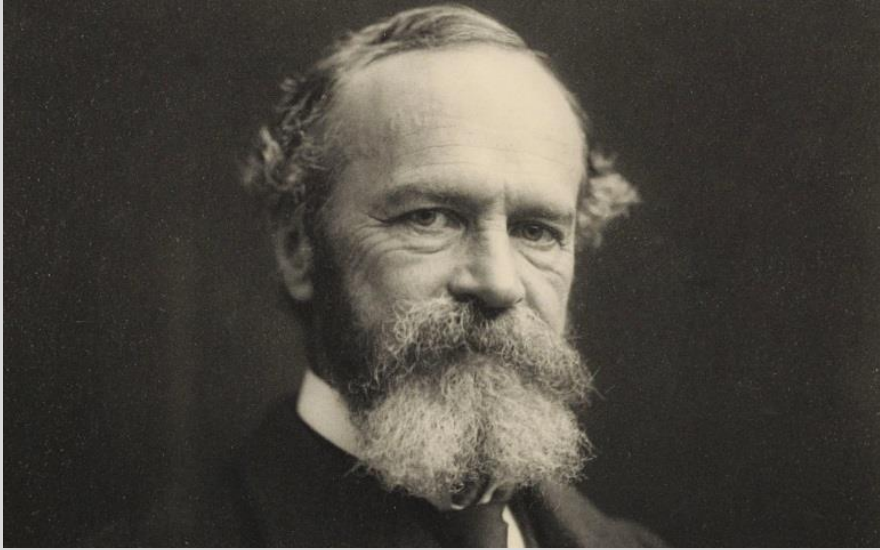


B

PTSD: Beyond the DSM; WHO (1992)

- WHO Classification of Mental and Behavioral Disorders; one of the categories is “Enduring personality change after catastrophic experience”
 - Changes to “personality features” include:
 - Hostile or mistrustful attitude toward the world
 - Social withdrawal
 - Feelings of emptiness or hopelessness
 - A chronic feeling of being “on the edge” as if constantly threatened
 - Estrangement
- Shay (1994) and Herman (1997) affirm that the galaxy of symptoms can arise in victims, perpetrators, and witnesses of trauma

Traumatic Experiences and Memory

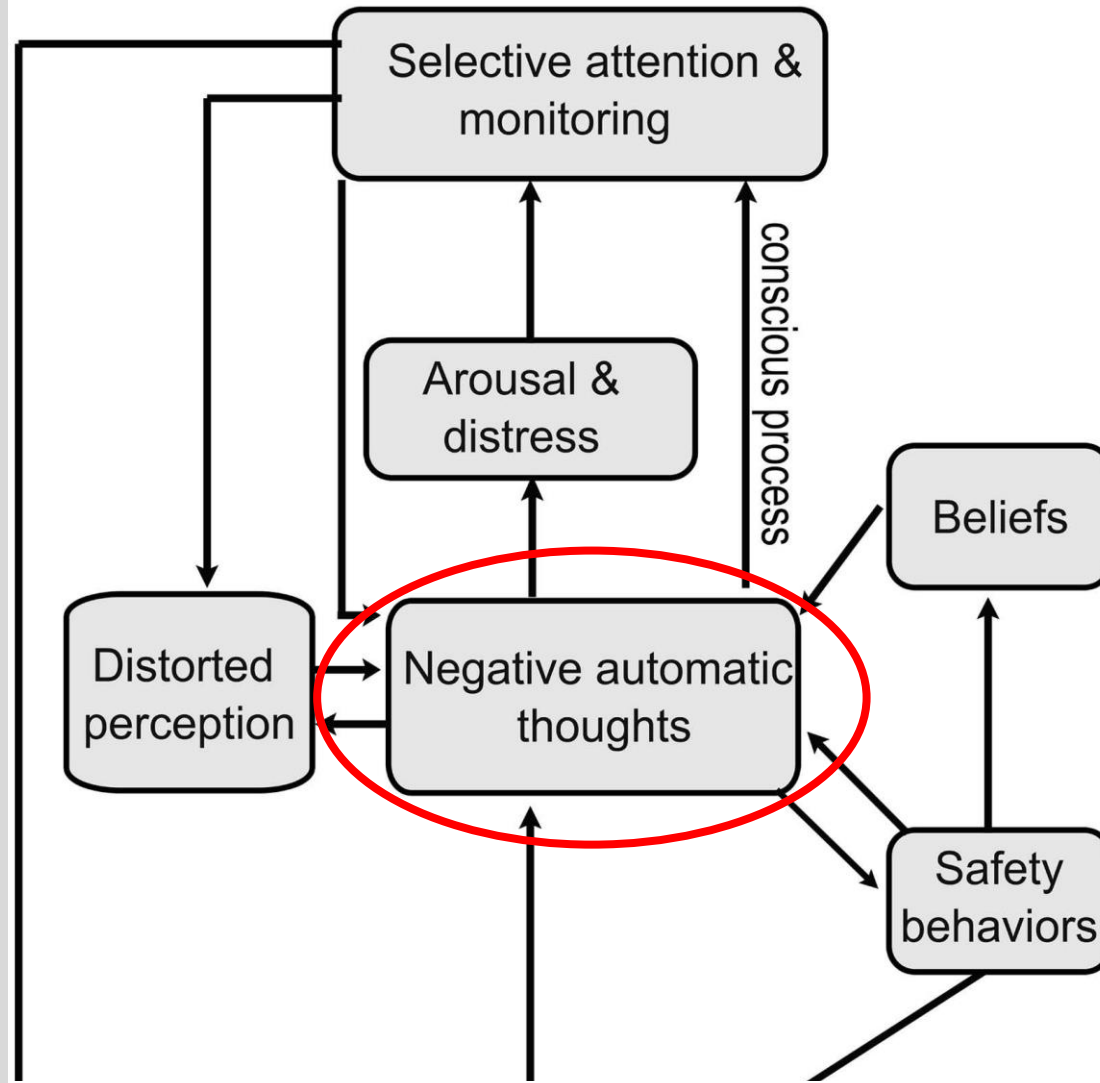


William James (1890): “An impression may be so exciting emotionally as almost to leave a scar upon the cerebral tissues.”

Shay (1994): Veterans’ narratives reveal the depth to which trauma’s effects endure. “Nothing is what it seems. That mountain there – maybe it wasn’t there yesterday, maybe it won’t be there tomorrow. You get to the point where you’re not even sure it IS a mountain.” Hypervigilance, in this context is a “rational response” b/c every detail in the environment must be scrutinized in order for the patient to accurately assess value/perceived threat.

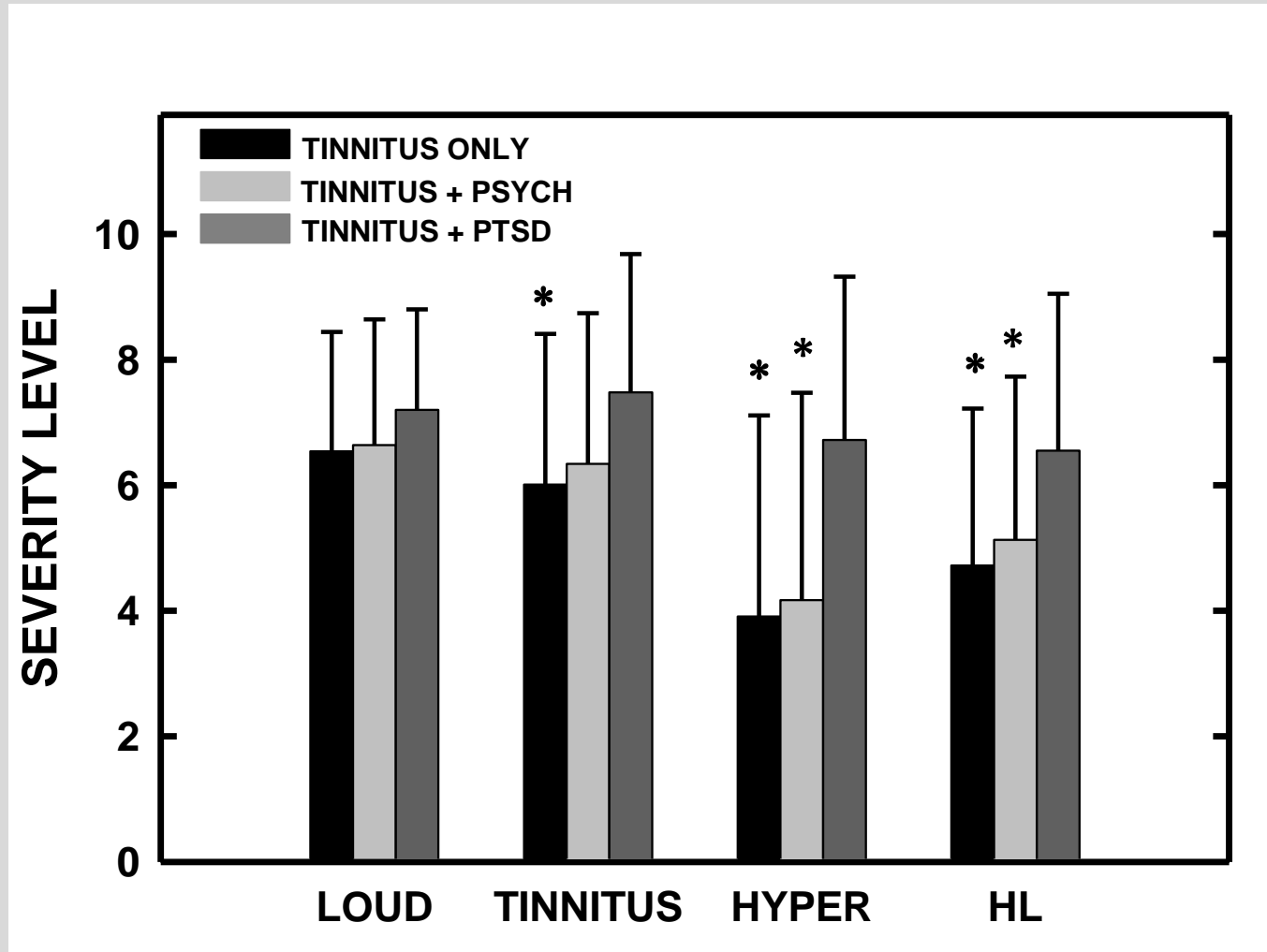
McKenna et al., 2014: CBT model. Front. Neuro; Oct. 2014

For this example, substitute “triggering sound” for tinnitus (although the two notions are not mutually exclusive).

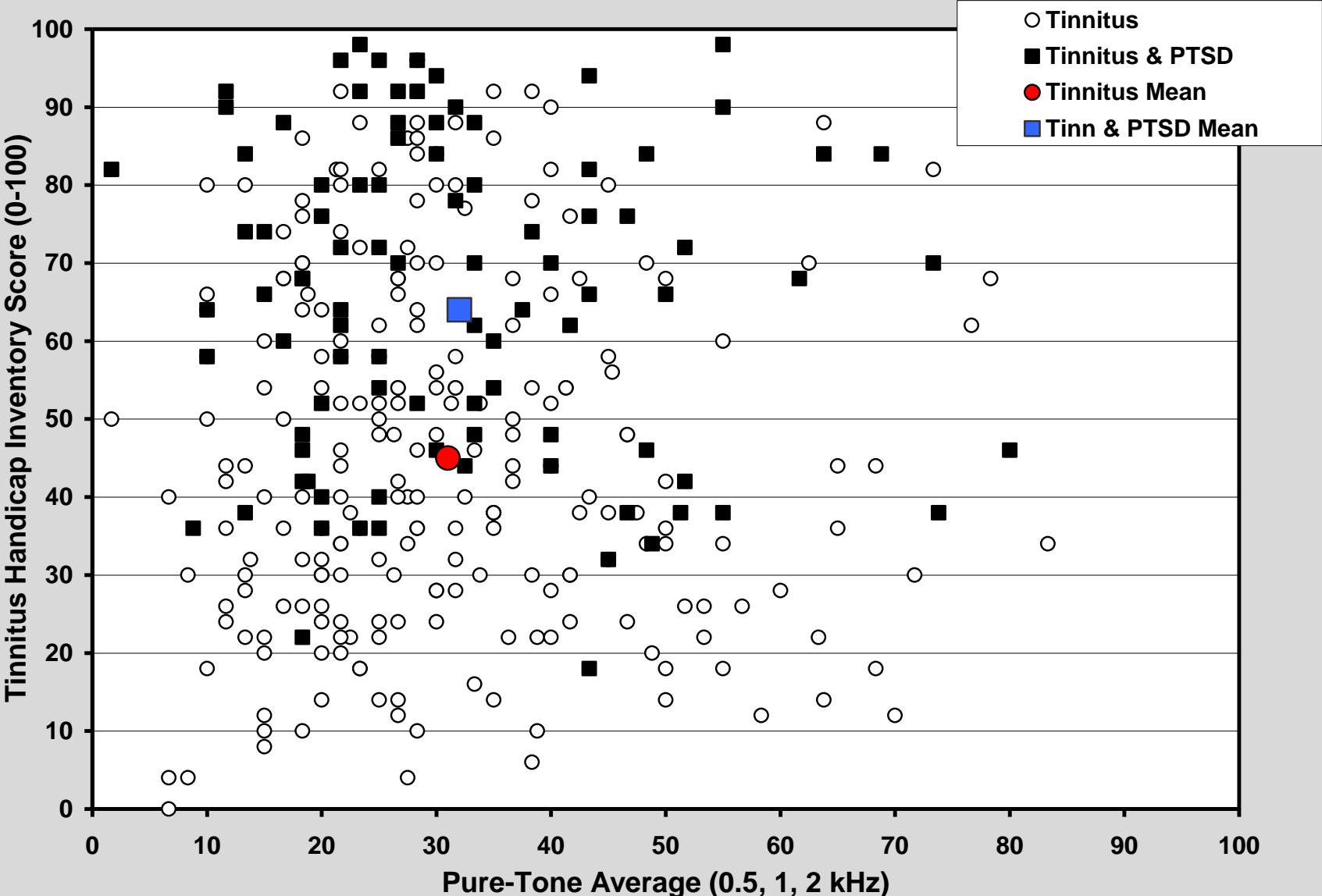


Detection of offending sound:
Consider elements of the sound that may provoke traumatic memories, and the “value added” such memories produce

Patient Ratings of Tinnitus/Hearing Symptoms

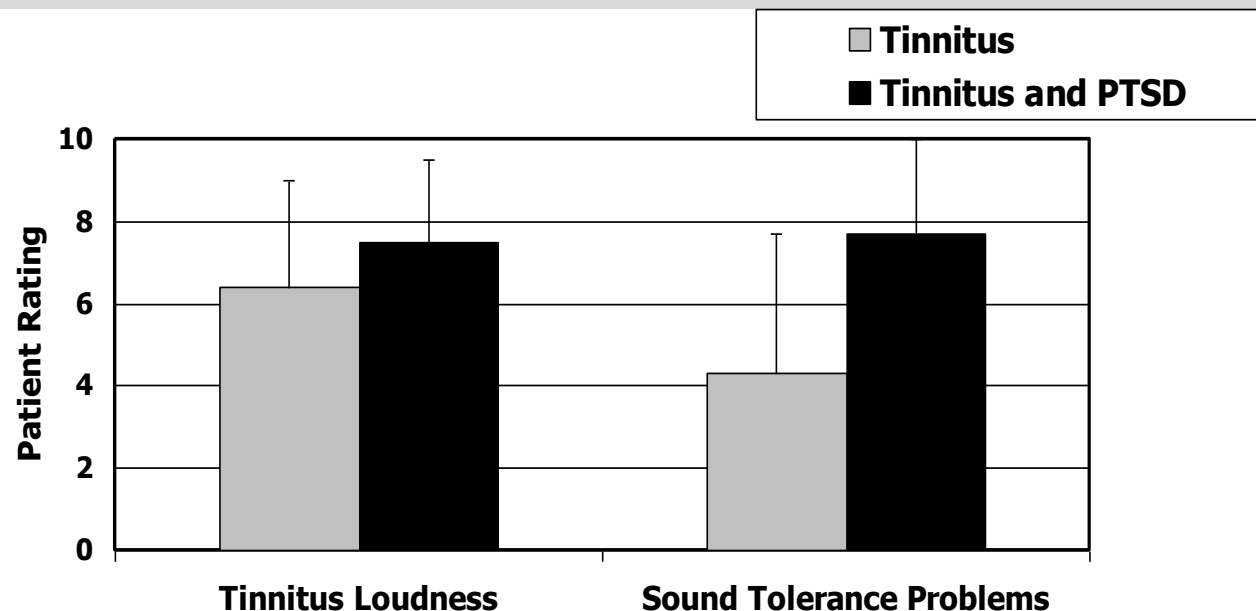


Perceived Tinnitus Handicap, and Relation to Auditory Sensitivity



Clinical Findings:

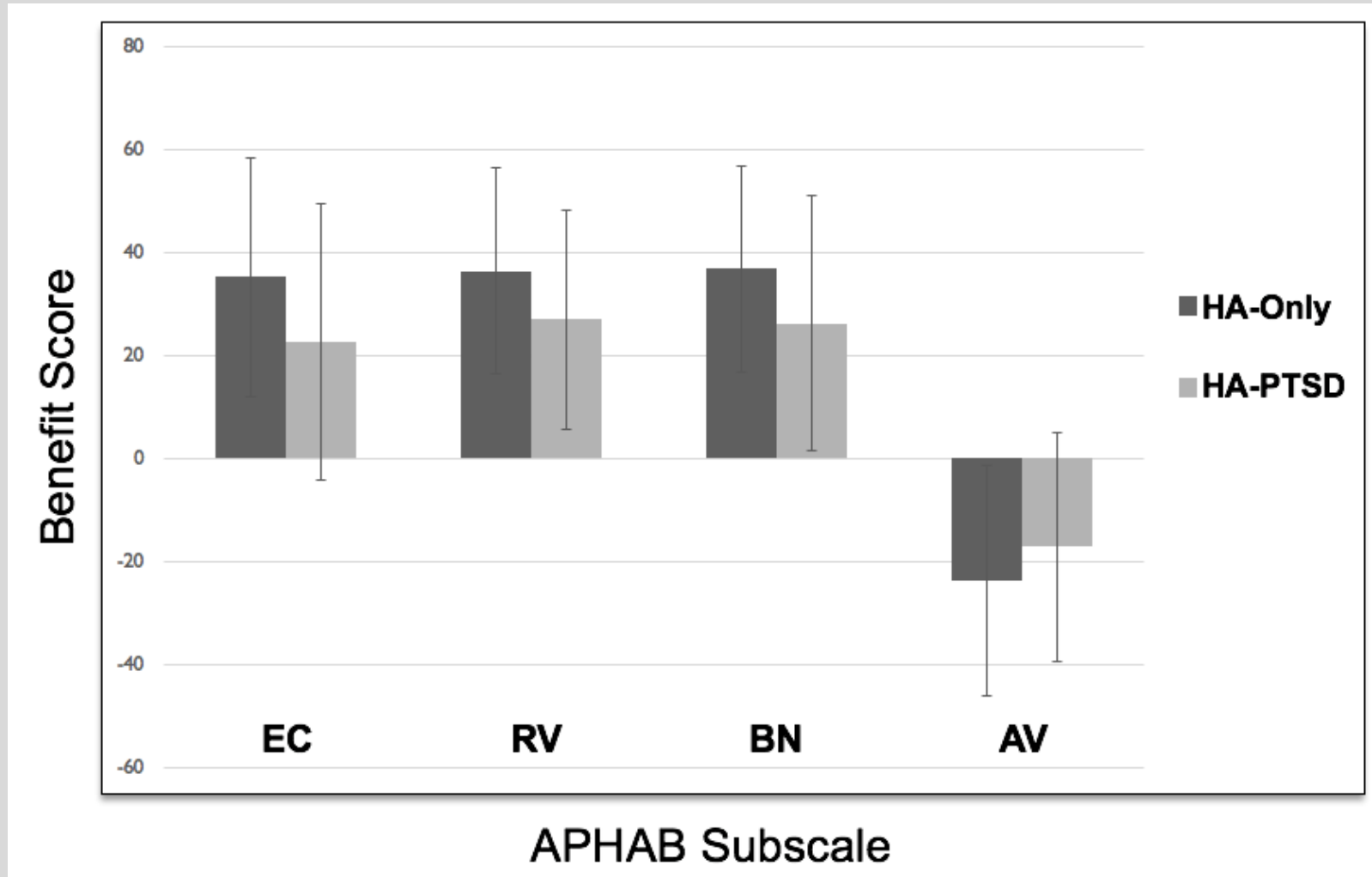
- Tinnitus-related symptoms presented by patients with trauma history/PTSD:
 - 2x more likely to report sudden-onset
 - 3x more likely to report reactive tinnitus
 - Patients with PTSD nearly 4x as likely as those w/ tinnitus alone to state that sound intolerance is a bigger challenge than tinnitus
 - Consider the potential utility of personal amplification in such cases both for tinnitus management and monitoring of environment



Scores on the THI at intake

N=550	Total	Func.	Cat.	Em.
PT (187):	62.8	28.4	11.6	22.8
T (363):	46.0	21.4	9.0	15.6

Scores on the APHAB indicated smaller aided effects for patients with PTSD (McClelland et al., 2020; AAS)



Patients with PTSD and hearing aids: largest aided differences (n=60)

Items on Study Questionnaire Under Development (Higher score indicates greater agreement with the item statement)		UNAIDED		AIDED		DIFFERENCE	
		HA- Only	PTSD	HA- Only	PTSD	HA- Only	PTSD
1. I communicate well in a quiet situation	M SD	4.5 2.2	5.5 2.2	8.6 1.4	8.5 1.6	4.0 2.4	2.9 2.8
2. I communicate well in a noisy situation	M SD	2.7 2.0	3.4 2.3	6.8 2.1	6.9 2.0	4.1 2.7	3.5 3.4
9. I am able to identify environmental sounds accurately	M SD	4.4 2.6	4.1 2.1	7.8 2.1	7.8 1.6	3.3 3.1	3.7 2.4
4. I feel secure in social situations	M SD	4.6 2.5	5.4 2.7	7.8 2.2	6.7 2.6	3.1 2.7	1.3 3.0
6. I am aware of my surroundings	M SD	7.1 2.8	7.9 2.4	8.6 2.0	9.4 1.0	1.5 2.5	1.5 2.2
5. I feel secure in my home	M SD	6.5 2.6	7.2 2.9	9.3 0.9	8.2 2.4	2.7 2.5	1.0 1.9

Patients with PTSD and hearing aids: small HA effect, negative score indicates benefit on neg. worded items (n=60)

Items on Study Questionnaire Under Development (Higher score indicates greater agreement with the item statement)		UNAIDED		AIDED		DIFFERENCE	
		HA- Only	PTSD	HA- Only	PTSD	HA- Only	PTSD
3. I avoid noisy situations	M SD	5.9 1.5	7.1 2.7	5.8 2.9	7.6 2.1	-0.1 0.5	0.5 0.8
16. I feel fatigued because of my hearing loss	M SD	3.9 3.4	5.6 3.0	3.6 3.3	5.6 2.9	-0.3 2.5	0.1 2.2
15. I feel inadequate, handicapped or broken because of my hearing loss	M SD	4.5 3.3	6.0 3.1	4.0 3.2	5.6 3.0	-0.5 2.4	-0.4 3.2
17. I have trouble concentrating because of my hearing loss	M SD	5.3 2.8	7.7 2.4	4.7 2.8	6.0 2.7	-0.6 3.0	-1.6 2.4
18. I do not enjoy life because of my hearing loss	M SD	3.1 2.7	5.1 3.2	3.0 2.8	4.3 2.9	-0.2 1.9	-0.8 2.7

Patients with PTSD and hearing aids: large group differences initially, both groups rated items as worse when aided

Items on Study Questionnaire Under Development (Higher score indicates greater agreement with the item statement)		UNAIDED		AIDED		DIFFERENCE	
		HA-Only	PTSD	HA-Only	PTSD	HA-Only	PTSD
10. I am more bothered by environmental sounds than other people	M SD	3.7 1.7	5.6 2.9	5.7 2.6	7.0 2.7	2.0 2.3	1.4 2.6
7. Unexpected sounds make me anxious.	M SD	4.5 2.8	8.3 2.3	5.4 2.9	8.4 2.7	0.9 2.9	0.1 2.1
12. Hearing certain sounds trigger strong negative feelings	M SD	3.9 2.9	7.4 2.9	5.4 3.2	7.6 2.9	1.5 2.2	0.2 1.9
13. Hearing certain sounds trigger memories that are difficulty for me to handle.	M SD	3.3 2.7	7.4 3.1	3.8 3.1	7.8 3.0	0.5 1.3	0.4 1.9
14. Everyday sounds that are comfortable or slightly loud for other people are too loud or cause me pain	M SD	2.7 2.0	5.1 3.0	4.3 2.9	6.6 2.8	1.6 2.4	1.5 2.5
8. Unseen or unexpected sounds startle me.	M SD	5.3 2.8	7.9 2.6	6.8 2.9	8.4 2.3	1.5 2.3	0.5 1.7
11. Unwanted sounds in the environment make me anxious	M SD	3.3 2.0	6.8 2.9	4.6 2.9	7.0 2.6	1.3 2.1	0.2 2.2

Priorities for Management

1. Restore access to neutral and positive sounds
2. Support accurate response to potentially triggering sounds; will benefit from clinical psychology collaboration
3. Identify hearing aid characteristics (noise reduction and processing of transients) with the potential to address issues related to PTSD symptoms, esp. those associated w/ hyperarousal

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