VANDERBILT UNIVERSITY

MEDICAL CENTER

"Fatigue Sounds Like Phantom, So Maybe a Squid?"

Subjective Reports of Listening-Related Fatigue in Children with Hearing Loss

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INTRODUCTION

Parents and teachers of children with hearing loss (CHL) have anecdotally reported that these children put forth greater effort to listen compared to peers with no hearing loss.[1] Recent findings suggest that CHL are at risk for atypical fatigue due to listening difficulties.[2, 4]

These findings have significant educational implications for a CHL. It is hypothesized that a child's ability to concentrate will be negatively affected by the additional cognitive load associated with difficulty listening and understanding in the classroom.

Because fatigue is a subjective experience, it is often difficult for a patient to quantify and describe. In addition to physical symptoms (e.g. sluggishness, sleepiness, etc.), anecdotal reports suggest that CHL also experience cognitive and/or emotional fatigue as a result of difficult listening.[3,4] Although various pediatric fatigue scales exist, none, to our knowledge, include items weighted for listening-related fatigue and its potential negative effects.

PURPOSE

The **overall study goal** was to construct and validate a clinical measure of listening-related fatigue in CHL for use in clinics and schools.

In **phase one**, we sought to obtain subjective data from participants in moderated focus groups to provide a framework for a clinical measure of listening-related fatigue.

METHODS

Data were obtained in focus groups and one-on-one interviews with CHL and CHL who have an additional disability (CHL-AD), as well as their parents, teachers, and school service providers. Additional disabilities included reading disability, speech-language delay, and attention deficit disorder. Children were included in the study with the following criteria: 1) bilateral moderate or greater hearing loss and 2) ability to speak in 5-6 word sentences per parent report.

Focus groups consisted of 4-8 participants within the same participant group-type (e.g. parents, teachers, CHL). CHL and CHL-AD were more relaxed and more likely to respond in a one-on-one interview than within a group of peers; therefore, the majority of child participants were interviewed by an examiner.

Parent and child participants were recruited through the Vanderbilt Audiology clinic and school providers were recruited through local school districts. All participants received monetary compensation for their time and participation.

Although initial recruitment included children ages 7-17, CHL under the age of 10 typically struggled to communicate about the concept of fatigue, especially as it related to difficult listening situations. As a result, thirty one of the 41 child participants were 10 years of age or older.

Table 1: Number of participants by group type.

Group	# of participants
Parent of CHL	17
Teacher of CHL (general, special, and deaf educator)	17
Service Provider (SLP, audiologist, interpreter)	11
CHL (age 7-17)	25 (13 males)
CHL-AD (age 7-17)	16 (9 males)
TOTAL	**86**

METHODS

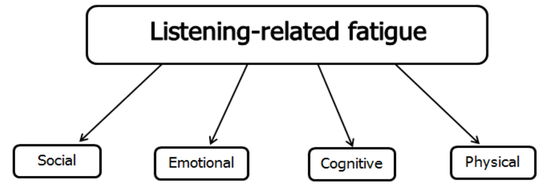

Figure 1. Common themes of "life domains" thought to be affected by listening-related fatigue. Domains were discussed in the focus groups and interviews.

Each focus group and interview was moderated by a trained audiologist or psychologist familiar with qualitative research design and data collection. A moderator's guide was created for each group-type aimed at examining the following themes:

1) characteristics of difficult listening situations that may result in fatigue;
2) physical, cognitive, and emotional manifestations of listening-related fatigue;
3) coping strategies following the experience of fatigue, and
4) temporal characteristics of the fatigue and coping time following fatigue.

Additional visual tools, games, and activities were used to further guide the discussion with children and adolescents. All groups were audio recorded and transcribed. Members of the research team reviewed the transcriptions to determine common themes related to listening effort and fatigue reported by each group type.

PARENT QUOTES

*"She **struggles** with her last class period each day. Usually [it] has some type of video aspect in it, that's when she'll come home with **more of a headache**, she will admit, it's just too **hard to drown out everything else** and listen to the video."*

–Parent of a middle-schooler with bilateral cochlear implants

*"Yesterday we took a field trip - explored a museum. The gentleman was great, but he spoke so fast—she was still **missing stuff**. In a very hectic environment, and if things go really, really quick for her, I can tell her it's a lot for her. **She has to make an effort, and it wears her out**."*

–Parent of a 10-year old with bilateral hearing loss

*"He does not have those intimate relationships, and I think it's just because it's time-limited. He has a small window of opportunity for learning and growing and talking with people, and then **once he becomes tired, um, he stops trying to figure [things] out in noisy environments."***

–Parent of a pre-teen with bilateral hearing loss

SCHOOL PROVIDER QUOTES

"But the fatigue, I think is a real killer on motivation! And so they start feeling more and more down on themselves, or like this is just way too hard or I just can't keep going."

-General education teacher

"In the cafeteria, they try to listen but that's their starting time of "fading down" so they just kind of take it a break time. I've had my one student, she sometimes just **takes her implant off and even turns the volume down on her hearing aid and that's like her time to just sit and not have to listen**."

–Deaf education teacher

"I feel like, if I'm doing a specific auditory task, I like to get the kids in the morning. **At the end of the day, their ability to focus with their implants only becomes nearly impossible."**

–Elementary school speech-language pathologist

CHILD REPORTS

Younger child participants struggled to communicate their experiences with listening-related fatigue. It appears that the CHL is often unable to recognize that he or she does not understand all of what is being said and how much they are struggling to listen in difficult listening situations.

*"Yeah, **you wanna give up**. You just don't want to try anymore because you know you won't actually get what they're trying to say or sometimes you think it's just you. Maybe I need to try a little harder to listen but when you do try, you **put all of your focus on what they're trying to say and you still can't hear them**."*

–teen with bilateral hearing aids

*"…for me I feel more focused when there's a one-on-one conversation and I feel kind of more talkative when there's just a one on one conversation. But **when there's a lot of friends…that makes me more tired**. Trying to focus on conversations and then trying to think about it and process it makes me a little tired."*

–teen with bilateral cochlear implants

"I feel like my ears are about to fall off."

–child with hearing loss on listening all day at school

*"I just have to really go in and try to listen to them, and I have to, like, put my **focus on them to zoom everything out just to hear what they're saying, and it's kind of a lot of work for me**."*

—child with hearing loss on focusing on listening to friends

SUMMARY THEMES

This section provides a review of commonly reported behaviors noted in CHL following demanding listening tasks. These behaviors may be indicative of listening-related fatigue in CHL.

BEHAVIORS AT HOME

- Taking a nap on the car ride home or immediately after school
- Feelings of anger or frustration after being in a noisy listening situation
- Asking to remove hearing assistive technology for a "listening break"
- Complaints of headaches
- Need for quiet time to recover from difficult listening situations

BEHAVIORS AT SCHOOL

- Excessive zoning out
- Lack of motivation for auditory tasks
- Increased anxiety/stress about hearing information in class
- Difficulty with auditory tasks (including therapy) in the afternoon

SOCIAL BEHAVIORS

- Withdrawing or avoiding crowds
- Feelings of frustration, sadness, or being "left out" following communication breakdowns
- Giving up or shutting down in a large group discussion

NEXT STEPS AND YOUR ROLE

VANDERBILT FATIGUE SCALE

In order to best identify CHL struggling with listening-related fatigue, the next phase of this research project is to create and validate a measure that is sensitive to the situations and fatigue manifestations experienced by CHL. The subjective experiences gathered by group participants will be used to create items for the measure.

CLINICAL RECOMMENDATIONS

- Discuss listening-related fatigue with your patients and their families.
- Probe further than a simple query: "Are you tired?". The observable behaviors associated with listening-related fatigue may not be captured by this question.
- Implore teachers and parents to observe the child's behavior and make appropriate accommodations as needed.

Although evidenced-based fatigue intervention methods are not yet available, reports from school providers suggest that the following strategies may be helpful for a CHL who is struggling with fatigue in the educational setting:

- Provide notes in advance of class
- Encourage preferential seating
- Encourage consistent amplification and FM system use
- Arrange class schedule so auditory tasks occur in the morning
- Provide scheduled listening or movement breaks

See our website for additional information on listening-related fatigue in CHL.
https://my.vanderbilt.edu/listeninglearninglab/

KEY REFERENCES

1. Bess, F.H. & Hornsby, B.Y. (2014). Commentary: Listening can be exhausting—Fatigue in children and adults with hearing loss. *Ear & Hearing, 35,* 592-599.
2. Hicks, C.B., & Tharpe, A.M. (2002). Listening effort and fatigue in school-age children with and without hearing loss. *Journal of Speech, Language and Hearing Research, 45(3),* 573-584.
3. Hockey, R (2013). *The psychology of fatigue.* New York, NY: Cambridge University Press
4. Hornsby et al., (2014). Subjective Fatigue in Children with Hearing Loss: Some Preliminary Findings. *AJA, 23,* 129-134.

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