

Tinnitus and Posttraumatic Stress Disorder

Marc A. Fagelson, PhD
East Tennessee State University
James H. Quillen Mountain Home VAMC

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Posttraumatic Stress Disorder

- ⊕ As defined in the Diagnostic and Statistical Manual of the APA (DSM-IV; 1994), the criteria for a diagnosis of PTSD include:
 - ⊕ Exposure to traumatic stressor that causes:
 - ⊕ Re-experiencing symptoms
 - ⊕ Avoidance and numbing symptoms
 - ⊕ **Symptoms of increased arousal**
 - ⊕ Duration > one month
 - ⊕ Significant distress or impairment of functioning

Posttraumatic Stress Disorder

- ⊕ The DSM-IV (1994) manual further describes the symptoms of increased arousal – patients must demonstrate 2 of the following:
 - ⊕ Difficulty falling or staying asleep
 - ⊕ Irritability or outbursts of anger
 - ⊕ Difficulty concentrating
 - ⊕ Hypervigilance
 - ⊕ Exaggerated startle response
 - ⊕ Frequency ,intensity, duration of event(s)

Posttraumatic Stress Disorder

- ⊕ Predisposing conditions/risk factors (Brewin et al, 2001)
 - ⊕ Severity of the trauma:
 - ⊕ Frequency, intensity, duration of event(s)
 - ⊕ Lack of support group
 - ⊕ Additional life stressors (family, work, etc.)
 - ⊕ Childhood abuse, low SES, intelligence, prior trauma, gender

Postconcussion Symptoms (PCS)

SOMATIC

- Headache
- Dizziness
- Fatigue – for physical and mental
- Visual Disturbances
- Sensitivity to Noise and Light

COGNITIVE

- Decreased Concentration
- Memory Problems

NEUROPSYCHIATRIC

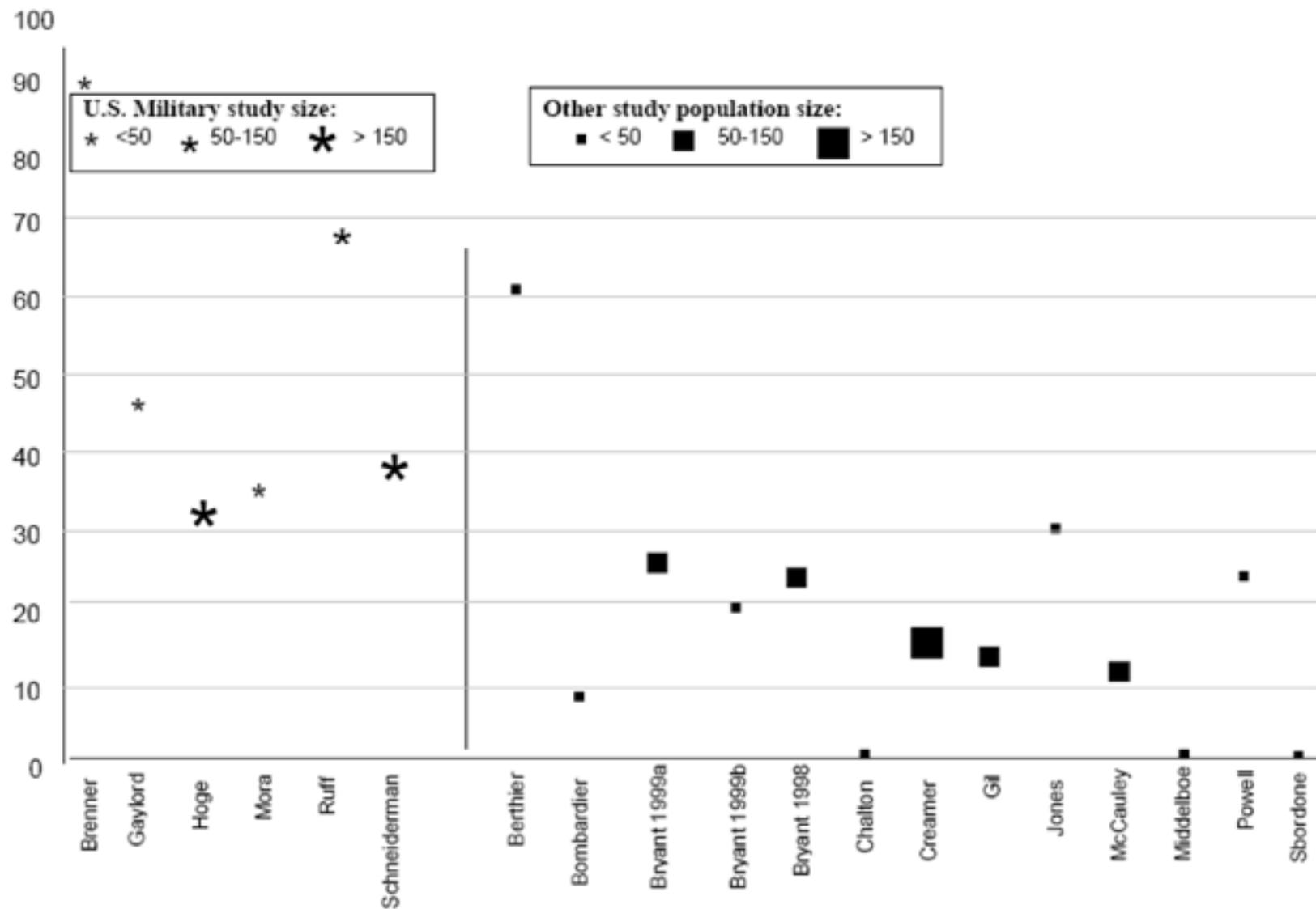
- Anxiety
- Depression
- Irritability
- Mood Swings
- Sleep Disturbances

Conclusions Regarding PTSD in TBI Patients

- Studies suggest that PTSD following TBI does occur, but may be modified by the brain injury
- Intrusive memories are less common in severe TBI cases; when present, highly predictive of PTSD
- PTSD is more likely in mild TBI than severe TBI

(Bombardier, C., et al. 2006. J Neuropsychiatry Clin Neurosci: Posttraumatic Stress Disorder Symptoms During the First Six Months After Traumatic Brain Injury: 18:4:501-508)

Prevalence of PTSD among study participants with a history of mTBI (Carlson, 2009; VA HSR&D analysis)



MISS (Keane et al, 1988)– Additional Diagnostic Considerations

- ④ Subsequent studies corroborated the four major types of symptoms: re-experiencing, avoidance, numbing, and arousal.
- ④ Arousal symptoms most relevant for audiologists to consider
 - ④ They indicate excessive physiological activation
 - ④ Include a heightened sense of “being on guard”
 - ④ Also manifested as difficulty with sleep and concentration
- ④ Patients also dislike confined spaces and unexpected sounds (test suite? PT and AR testing? LDL testing?)

PTSD Prevalence (www.ncptsd.org)

- Prevalence among Veterans
 - For Vietnam Veterans, 31% of males and 27% of females meet criteria at some point in their lives (total of 1.7 million VN-era Vets)
 - Observing higher prevalence from OEF/OIF due to more aggressive intervention/more awareness
 - More than 1,000 patients currently enrolled in PTSD clinics at Mountain Home

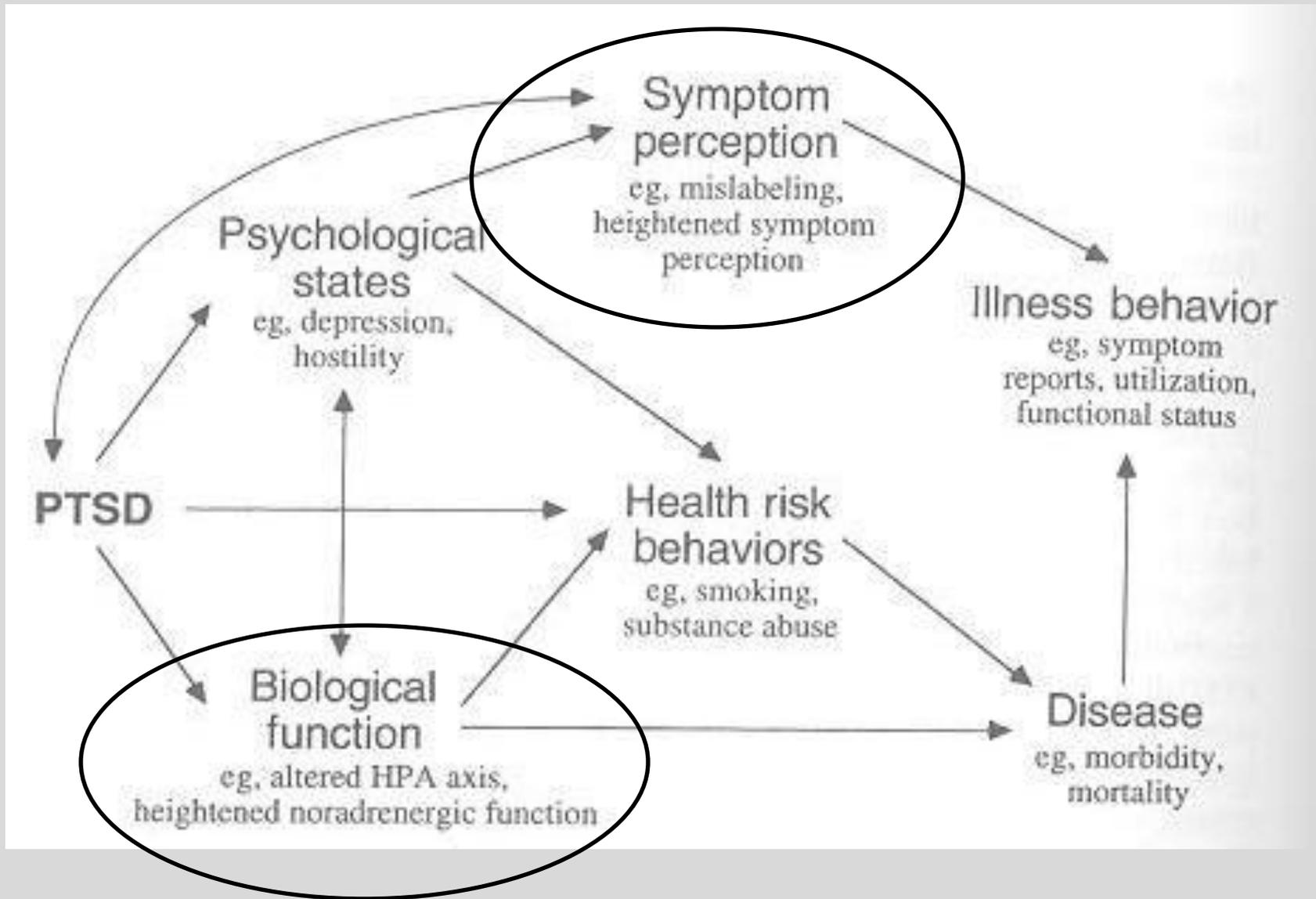
PTSD – Severity of Trauma

(www.ncptsd.org)

- ④ PTSD most likely to influence tinnitus severity if tinnitus onset is linked to factors that exacerbate PTSD severity:
 - ④ Direct exposure to traumatic event as victim or witness
 - ④ Patient experienced trauma in childhood
 - ④ Was seriously injured during the event
 - ④ A long-duration event (i.e., captivity for more than 24 hours)
 - ④ An event that produced a severe reaction, such as crying, shaking, vomiting, or feeling apart from surroundings (observing self from outside body)
 - ④ Helplessness during event; unable to help oneself or a loved one

PTSD and Health

- ④ PTSD is related to higher levels of health-related problems (Schnurr & Green, 2004)
- ④ Global impairments of function in veterans and civilians (Thorp & Stein, 2005)
- ④ PTSD exacerbates:
 - ④ Chronic mental health conditions (depression, anxiety, nervousness, aggressiveness)
 - ④ Chronic physical conditions (GI, chronic pain i.e., back pain, headache), cardiopulmonary disease
 - ④ Substance abuse



Schnurr & Janikowski, 1999; Sem. in Clin.
Neuropsychiatry

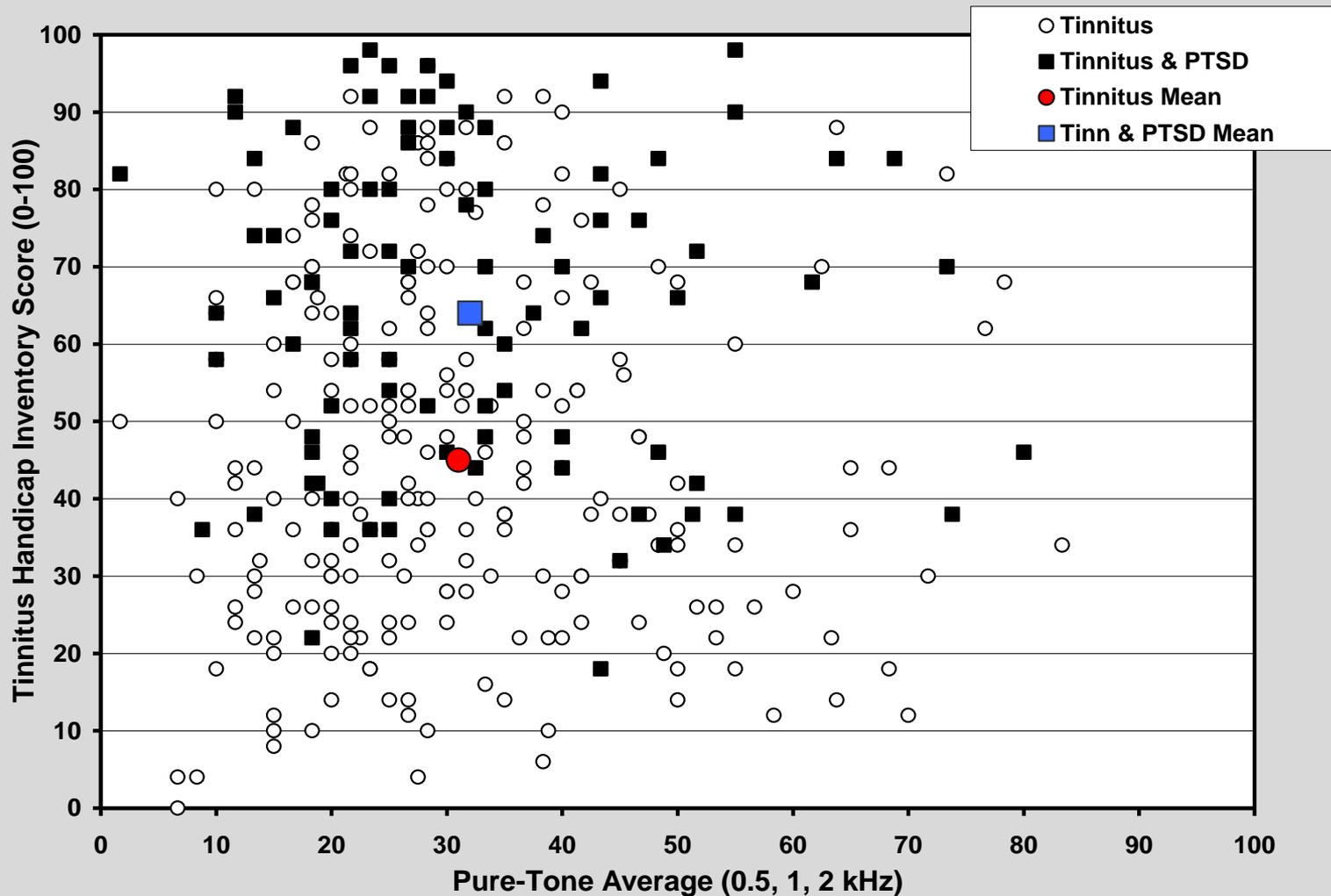
PTSD and Senses

- ① Sensory events “exaggerated” or “mislabeled”
 - ① Sound (either external OR tinnitus) does not represent a threat; however the sensory event is misinterpreted by the perceiver
 - ① Creates arousal consistent with the sense of threat (impending trauma)
- ① Responses to perceived threat are difficult to control or suppress (Vets avoiding war movies)
 - ① Patient develops avoidance strategies similar to those observed in hyperacusic or phobic patients

PTSD and Tinnitus in a Veteran Population

- @ Clinical findings support an interaction:
 - @ Of our first 700 patients, 247 (more than 35%) are enrolled concurrently in PTSD clinic or carry PTSD dx
 - @ We have referred 27 patients in past 8 years to psych clinic, all of whom subsequently returned a positive PTSD diagnosis
 - @ Referrals based upon an analysis of patient characteristics performed using tinnitus intake and self-assessment forms, and on occasion tinnitus testing
 - @ For analysis of charted data the patients are divided into two groups, Tinnitus-Only, and Tinnitus w/ PTSD

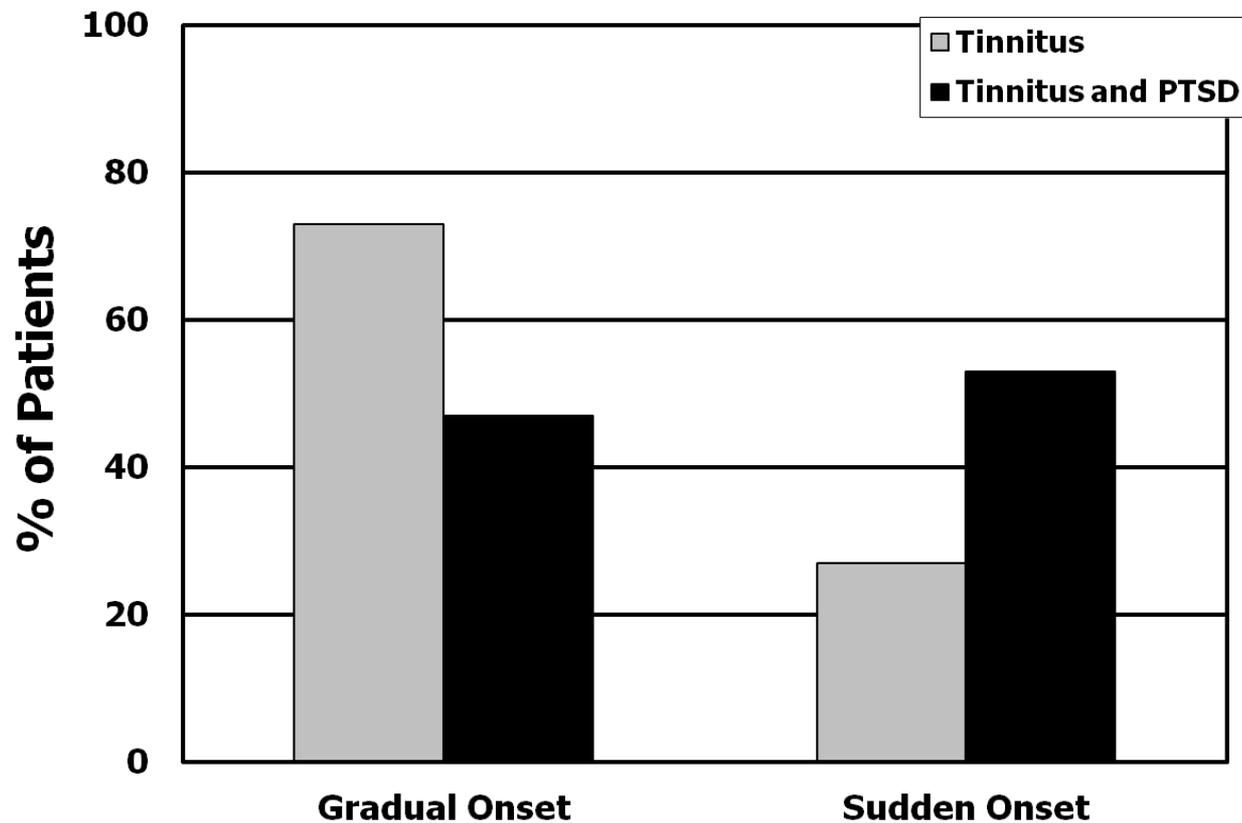
PTSD, Tinnitus, and Hearing Loss in a Veteran population (N=300)



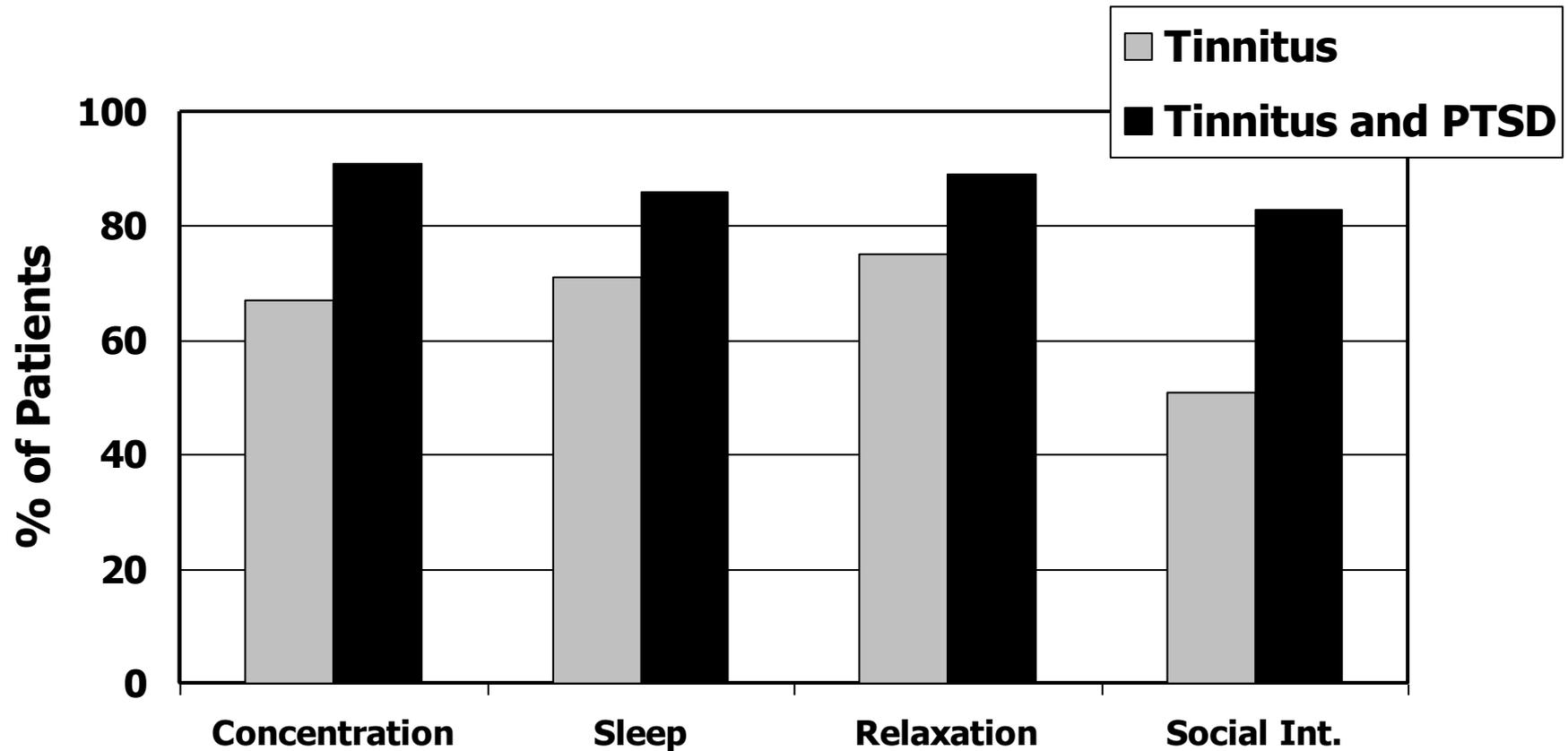
Onset of Tinnitus

- ② Sudden Onset defined as a tinnitus experience that reached ‘its current level of annoyance’ within one week of its initial appearance
- ② Gradual onset – tinnitus continues to get worse over time (may be 30-40 years prior to initial appearance)

Reported Onset of Tinnitus (N=500; T=329; PT=171)



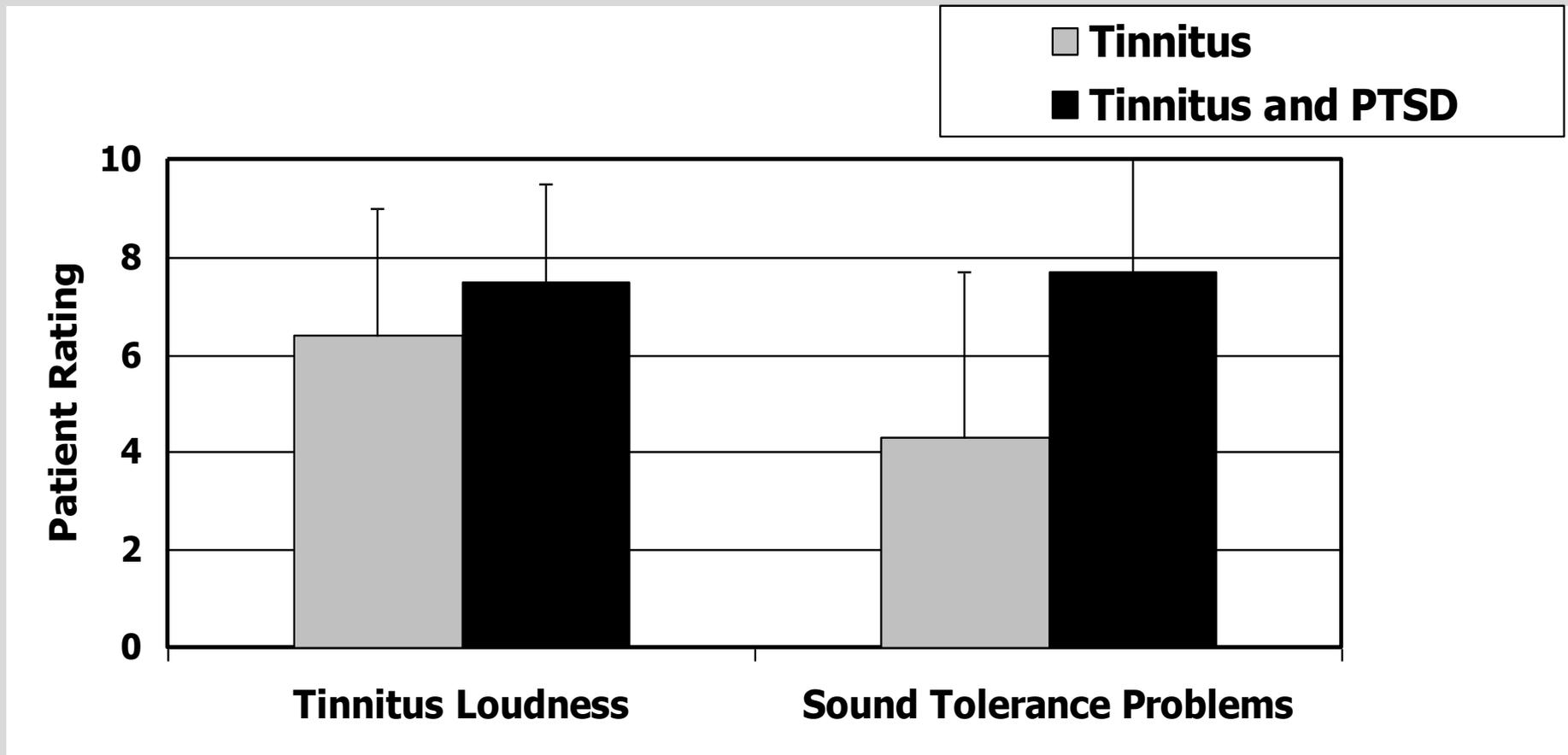
Tinnitus-Related Disturbances (N=500 total pts)



Patient Ratings

- ② Estimates of tinnitus loudness
 - ② Scale the typical or “average” loudness (1-10)
 - ② No consideration given to fluctuation (that question was asked separately)
- ② Estimates of sound-provoked discomfort
 - ② Patients asked to identify sounds that were most likely to produce problems (goal was to identify ‘everyday’ or frequently encountered sounds)
 - ② Most bothersome were impulsive, sudden, unexpected

Patient Ratings of Tinnitus Loudness and Sound Tolerance



Clinic Chart Review of PTSD pts:

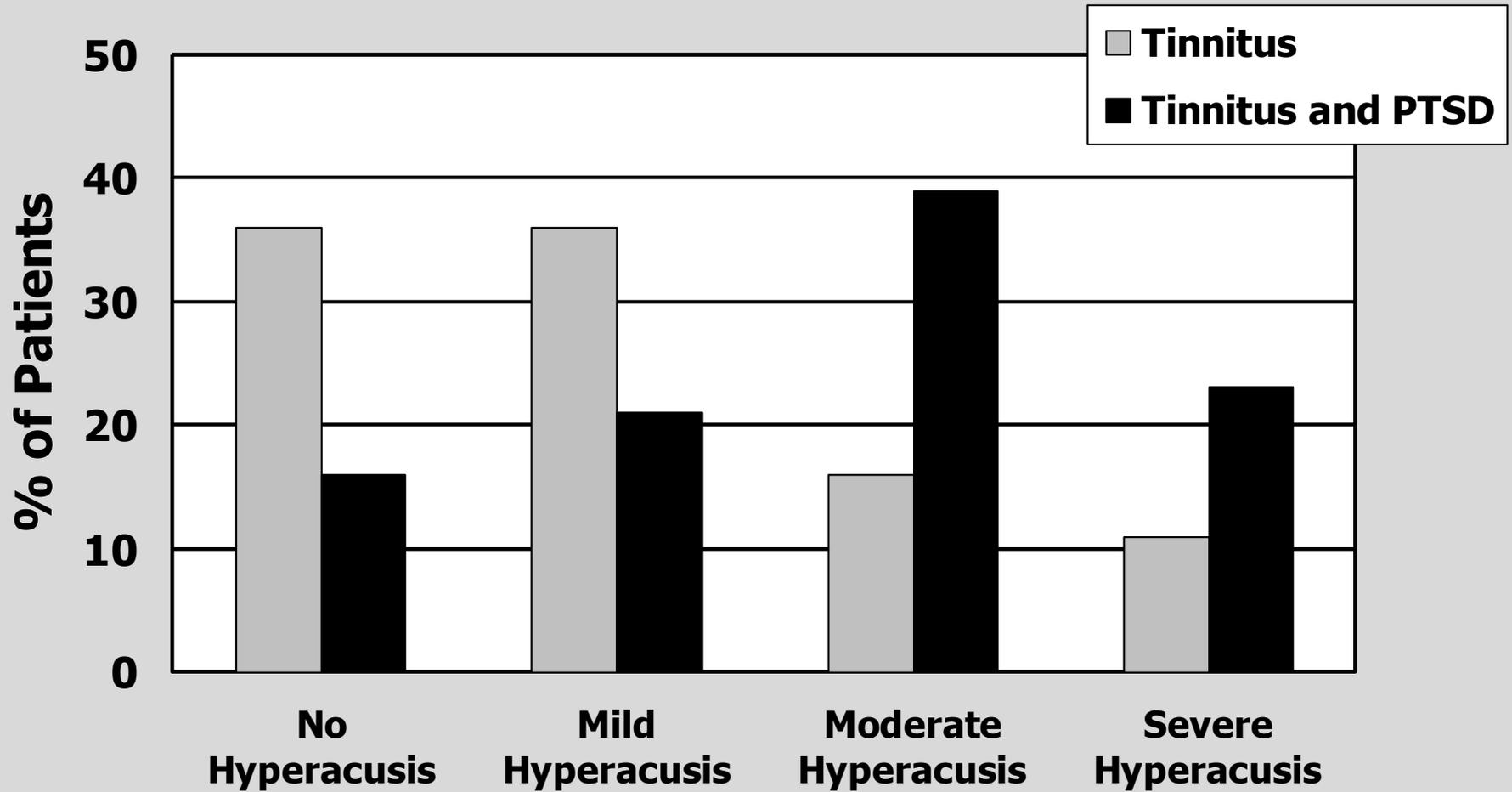
Do sounds make you feel physical discomfort, or feel the need to get away? (open set if “yes”)

Offending Sound	Proportion of Patients Reporting (N=247)
Impulse	84%
Impulse (“worse when unexpected?”)	100%
Children Shouting (“Carrying on”)	72%
Metallic “scraping” sounds	69%
Sirens	67%
Loud Machinery	56%
Helicopters/Airplanes	53%

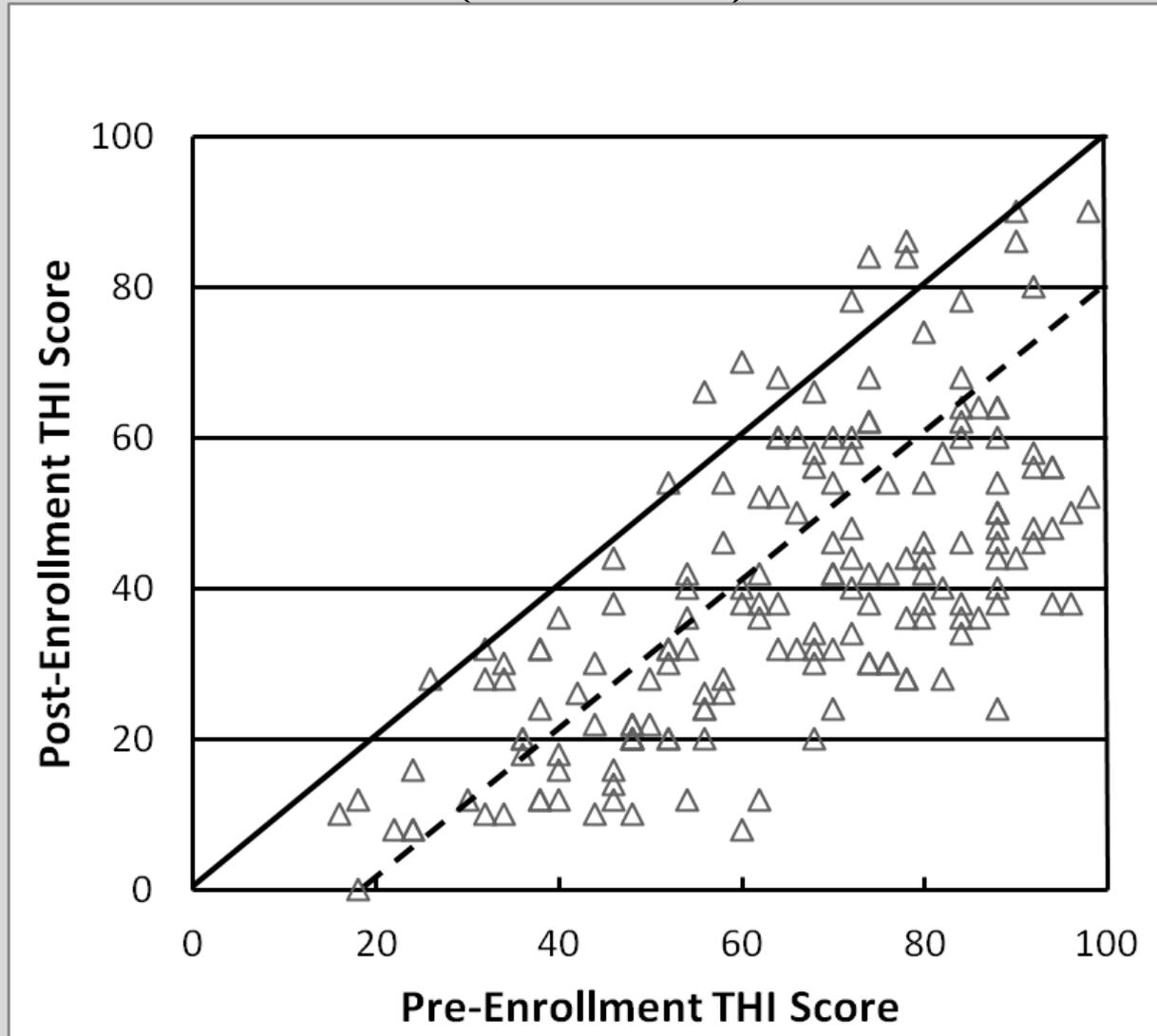
“Frequently-Encountered Sounds” Provoking Discomfort (1-10)

Degree of Hyperacusis	Patient Report
None	Patient denies problem
Mild	Patient reports problem and rates discomfort at <5
Moderate	Patient reports problem and rates discomfort at 5-7.5
Severe	Patient reports problem and rates discomfort at ≥ 8

Degree of Hyperacusis



Changes in THI Over Time: PTSD Pts. (N=171)



Pre- and \geq One Year Post-Enrollment THI Scores for Both Groups (N=500)

T: N=329	Total	Functional	Catastrophic	Emotional
Pre Mean	46.8	21.1	10.7	15.0
Post Mean	35.3	17.8	9.4	8.1

PT: N=171	Total	Functional	Catastrophic	Emotional
Pre Mean	63.5	27.3	11.1	25.1
Post Mean	41.1*	22.1	8.2	9.8

* Exceeds Newman et al (1998) criterion of 20-point decrease for test significance

Self-Efficacy Theory

- ⓐ Belief, or *domain-specific* confidence, individuals have in their abilities (or a specific skills) to accomplish, develop, and/or maintain a certain behavior, including health behaviors (Bandura, 1986, 1997)
 - ⓐ self-efficacy can be high in one domain, low in another
- ⓐ Different from a general self-confidence or self-esteem

Self-Efficacy Theory

- Individuals make judgments about their self-efficacy beliefs through 4 sources of information
 1. Mastery experiences – evidence supported by accomplishment (whether easy or hard)
 2. Vicarious experiences – evidence of, and comparison to, others' success (modeling)
 3. Verbal persuasion – counseling, examples, evaluations
 4. Physiologic and affective states – enhancement of physical status and reduction of negative emotional states, as well as fostering correct interpretation of sensory information and physiologic state

Why Is Self-Efficacy Important?

- Patients with high self-efficacy beliefs for skills needed to manage a health condition have been associated with:
 - Increased compliance with treatment/management recommendations
 - Improved subjective and objective outcomes
 - Higher health-related quality of life
 - Persevere in face of difficulty
 - Put forth greater effort in managing condition

Self-Efficacy in Audiology

- Balance Dysfunction/Falls (Tinetti et al., 1990)
- Hearing Conservation
 - Hearing protective devices (Lusk and colleagues, 1999, 1997; Melamed et al., 1996)
- Hearing Aid Intervention (Smith & West, 2006 a,b; West & Smith, 2007; Sweetow and Sabes, 2011)
- Communication Strategies Training (Jennings, 2007)
- Tinnitus Management (Smith & Fagelson, 2008, 2011)

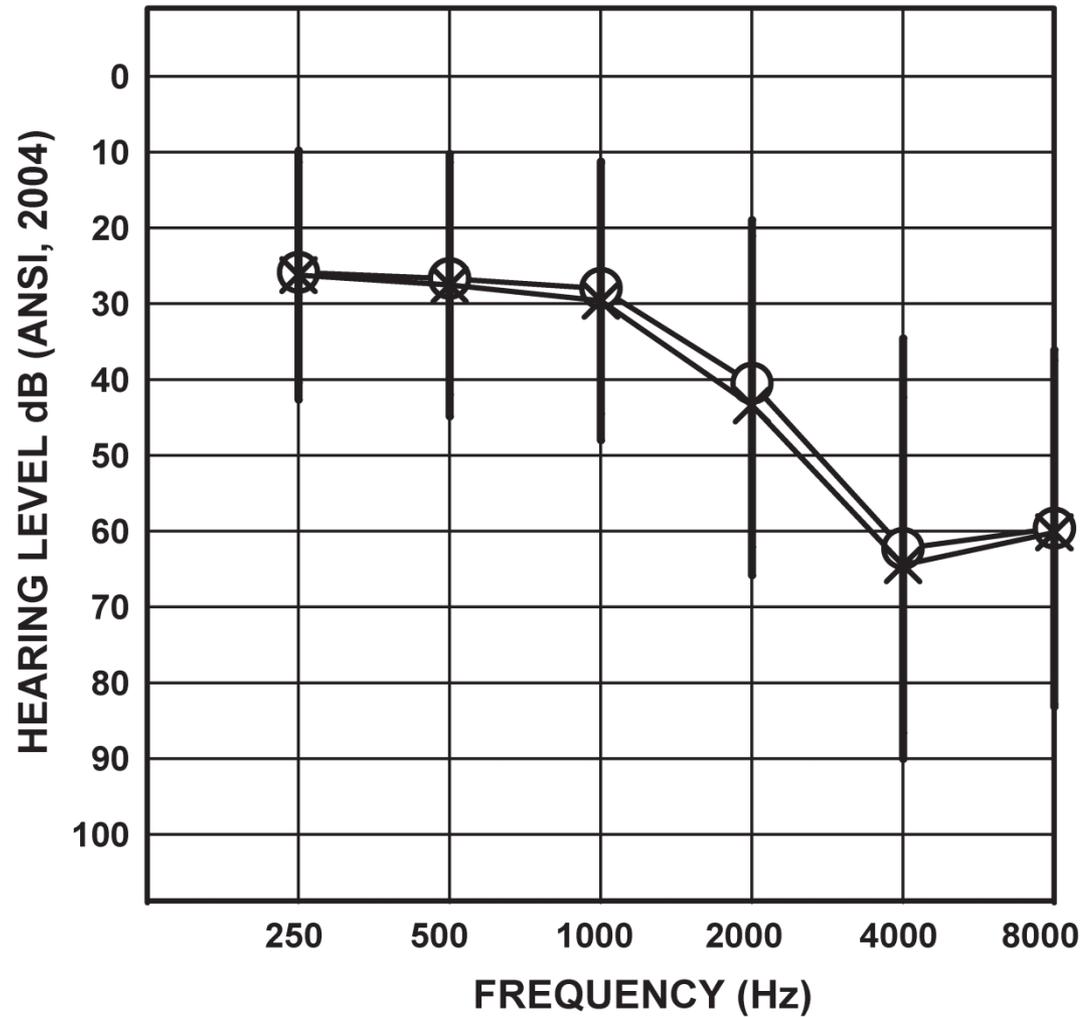
Self-Efficacy and Tinnitus

- Self-efficacy objectives for the patient with tinnitus
 - Identify specific activities for which the patient lacks sense of control
 - Foster patient's knowledge of mechanisms and effects
 - Target coping strategies that can reduce the patient-identified influences of tinnitus on daily function
 - Fits well w/ models of tinnitus that stress either conditioned response, or phobic reaction to the signal

Tinnitus Self-Efficacy

“The confidence individuals have in their capabilities to perform courses of action needed to manage their tinnitus successfully.”

Methods: Participants



Routine Tinnitus Management Items

- 16 items (mean=38.5; SD=27.9)
- Item examples
 - I can ignore my tinnitus when listening to music
 - I can ignore my tinnitus when reading in a quiet place
 - I can ignore my tinnitus when I try to go to sleep at night
 - I can ignore my tinnitus when driving in heavy traffic
 - I can ignore my tinnitus when I am working

Emotional Response Items

- 9 items (mean=56.8; SD=26.2)
- Item examples
 - I can manage my anger when I hear my tinnitus
 - I can manage my stress level when I hear my tinnitus
 - I can manage feelings of nervousness when I hear my tinnitus
 - I can manage feelings of fear when I hear my tinnitus.

Internal Thoughts and Interactions with Others

- 8 items (mean=60.8; SD=27.8)
- Item examples
 - I can help people in my workplace despite my tinnitus
 - I can feel my senses are reliable even when I hear my tinnitus
 - I can manage to have a positive self-image even when I hear my tinnitus
 - I can carry out conversations with a small group of people even when I hear my tinnitus

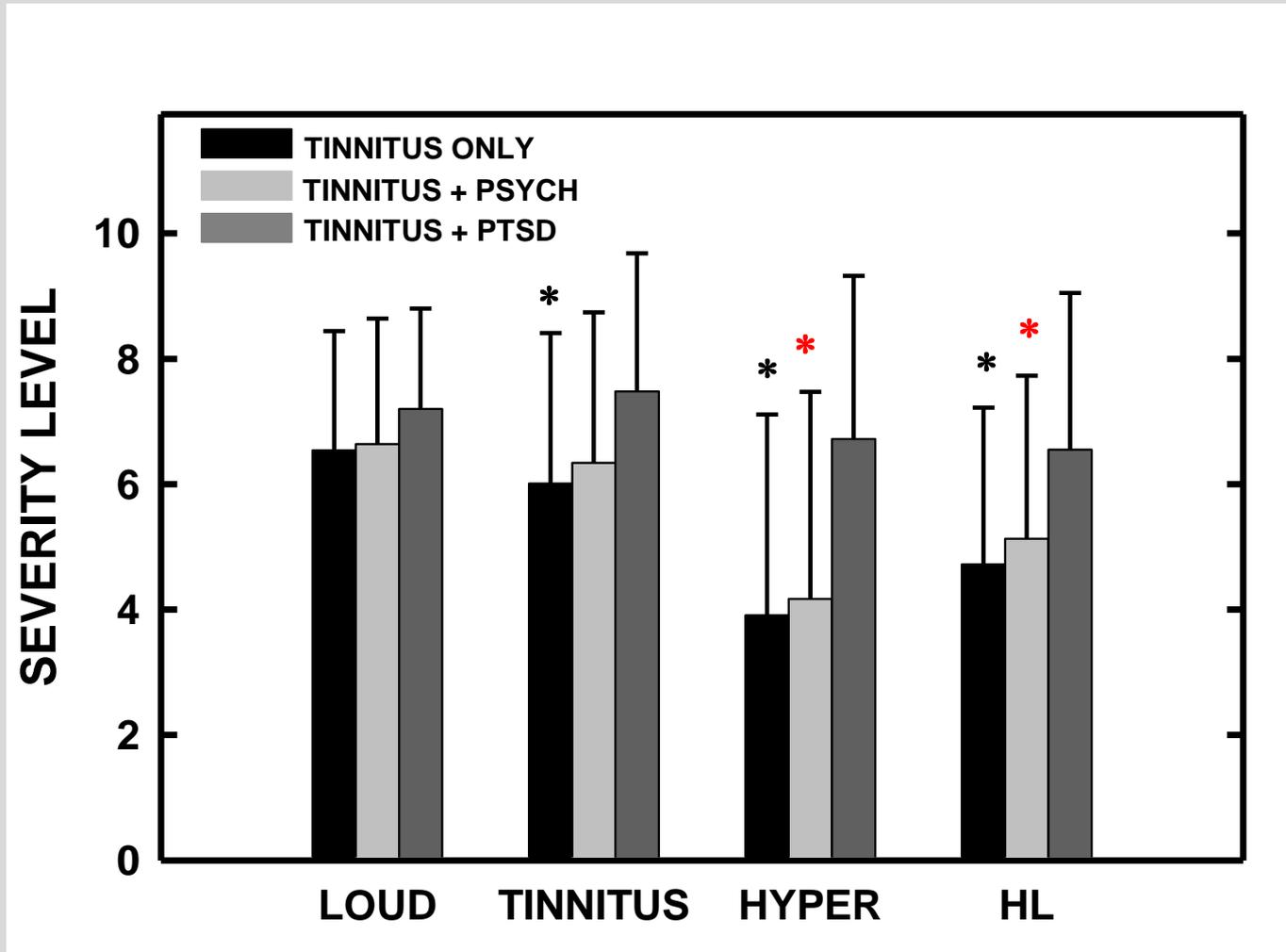
Tinnitus Concepts Subscale

- 4 items (mean=60.5; SD=27.9)
 - I can understand the difference between my hearing loss and my tinnitus
 - I can understand the changes to my hearing system that caused my tinnitus
 - I can understand that my hearing loss is not caused by my tinnitus
 - I can understand the results of my hearing test

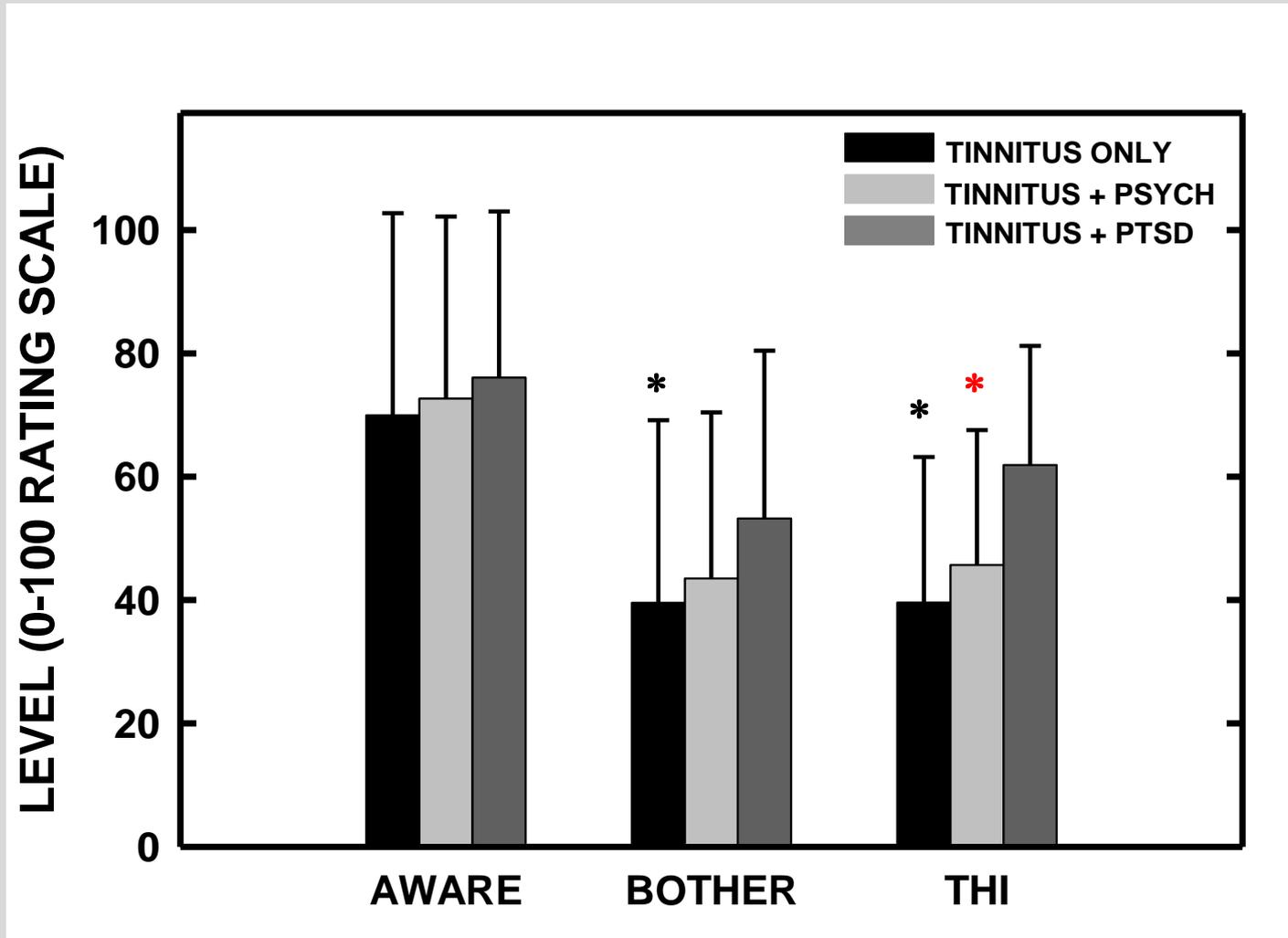
Devices Subscale

- 3 items (mean=50.6; SD=28.2)
 - I can use hearing aids or other assistive devices to help reduce communication problems caused by my tinnitus
 - I can use a masking device to help reduce my tinnitus without reducing my ability to understand speech
 - I can use a sound generating device such as a fan or noise machine to help me sleep when I hear my tinnitus

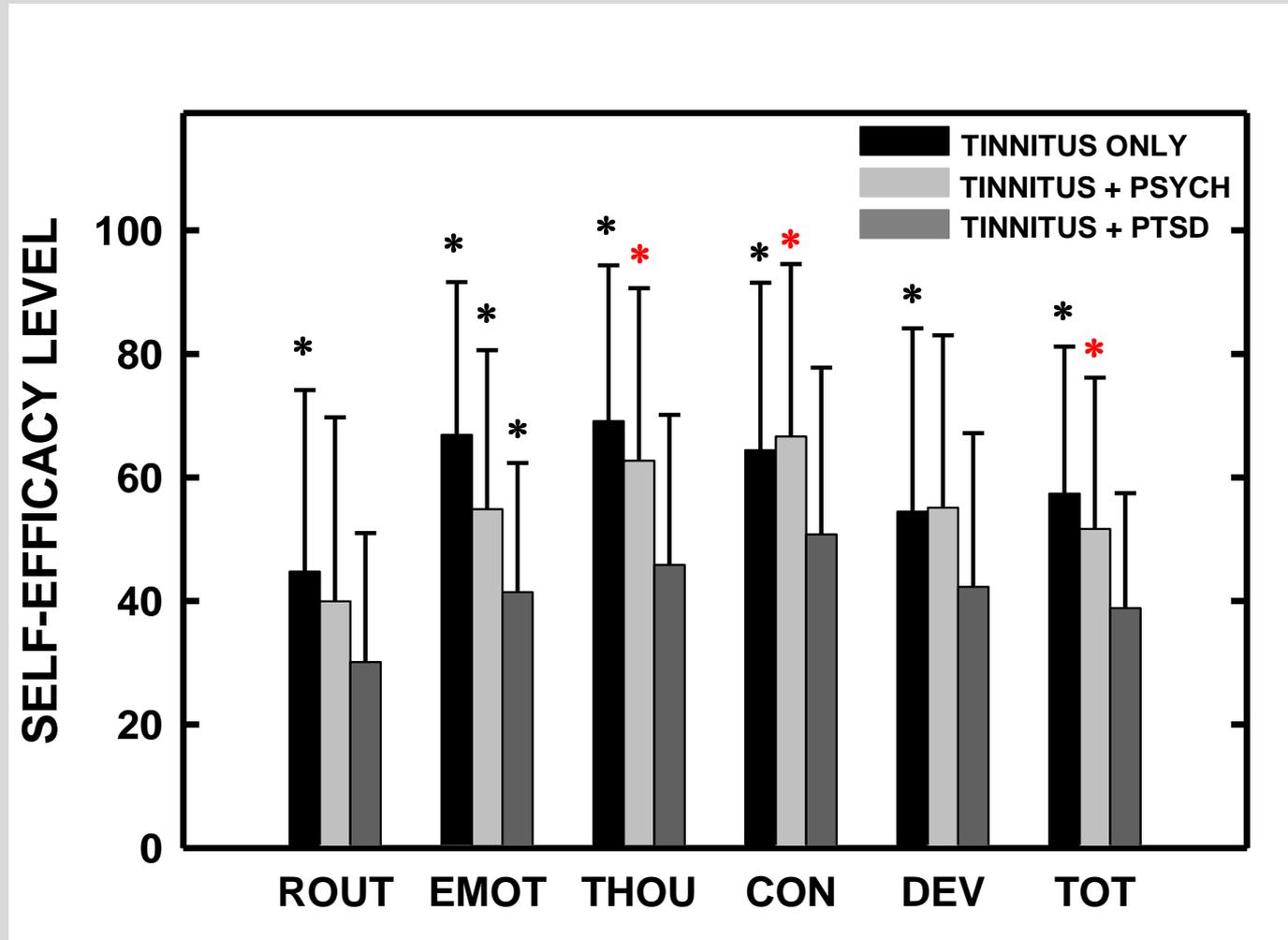
Patient Ratings of Otologic Symptoms



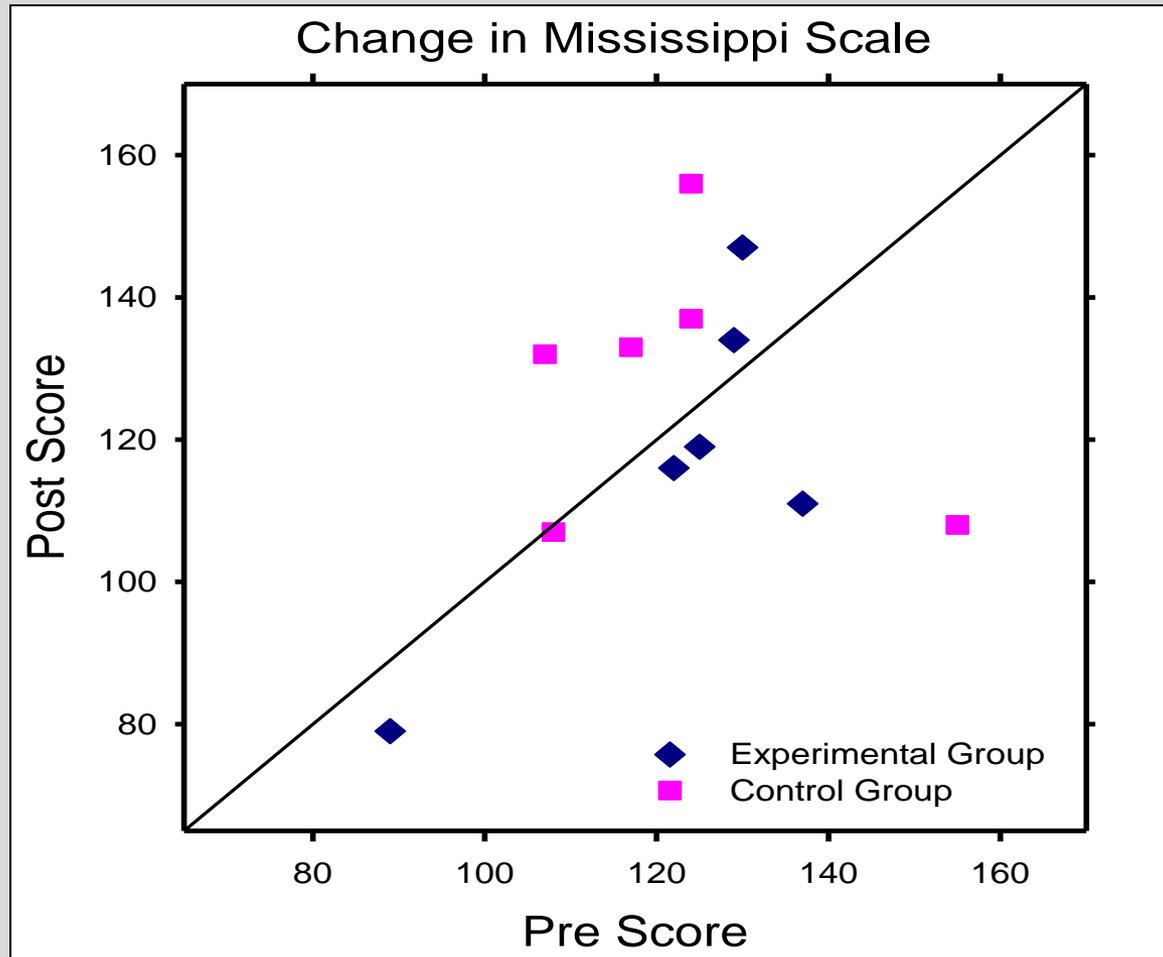
Patient Ratings of Tinnitus Symptoms



Self-Efficacy for Tinnitus Management Questionnaire Results



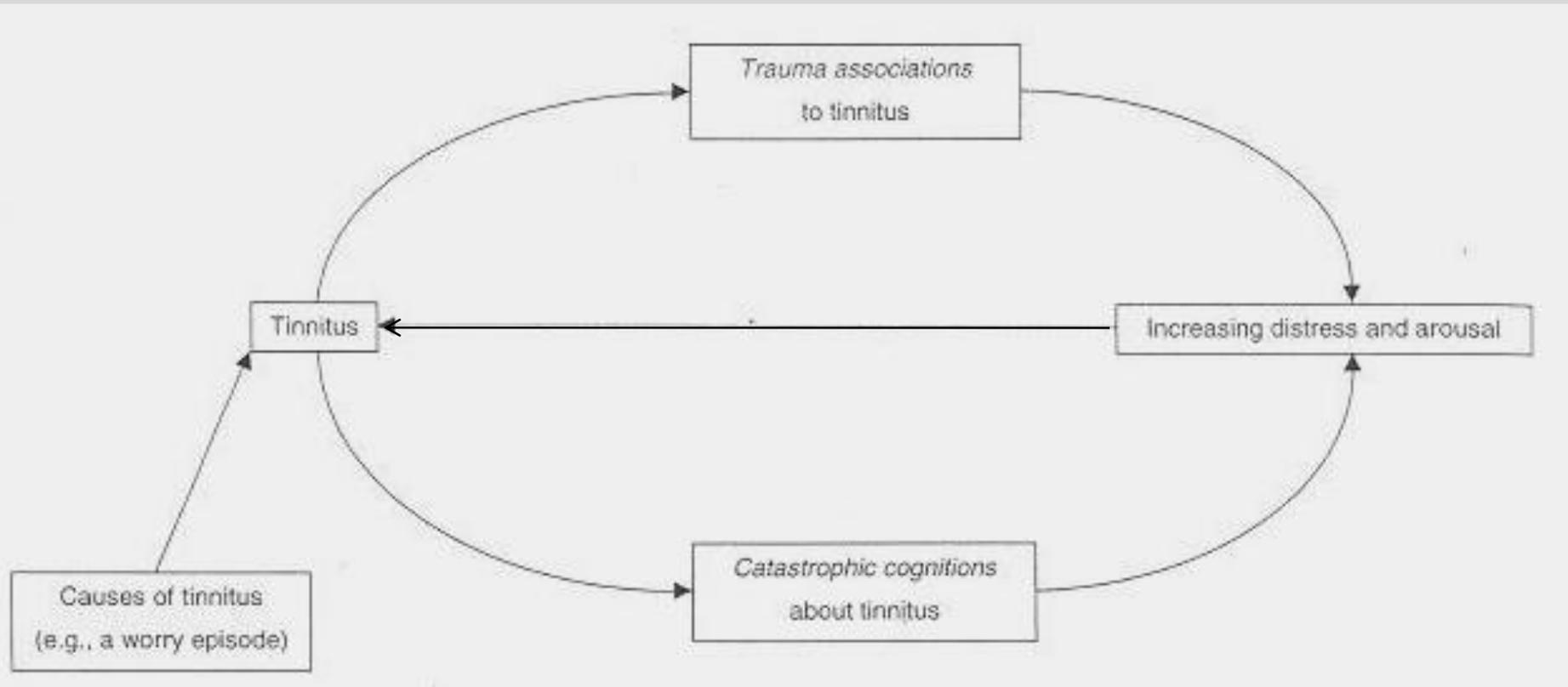
Utility of Sound Therapy in PTSD Patients



Posttraumatic Stress Disorder & Tinnitus

- ⊕ Hinton et al. (2006; *Journal of Traumatic Stress*)
- ⊕ Sampled a Cambodian refugee population
 - ⊕ N=104; 52 had tinnitus
 - ⊕ Questioned pts. regarding tinnitus and its psych. effects (as well as more standard PTSD intake)
 - ⊕ Pt. tinnitus reports included “loss of soul” and inability to trust senses
 - ⊕ The magnitude to which these complaints affected pts. was more strongly correlated with severity of PTSD than was tinnitus loudness
 - ⊕ Pts. w/ tinnitus rated their PTSD as more severe (on PTSD scales) than those w/out tinnitus

Hinton et al., 2006



PTSD-Related Treatment Priorities for the Audiologist/Tinnitus patient

- ① Reduce symptoms associated with hyperarousal through desensitization, counseling
 - ① Reduce power of startle response (improve sound tolerance)
 - ① Improve concentration or focusing of attention
 - ① Reduce irritability
 - ① Facilitate sleep

PTSD– Considerations for Audiologists

- ⓐ Arousal symptoms to watch for:
 - ⓐ Irritability (by own report, by spouse’s report):
Indicates excessive physiological activation
(sound-provoked tinnitus exacerbation)
 - ⓐ Exaggerated Startle: A heightened sense of “being on guard”
 - ⓐ Also manifested as difficulty with sleep and concentration
 - ⓐ May want door to booth open, certain lighting, unknown people (i.e., supervisees) out

Summary

- Ⓢ High prevalence of PTSD among civilian and Veteran populations has implications for audiologists, their tests, and interpretation of pt. history and complaints (prior trauma a major factor)
- Ⓢ Hyperarousal causes mislabeling of sensory information, central to PTSD and hyperacusis
- Ⓢ Intrusive memories may be triggered by such sensory inputs particularly those associated w/ trauma (unexpected impulse sounds, etc.)

Summary

- Tinnitus symptoms are rated more severe by patients with PTSD compared to those without PTSD
- Tinnitus self-efficacy is lower in patients with PTSD compared to those with other psychological conditions or those with just tinnitus

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