Factors Disrupting Uptake of Audiological Services and Technology

Amyn M Amlani, PhD
Professor & Chair
University of Arkansas for Medical Sciences / University of Arkansas at Little Rock

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Disclosure

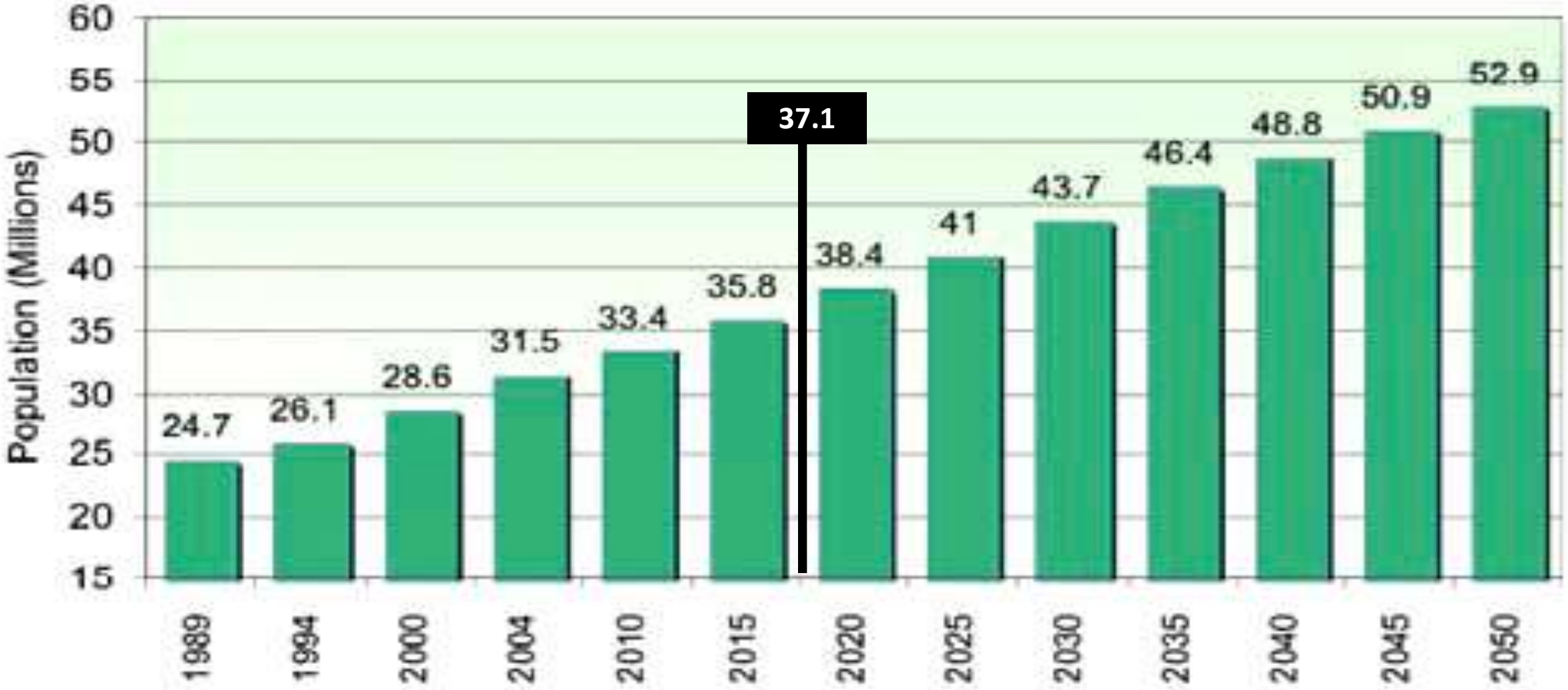
Relevant Financial Relationships:

- Employee of University of Arkansas for Medical Sciences
- Former employee of University of North Texas
- Special Appreciation to
  - AARP
  - Elise Williams (UAMS – AuD Student)

Relevant Nonfinancial Relationships:

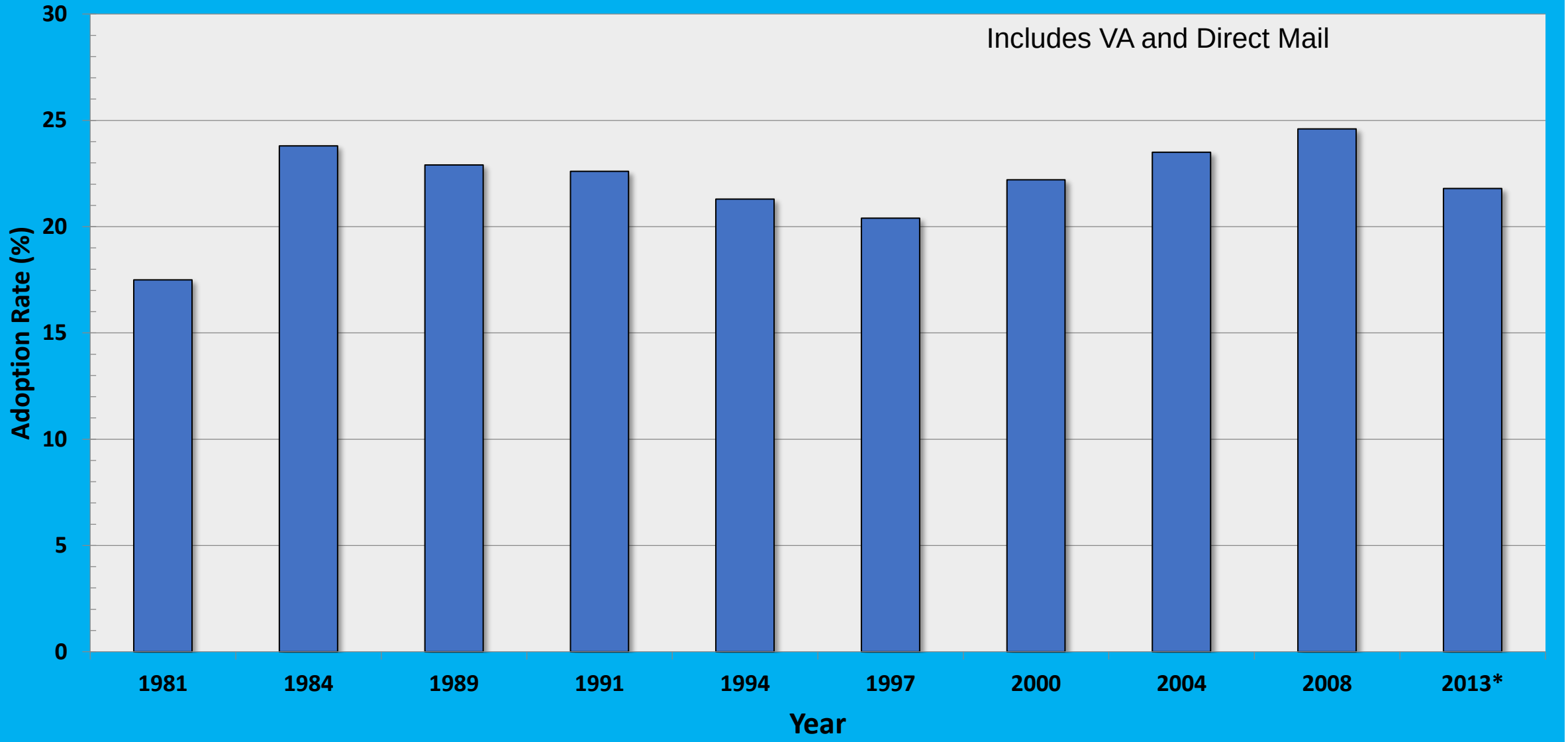
- None

BHI Estimates of Hearing Impairment - US



Kochkin (2009)

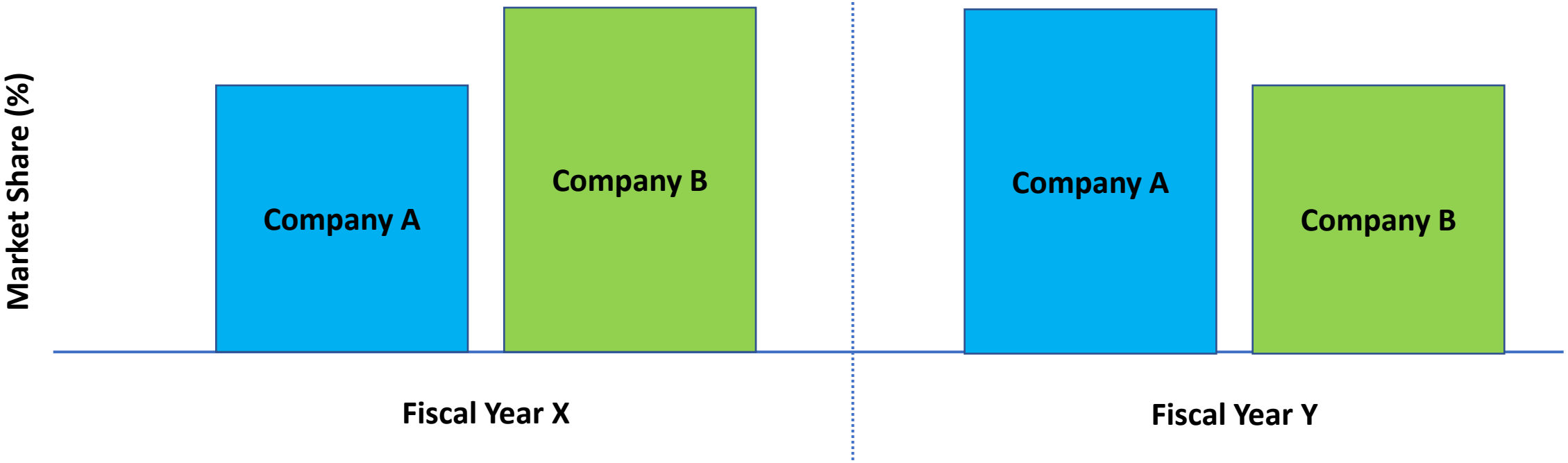
US Adoption Rates - Historic



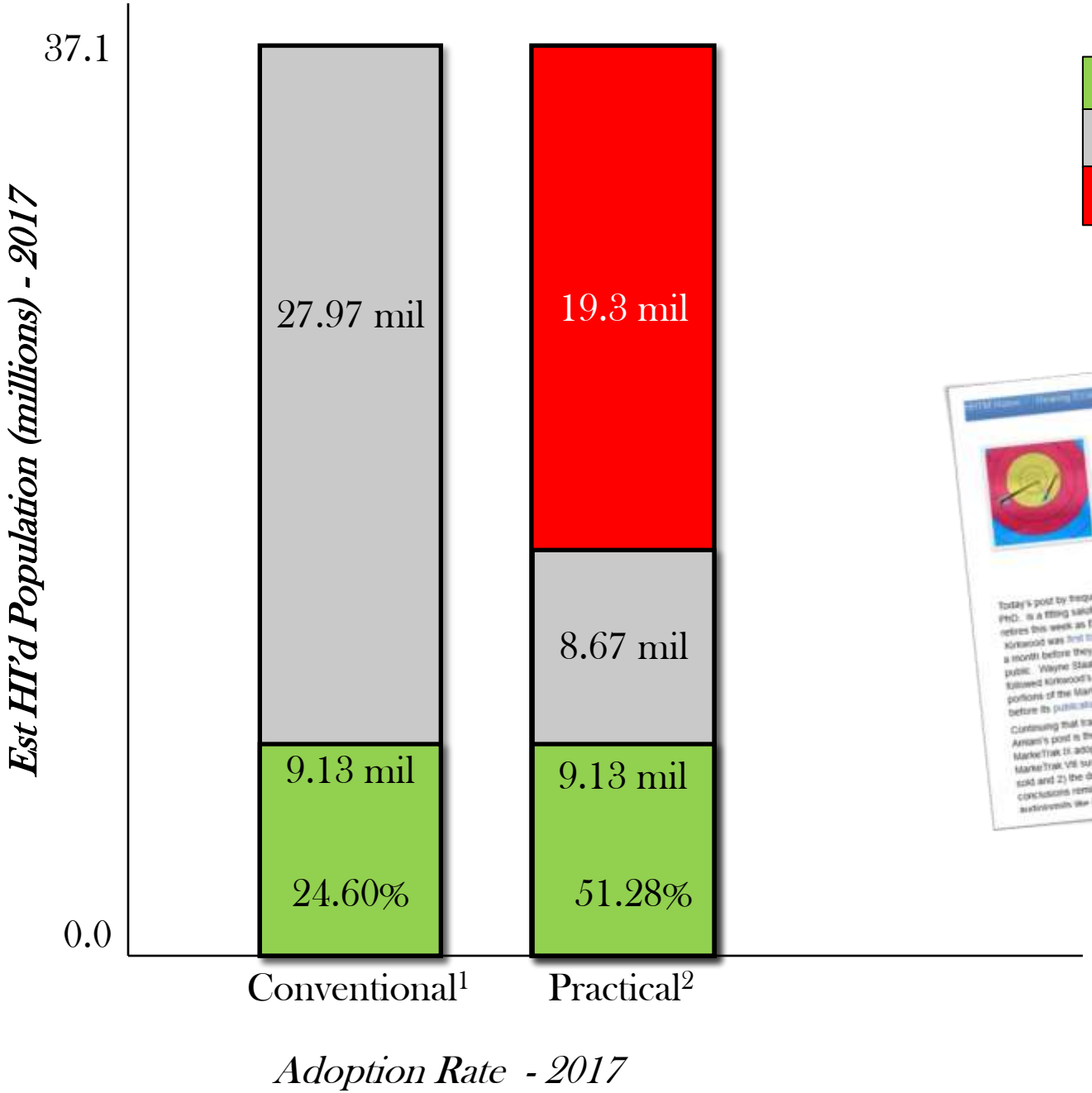
Kochkin (2009); * William Dement Holdings (June, 2013)

Market Growth = 3-5% annually

% Sales	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Change
ReSound	12.3%	16.5%	16.4%	17.0%	17.3%	18.2%	5.9%
Oticon	7.5%	7.7%	7.5%	7.3%	7.3%	7.4%	-0.1%
Phonak	43.0%	41.9%	42.9%	42.2%	42.9%	42.6%	-0.4%
Sivantos	10.7%	10.4%	10.5%	10.8%	9.9%	9.8%	-0.9%
Starkey	23.9%	21.3%	21.0%	20.7%	20.9%	20.5%	-3.4%
Widex	2.6%	2.3%	1.8%	2.0%	1.8%	1.5%	-1.1%



Supply-Side Growth

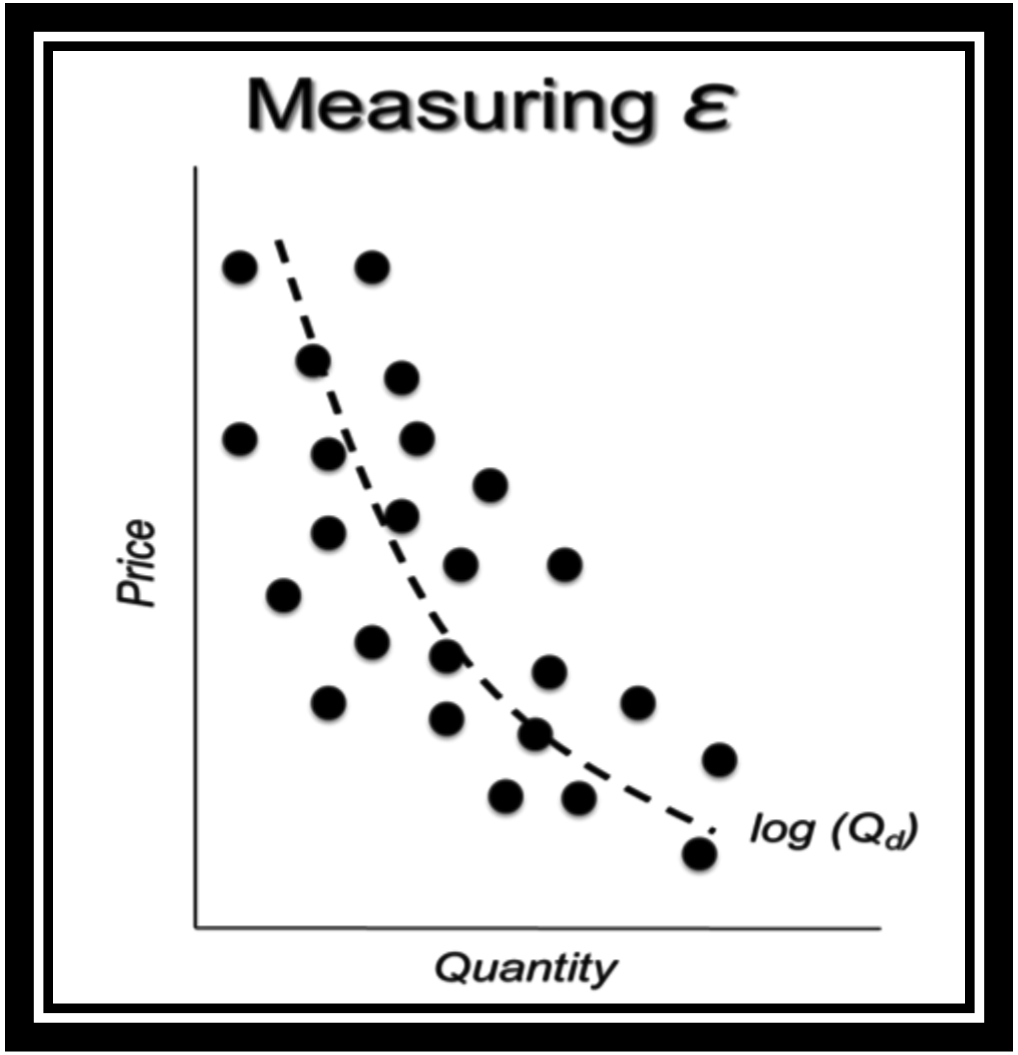


1. Kochkin (2009)
2. Amlani (Unpublished)

Demand and Hearing Aid Market

- Demand function ($\mathcal{E}$), overall, within the hearing aid market is inelastic (Aaron, 1987; Lee & Lotz, 1998; Amlani & De Silva, 2005; Amlani, 2010)

- Elastic demand means that consumers ***<u>are</u>*** price sensitive (i.e., $\varepsilon > |1|$)
  - Appreciable decline in quantity sold when price is increased
  - Appreciable increase in quantity sold when price is decreased
- Inelastic market means that consumers are ***<u>not</u>*** price sensitive (i.e., $\varepsilon < |1|$)
  - No appreciable decline in quantity sold when price is increased
  - No appreciable increase in quantity sold when price is decreased



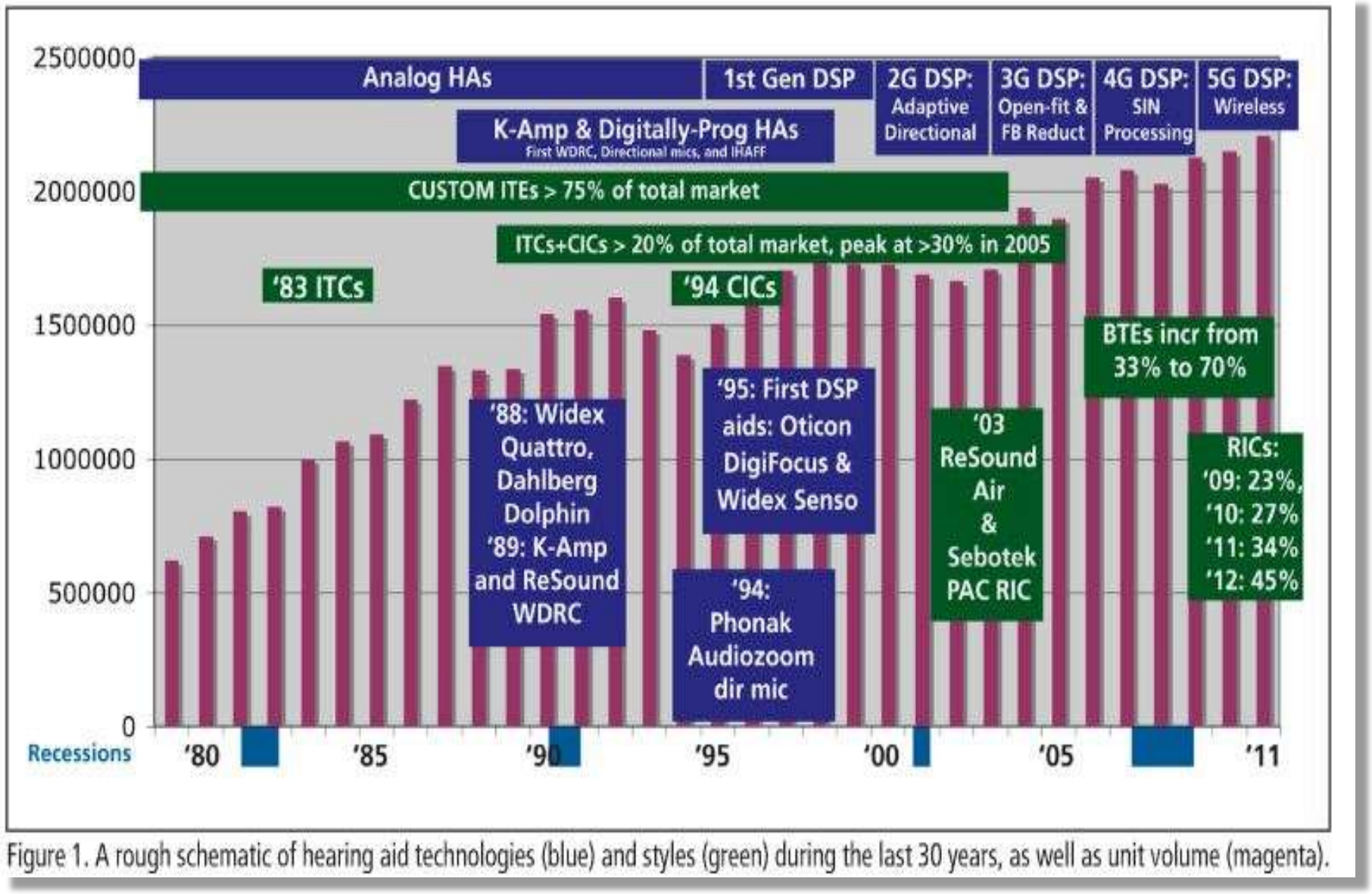
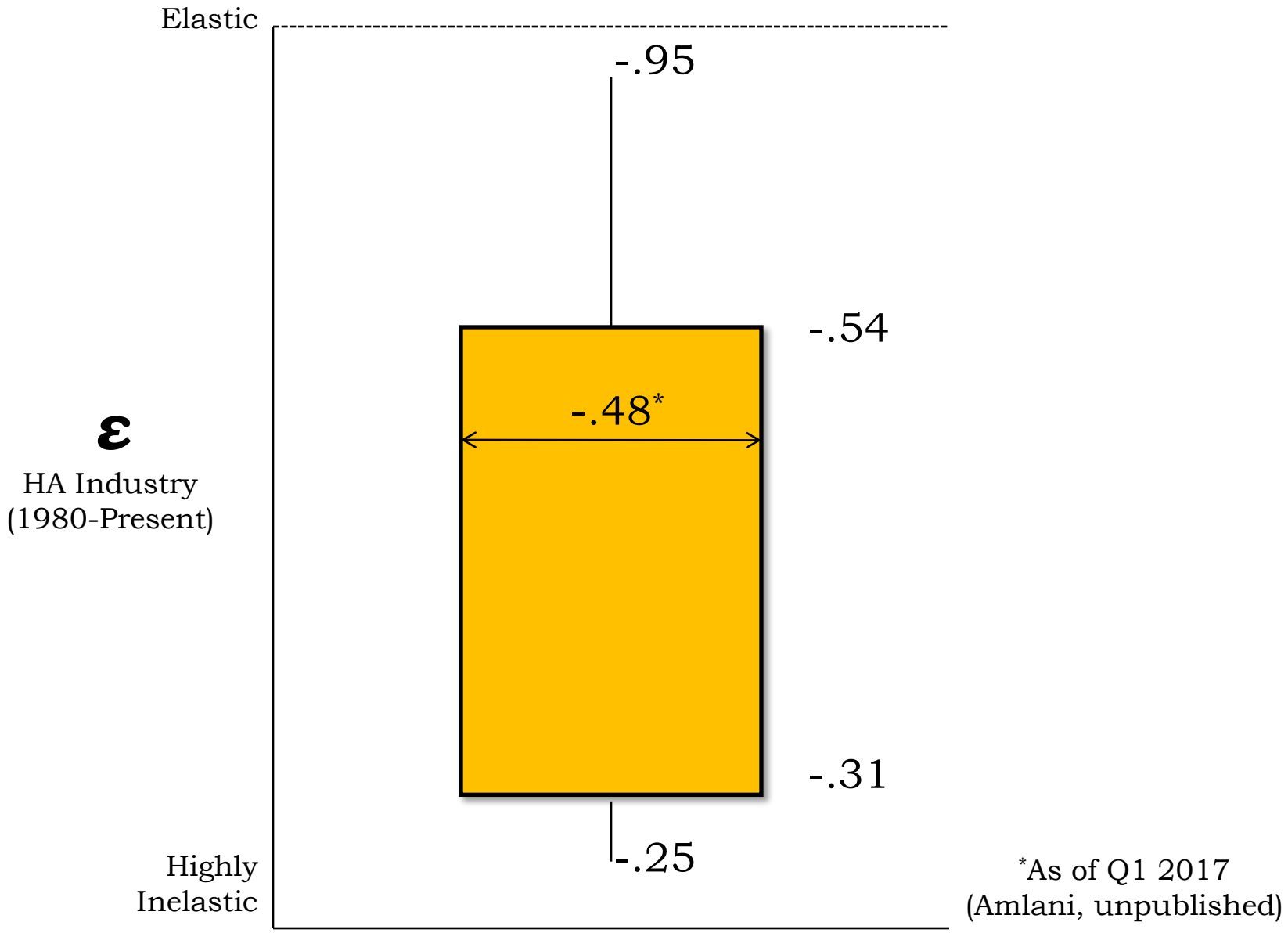


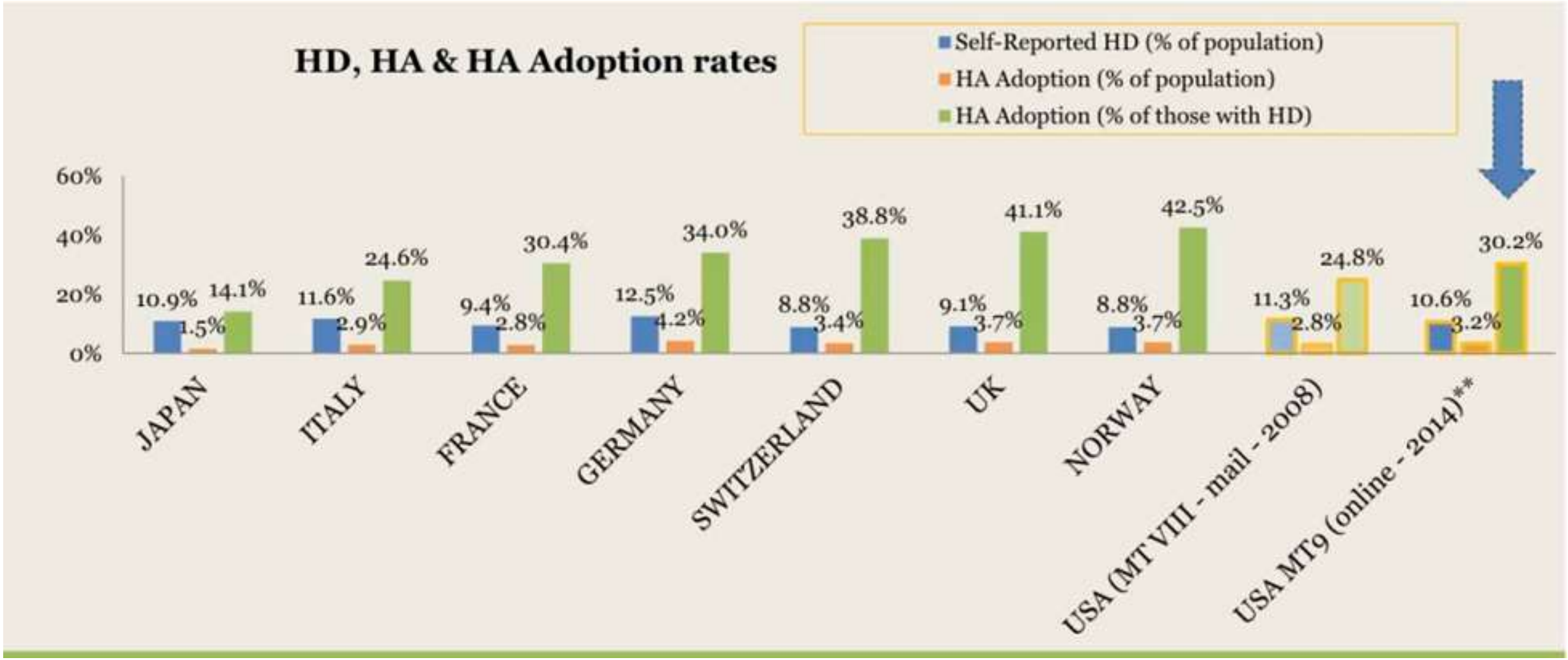
Figure 1. A rough schematic of hearing aid technologies (blue) and styles (green) during the last 30 years, as well as unit volume (magenta).

http://hearinghealthmatters.org/hearingeconomics/2013/hearing-aid-prices-going-up-going-down/

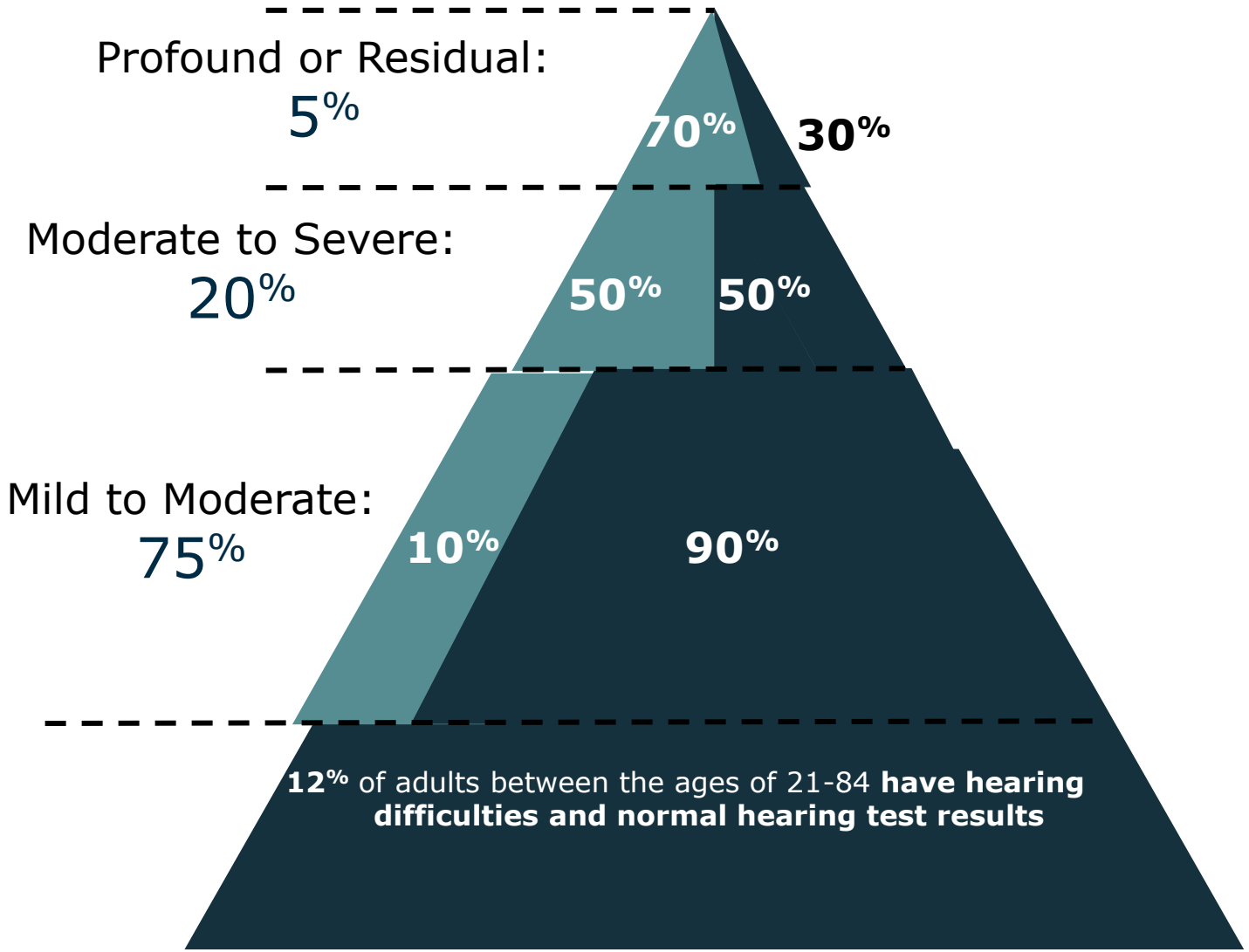


As market price decreases by 100%, demand increases by 48%

Global Issue



Valente & Amlani (2017)



Nash et al 2013; Tremblay, et al 2015

Processes of Change Toward a Healthy Behavior

Transtheoretical Model

Prochaska et al. (1983) *J Consult Clin Psychol*

Example

Precontemplation - I am not ready for hearing aids at this time.

Contemplation - I have been thinking that I might need hearing aids.

Preparation - I have started to seek information about hearing aids.

Action - I am ready to get hearing aids if they are recommended.

Maintenance - I am comfortable with the idea of wearing hearing aids.

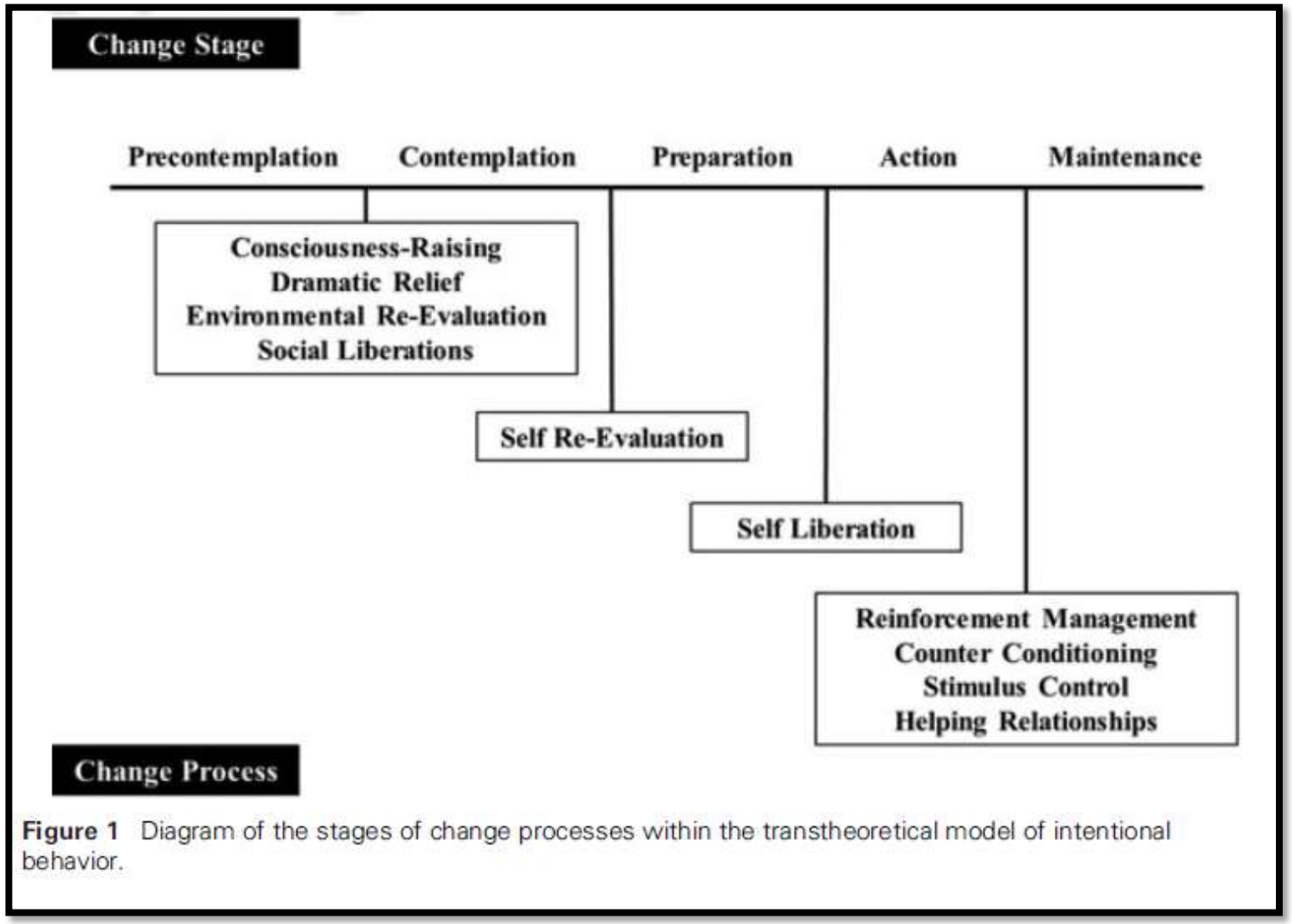


Figure 1 Diagram of the stages of change processes within the transtheoretical model of intentional behavior.

Amlani (2015)…*Seminars Hear*

Transtheoretical Model – Literature Review

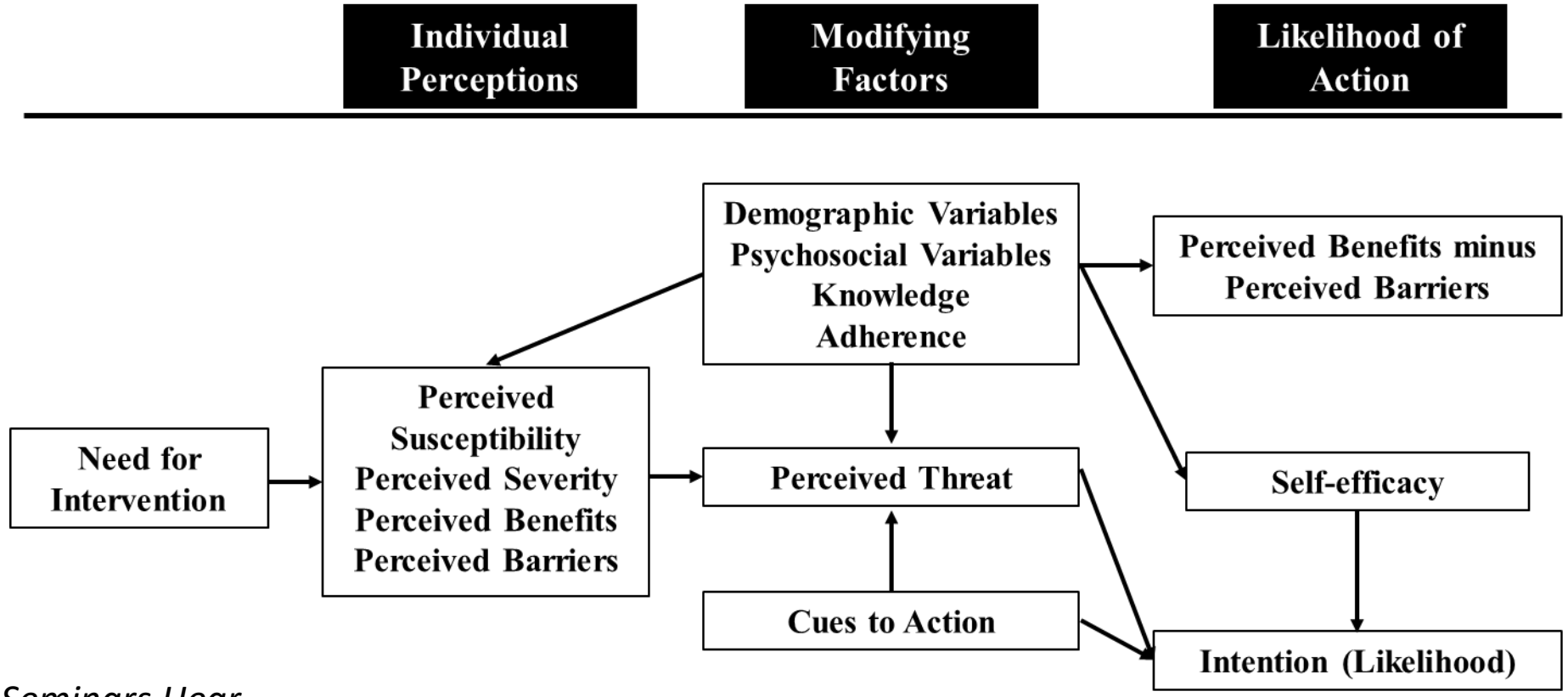
- Milstein & Weinstein (2002, *J Acad Rehab Audiol*)
  - Obtained hearing screening results and stage of change responses in 147 older adults
  - Prior to the screening, 76% of the participants rated themselves as either precontemplative or contemplative.
  - Respondents then provided stage of change responses after participating in a hearing screening, with no significant change in stage response.

- Laplante-Lévesque et al (2013, *Ear Hear*)
  - Participants who reported a lower stage of change (i.e., precontemplation) were those with milder hearing losses, and these individuals were less likely to use intervention and report successful outcomes

- Laplante-Lévesque et al (2015, *Ear Hear*)
  - Evaluated the stage of change in 224 adults who failed an online hearing screening.
  - Results revealed that 88% of the participants were either in the preparation or contemplation stages of change, while 12% reported being in the preparation or action stage.

Health Belief Model

Rosenstock et al. (1974) *Health Educ Monogr*



Amlani (2015)…*Seminars Hear*

Perceived Susceptibility – Perceived risk of acquiring the medical condition
Perceived Severity – Degree to which condition affects medically/socially
Perceived Benefits – Intervention will yield a desired outcome
Perceived Barriers – Internal/external obstacles to overcome

Threat - Low risk for developing hearing loss, increase to engage in risky behavior; high risk for developing hearing loss, decrease in risky behavior

Cue – prompt for action (e.g., interventional audiology, appt card reminders)

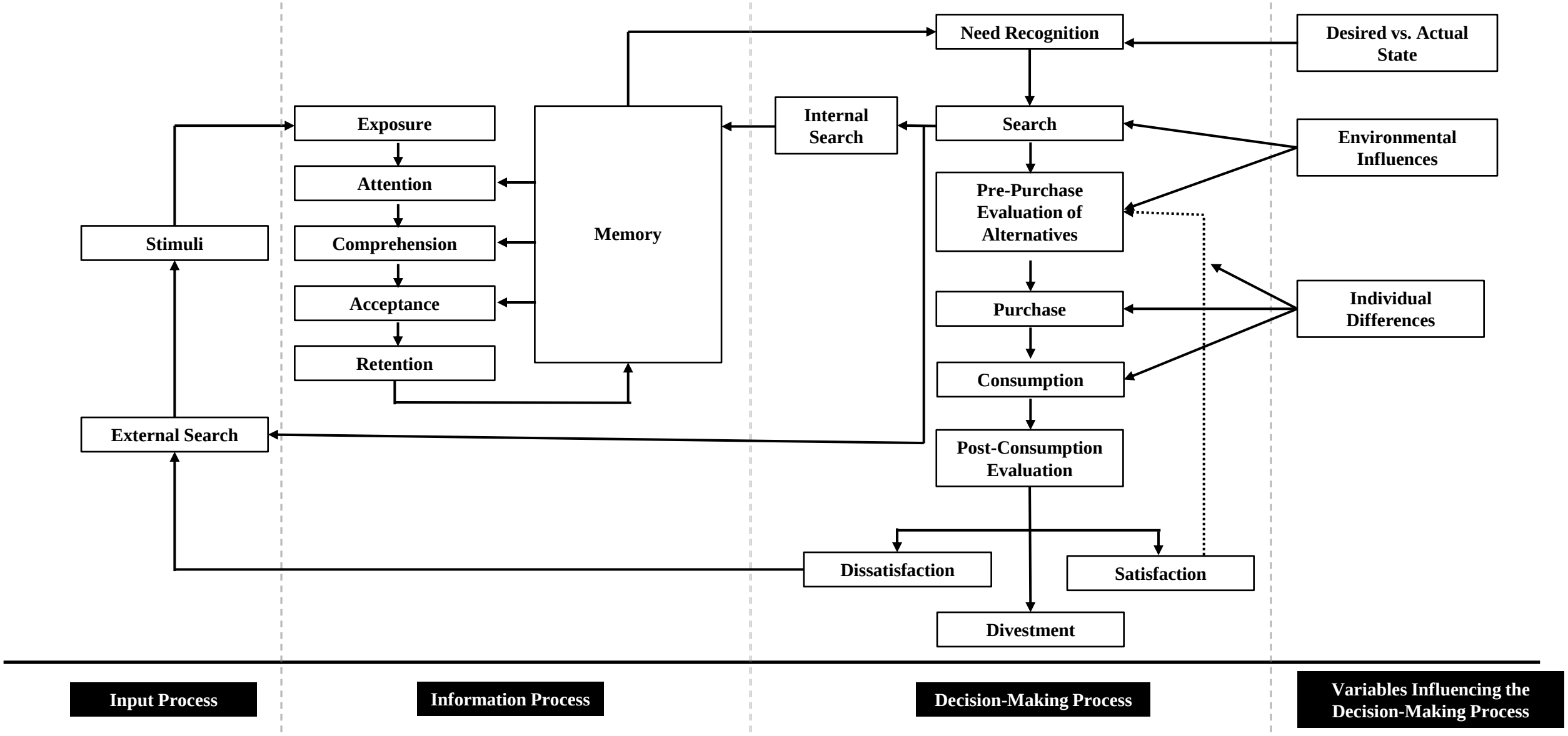
Health Belief Model – Literature Review

- van de Brink et al (1996, *Brit J Audiol*)
  - Assessed Relationship between attitudes and help-seeking behaviors (n = 624)
  - 41% wore hearing aids, 26% sought out intervention/no uptake, 27% had yet to seek out intervention
  - Survey assessed (1) perceived severity of decreased audibility, (2) perceived benefits of hearing aids, (3) perceived barriers related to cost, and (4) cues to action stemming from perceived social norms.
    - Adopted hearing aids reported higher scores on perceived severity, perceived benefits, and cues to action
    - Intermediate scores for these constructs for those who had had sought out intervention
    - lowest scores reported by participants who had yet to seek out intervention for decreased hearing sensitivity

- Saunders et al (2013)
  - Developed HBQ with six constructs that measure hearing health behaviors
    - (1) perceived susceptibility to acquiring hearing loss, (2) perceived severity of hearing loss both medically and socially, (3) perceived benefits from intervention, (4) perceived barriers to overcome for intervention to be successful, (5) perceived self-efficacy, and (6) internal (e.g., symptoms of a health problem) and external (e.g., mass media information) cues to action
  - Help seekers demonstrated higher perceived susceptibility, lower perceived barriers, and higher cues to action than non-help seekers
  - Hearing aid adopters perceived an increased susceptible to hearing loss, while perceiving more benefits and fewer barriers to action, and were provided more cues to action compared to those who had not adopted amplification technology.
  - Hearing aid users perceived an increase in severity of the health condition, perceived fewer barriers, increased self-efficacy, and had encountered more cues to action than participants who did not use hearing aids regularly

What if…listeners did not view decreased hearing sensitivity as a medical condition, but as a consumer decision?

(i.e., not a change in behavior, but the need for a strategy to overcome a state)



Consumer Decision Model (Blackwell et al, 2001)…*Consumer Behavior* (Book)
Amlani (2015)…*Seminars in Hearing*

CDM

- A neo-behavioral approach (i.e., considers, unobservable, internal behaviors) that attempts to describe an individual's psychological and cognitive emphasis toward a stimulus, called a stimulus-organism-response (SOR) approach

Stimulus

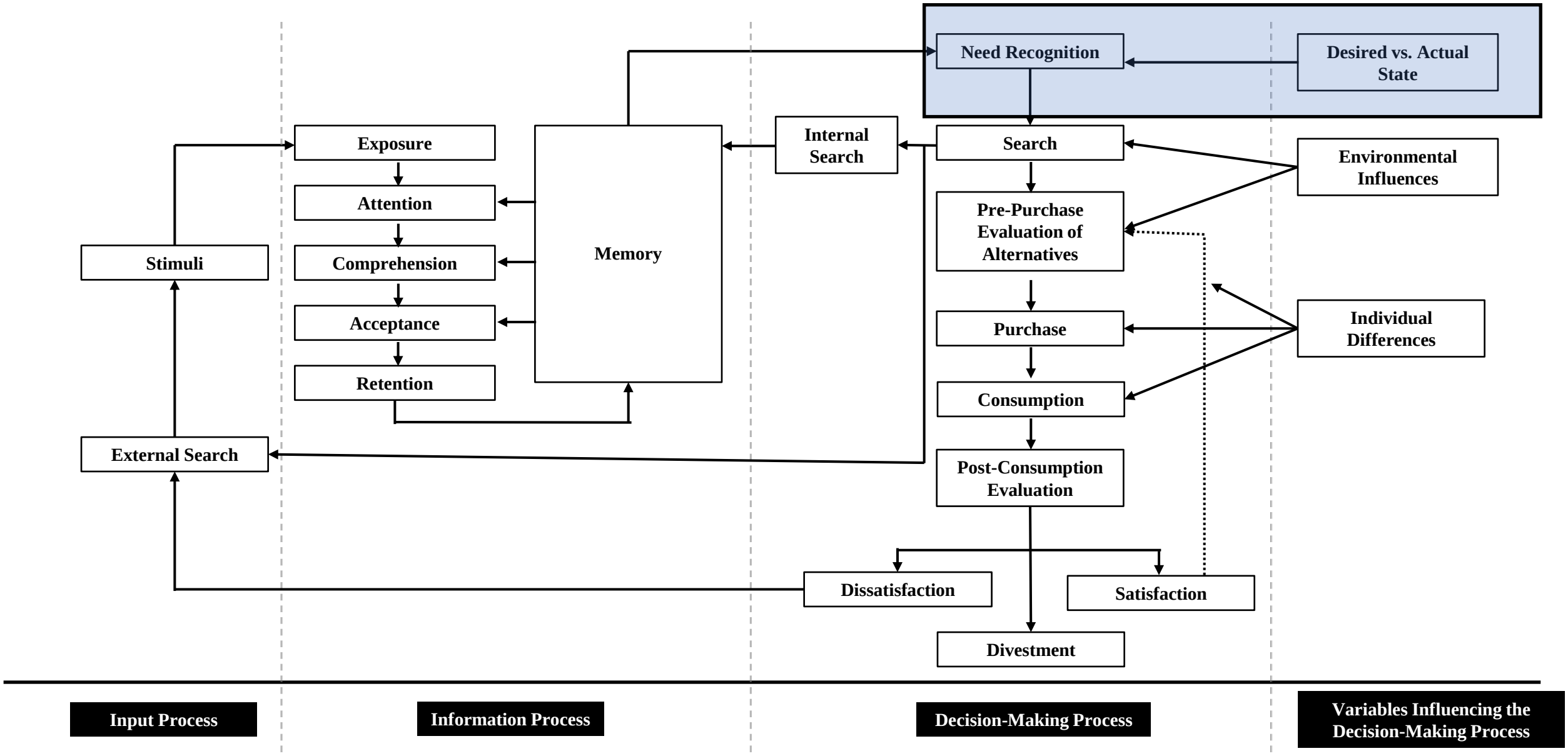
Organism

Internal
(e.g., attitude, emotions, motivation)

External
(e.g., culture, family, social)

Yes

No



Consumer Decision Model (Blackwell et al, 2001)…*Consumer Behavior* (Book)
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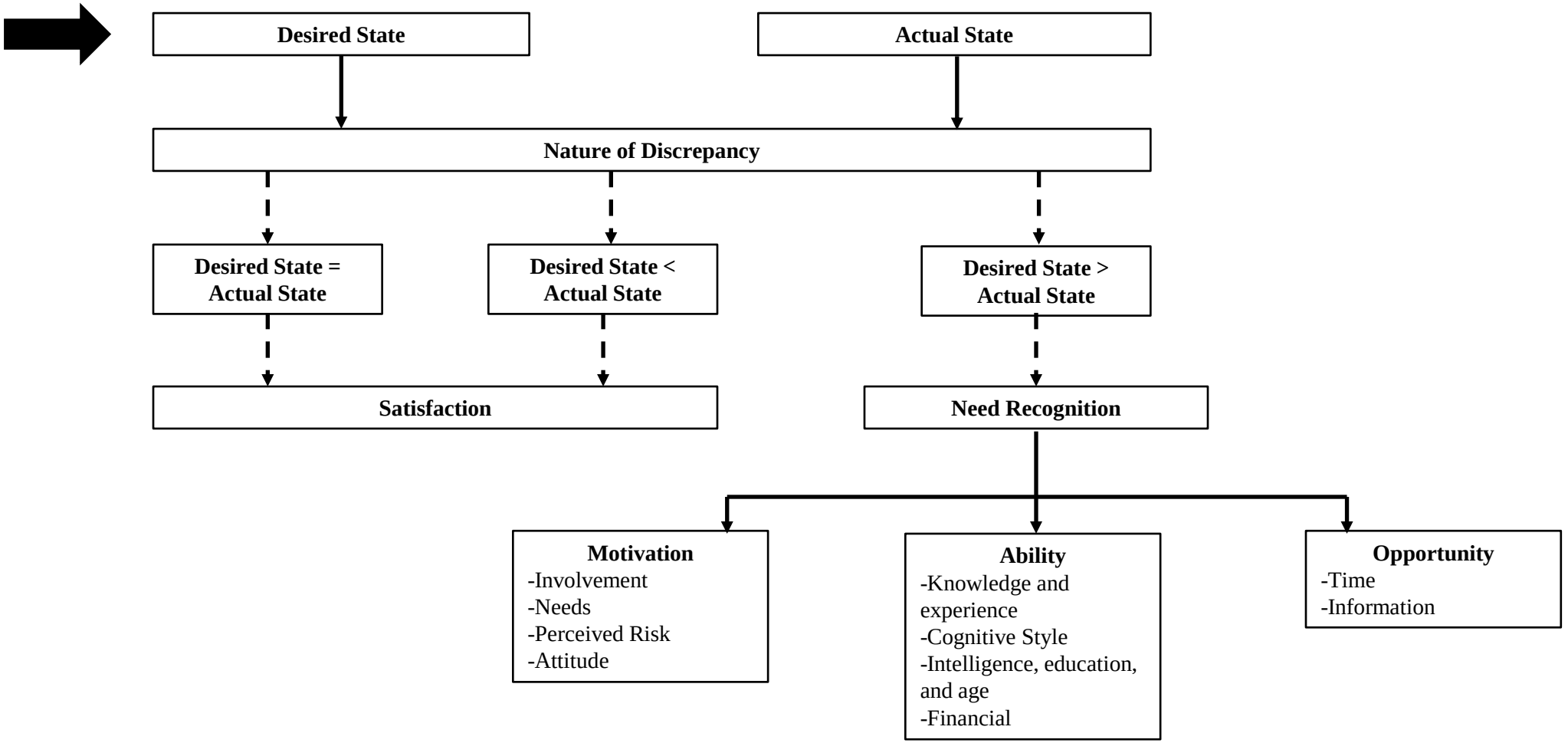
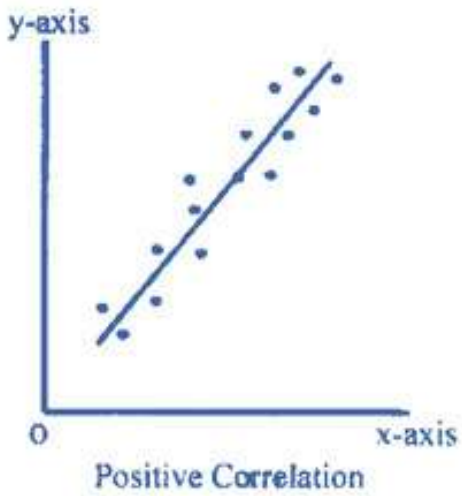


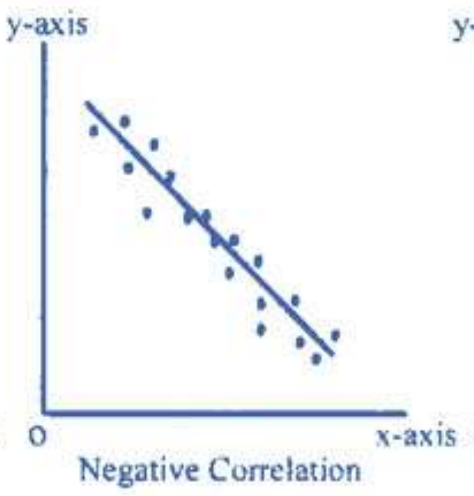
Need Recognition

Methodology

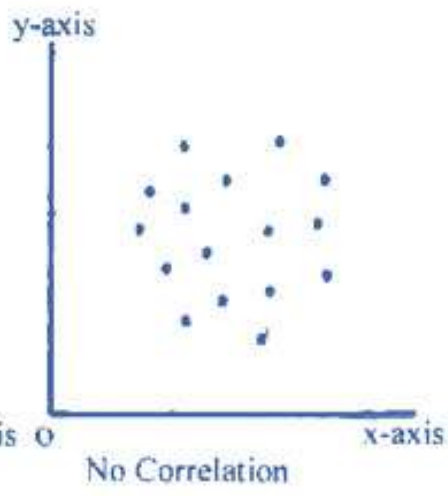
- 1273 listeners completed online questioning (all AARP members)
  - Females = 903 (Mean = 58.0 years; SD = 6.1)
  - Males = 370 (Mean = 62.2 years; SD = 5.5)
- Survey open from October 2015 – December 2016
  - Responses scored using magnitude estimation responses ranging from 1-100%
- Participants completed the survey twice:
  - Pre-appointment = desired (i.e., what was expected)
    - Survey requested to be taken within 14 days of appointment (Mean = 7.6, SD = 3.8)
  - Post-appointment = actual (i.e., what was received)
    - Survey requested to be taken within 14 days of appointment (Mean = 3.3, SD = 2.1)



Both Variables Increase

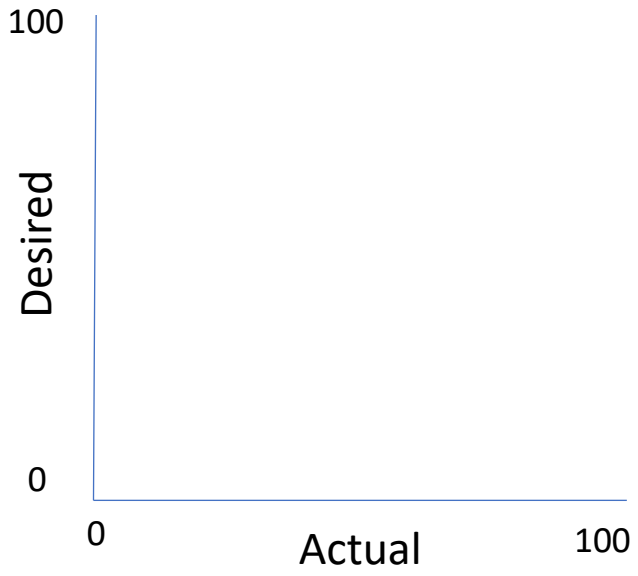


One Variable Increases/Other Variable Decreases



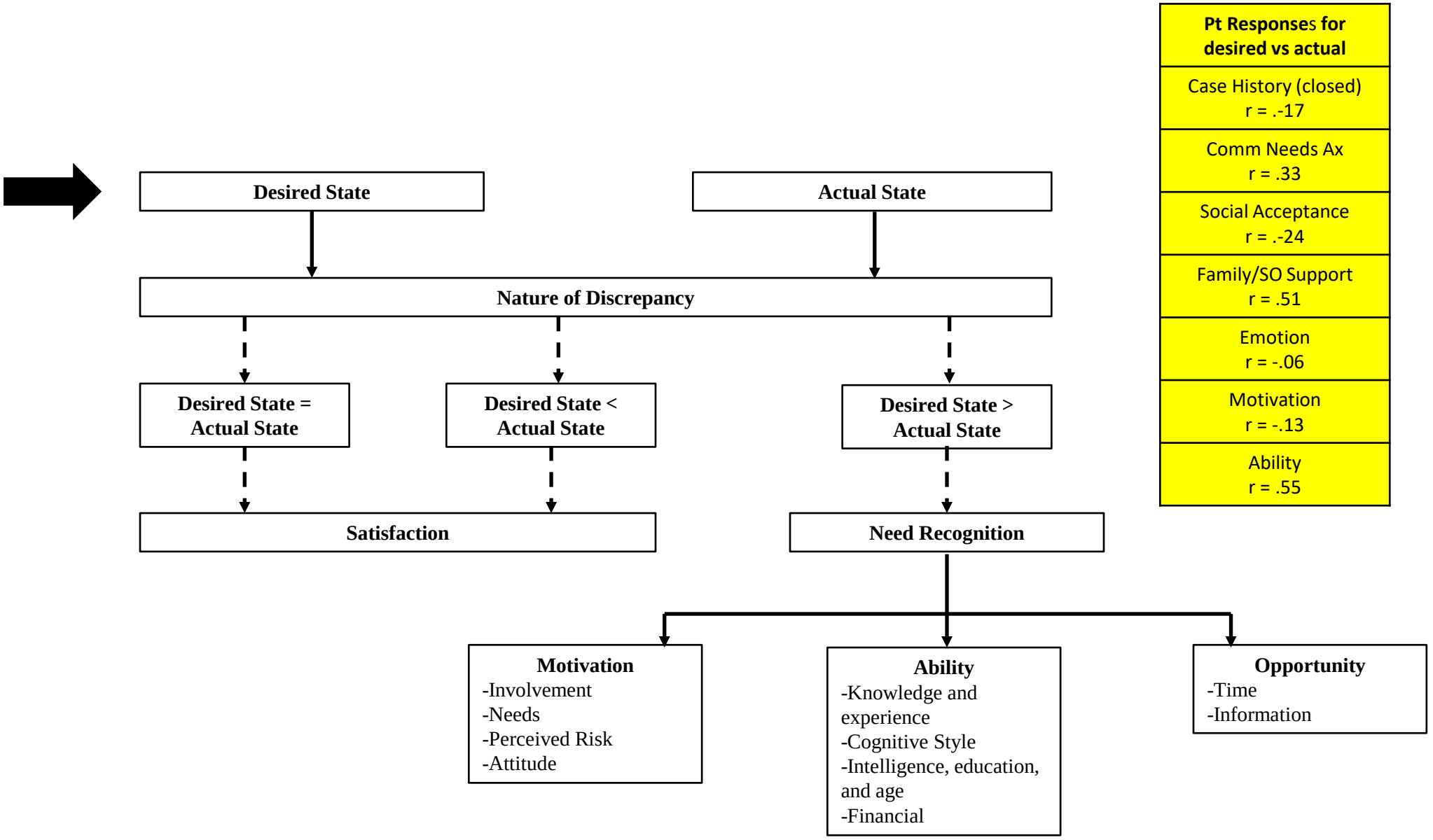
One Variable Changes/Other Variable Stays Constant

Research question: What is the relationship between the desired (i.e., expected) state and the actual (i.e., received) state?



Evans (1996)

- .00-.19 "very weak"
- .20-.39 "weak"
- .40-.59 "moderate"
- .60-.79 "strong"
- .80-1.0 "very strong"



Need Recognition

Pt Responses for actual vs desired	**Possible Ways to Improve Actual vs Desired**
Case History (closed) r = -.17	-Closed (paper/pencil) to open (interview based including family/SO)
Comm Needs Ax (next slide) r = .33	-Part of clinical protocol? -Do various test protocols matter (closed [HHIA] vs open [COSI])?
Social Acceptance r = -.24	-How do we quantify/qualify social acceptance in a communication setting? -Interview style with family/SO?
Family/SO Support r = .51	-Positive affect (Brooks, 2001, *Br J Audiol*; Chisholm et al, 2007, *J Am Acad Audiol*) -Interview style with family/SO?
Emotion r = -.06	-Emotion is correlated with perceived risk (Nuzarello & Goldberg, 2004, *Acad* Med; Heska et al, 2012, *Genetics Med*) -How do we quantify/qualify emotion? -Affective speech (Emotional Communication in Hearing Questionnaire (Emo-CheQ; Singh et al, 2017]) -Interview style with family/SO?
Motivation r = -.13	-Comm Needs Ax for post-treatment (Goal-Oriented Patient Care, Reuben & Tinetti [2013], *New England J Med*).
Ability r = .55	-Self-efficacy (Smith & West, 2006, *Am J Aud*; Amlani et al, 2015, *Hear Rev*)

Table 1. Possible Components of the Communication Needs Assessment Battery

Objective Procedures

QuickSIN [2]
Hearing in Noise Test (HINT) [3]
Acceptable Noise Levels (ANL) [4]
A test of binaural interference [5]
Listening span [6]

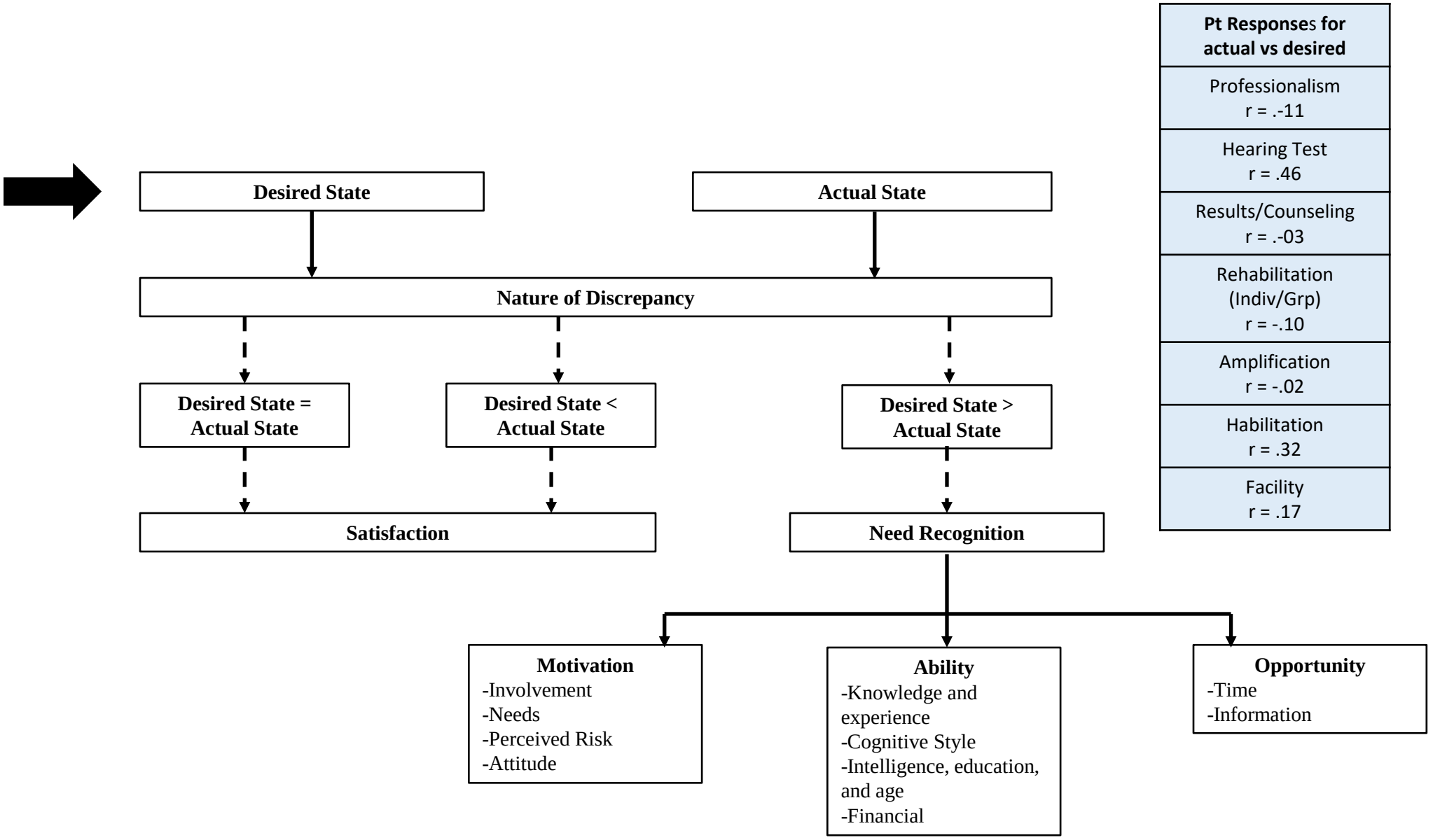
Subjective Measures

Hearing Handicap Inventory for the Elderly – Screening HHIE-S [7]
The Hearing Handicap Inventory for Adults (HHIA) [8]
Communication Scale for Older Adults (CSOA) [9]
Characteristics of Amplification Tool (COAT) [10]
The Client Oriented Scale of Improvement (COSI) [11]
Expected Consequences of Hearing Aid Ownership (ECHO) [12]
Communication Confidence Test [13]

Combined Method

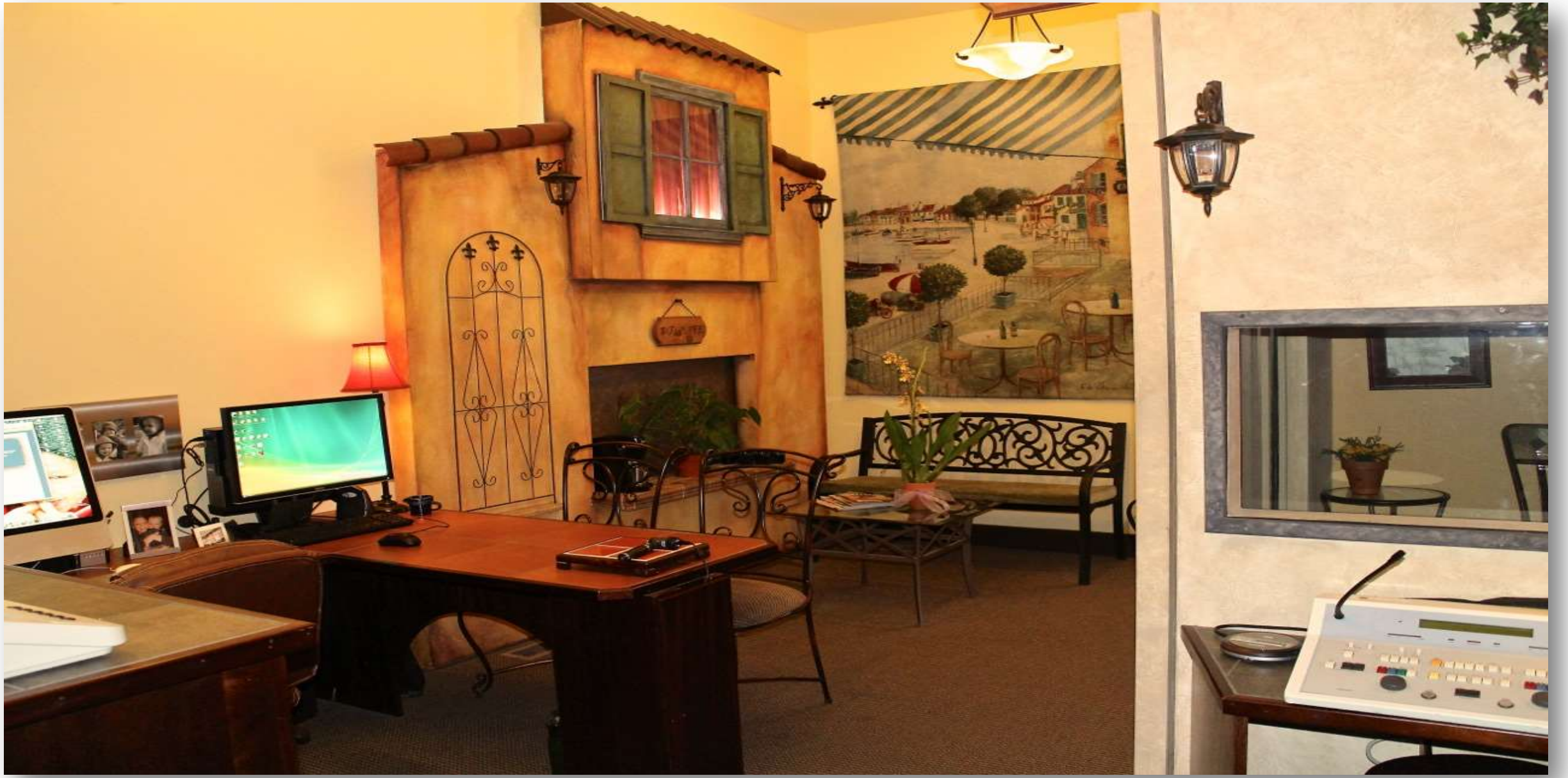
Performance Perceptual Test (PPT) [14]

Sweetow (2009, *Starkey Audiol*)



Need Recognition

Pt Responses for actual vs desired	**Possible Ways to Improve Actual vs Desired**
Professionalism r = .-11	-Front desk personnel training (https://www.audiology.org/sites/default/files/PracticeManagement/marketingscene052008.pdf) -Audiology title (Dr. vs Ms. Vs First Name) -Attire
Hearing Test r = .46	-Checklist to show which tests are being performed -Better explanation of tests being administered
Results/Counseling r = .-03	-Reduce emphasis on audio (possibly use count-the-dot or speech-weighted AI) -Terminology (hearing loss replaced by reduced audibility, etc) (See Alcock: http://canadianaudiologist.ca/issue/volume-4-issue-2-2017/breaking-the-circles-feature/) -Reschedule appt to discuss results
Rehabilitation (Indiv/Grp) r = -.10	-AR “Genius Bar”/Local support groups -Online tutorials/handouts
Amplification r = -.02	-Sales pitch and not benefit based -Offer alternatives to try at home (demo HA, PSAP) -Setup “hearing store” inside practice
Habilitation/Education r = .32	-Scheduling of preventative appt in 6 to 12 months -Handouts -Availability of hearing protection (possible indiv grp session)
Facility (next slides) r = .17	-Comfortable, less medical; -Coffee, water



What if…listeners did not view decreased hearing sensitivity as a medical condition, but as a consumer decision?

(i.e., not a change in behavior, but the need for a strategy to overcome a state)

In you opinion, the profession of audiology is best classified under the heading of (a) medical, (b) rehabilitation, or (c) consumer electronics?

Pre-	***Post-***
a. 23%	***a. 9%***
b. 63%	***b. 28%***
c. 14%	***c. 63%***

AMAmlani@uams.edu