**METHODS**

Each focus group 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 adults. Focus 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.

**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 modified 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 or greater hearing loss and 2) ability to speak in 5-6 word sentences per parent report. Focus groups consisted of 4-6 participants within the same participant group type (e.g., parents, teachers, CHL, and CHL-AD) were more relaxed and more likely to respond in a one-on-one interview within a group of peers, therefore, the majority of children were interviewed by an examiner team. 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 or older.

**INTRODUCTION**

Parents and teachers of children with hearing loss (CHL) have frequently reported that these children put forth greater effort to listen compared to peers with no hearing loss. Recent findings suggest that CHL are at risk for physical fatigue due to listening difficulties.12

These findings have significant educational implications for 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, sleeplessness), anecdotal reports suggest that CHL also experience cognitive and/or emotional fatigue as a result of difficult listening.13 Although various pediatric fatigue scales exist, none, to our knowledge, include items weighted for listening-related fatigue and its potential negative effects.

**METHODS**

<table>
<thead>
<tr>
<th>PARENT QUOTES</th>
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<tbody>
<tr>
<td>She struggles with her class close period each day. Usually 30 has some type of video called &quot;It’s a that when she’ll come home with more of a headache, she won’t sit just too hard to draw out everything else and listen to the other.</td>
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<tr>
<td>Parent of a middle-schooler with bilateral cochlear implants</td>
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| "Yesterday we went to field trip - explored a museum. The specimen was great, but she spoke on flash-flash was a memory stuff. So a very hectic environment, and things go really really quick. For her, can tell her it’s a lot for her. She has to make what and it wears her out."
| Parent of a 10-year-old with bilateral hearing loss |
| The does not have those intimate relationships, and I think it’s because it’s three-dimensional. It’s a window of opportunity for learning and growing and talking with |
| -Parent of a pre-teen with bilateral hearing loss |

**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.

**PARENT QUOTES**

The does not have those intimate relationships, and I think it’s because it’s three-dimensional. It’s a 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 a noisy environment.”

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"Parent of a pre-teen with bilateral hearing loss”

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

"General education teacher"" |

**SCHOOL PROVIDER QUOTES**

"In the cafeteria, they try to listen but then it’s their chance to talk. Then they do just kind of take a break. I think for a child student, she sometimes 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 my ears are not aligned. I have a child with hearing loss on listening all day at school"

"I feel like my ears are not aligned. I have a child with hearing loss on listening all day at school."

"I feel like my ears are not aligned. I have a child with hearing loss on listening all day at school."

**PARENT QUOTES**

"When 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 will can’t hear them."

"Deaf education teacher"

**FIGURE 1. Common themes of "we domain" thought to be affected by listening-related fatigue. Domains discussed in the focus groups and interviews.**

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**School provider quotes**

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