INTRODUCTION
Parents and teachers of children with hearing loss (CHL), even those with unilateral hearing loss (UHL), have anecdotally reported that these children put forth greater effort to be compared to peers with no hearing loss. Recent findings suggest that CHL are at risk for atypical fatigue due to listening difficulties. These findings have significant educational implications for the 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 an individual 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 difficulty listening.1,2 Although various pediatric fatigue scales exist, none of our knowledge, includes items weighted for listening-related fatigue and its potential negative effects.

FOCUS GROUP PARTICIPANTS
Younger children (ages 5-11) and pre-teen children provided a framework for the creation of a clinical measure of listening-related fatigue. Each focus group and interview was moderated by a trained audiologist or psychological assistant with qualitative research design and data collection. A moderator’s guide was created for each focus-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 following fatigue.

Additional audit 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.

FOCUS GROUP METHODS
The overall study goal was to construct and validate a clinical measure of listening-related fatigue in CHL for use in clinics and schools. Three versions will be created: 1) parent version, 2) child version and 3) school provider version.

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.

In phase two (currently ongoing), we are completing the preliminary item analysis on item lists as a precursor to the creation of the Vanderbilt Fatigue Scale for CHL (VFS-CHL).

FOCUS GROUP DATA ANALYSIS AND INTERCEPTIVE INTERVIEWS
Following the completion of the focus groups and interviews, the sessions were transcribed from the audio recordings. These transcriptions provided rich, qualitative data that was used to create potential items for the fatigue scale. Items were written to capture multiple domains covering the focus groups, including emotional, cognitive, and physical fatigue symptoms.

Over 500 unique items were written as a result of the focus group data. Following an iterative process, the top 92 items were compiled for each participant group. These items were subjected to cognitive interviews were participants were asked to “think aloud” as they reviewed the items. This process helped to eliminate unclear and poorly written items.

Items were reviewed by a panel of experts to further refine the item list. Due to concerns regarding item list length, it was determined a total of 40 items would be needed for further statistical analysis (Item Response Theory). Phase 2, the preliminary review of the pediatric scale, is currently in progress with the 60 item list for each sub-group.

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 at being left out in a noisy listening situation
• Asking to remove hearing assistive technology for a “listening break”
• Feels tired or fatigued
• Need for quiet time to recover from difficult listening situations

BEHAVIORS IN THE SCHOOL
• Avoiding speaking in class
• Difficulty completing assignments
• Feels tired or fatigued
• Need for quiet time

SOCIAL BEHAVIORS
• Withdrawing or avoiding crowds
• Feelings of frustration, sadness, or being “left out” following conversation breakdowns
• Giving up or shutting down in a large group discussion

NEXT STEPS AND YOUR ROLE
The next phase in scale development is a pre-test phase of the current list of items with individuals in the three study sub-groups: 1) CHL, 2) parents of CHL, and 3) school service providers of CHL. In order to obtain a range of responses, children with typical hearing, their parents and teachers will also be asked to complete the scale.

Following data collection, statistical analyses will be completed to further refine the scale to a 15-item question measure. In Phase 3, the scale will be validated on a large sample so that the scale can be used in clinics and schools to identify CHL struggling with listening-related fatigue. It is the goal of this project to provide the scale and associated user manual free of charge online following its completion.

If you would like to participate in data collection for the current project, or for more information, please visit the Listening and Learning Lab’s website at: https://my.vanderbilt.edu/listeningandlearninglab/