

A User Guide to the Vanderbilt Fatigue Scale for Adults (VFS-A-40 & VFS-A-10)©

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VFS-A-40:

Hornsby, B. W. Y., Camarata, S., Cho, S.-J., Davis, H., McGarrigle, R., & Bess, F. H. (2021). Development and validation of the Vanderbilt Fatigue Scale for Adults (VFS-A). *Psychological Assessment*, 33(8), 777–788.
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VFS-A-10:

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THE VANDERBILT FATIGUE SCALES FOR ADULTS (VFS-A) ADMINISTRATION AND SCORING GUIDE

Application of the VFSs for adults

The Vanderbilt Fatigue Scales (VFSs) are designed to assess listening-related fatigue in individuals with hearing loss or other communication and learning difficulties (e.g., language disorders, stuttering, reading difficulties, etc.). This guide describes administration and scoring of the **VFSs for adults (VFS-A)** which are designed to assess listening-related fatigue in adults. There are two versions of the VFS-A.

The **VFS-A-40** is a 40-item scale that provides subscale scores for four domains of listening-related fatigue (Emotional, Social, Cognitive and Physical) and a Total score (overall listening-related fatigue). The four domains were identified as relevant to adults with hearing loss (AHL) via literature review and comments from AHL during focus group sessions that were conducted as part of the development process for the scale. Given its length, the VFS-A-40 is likely to be most appropriate for research purposes.

The **VFS-A-10** is a 10-item scale (all items were extracted from the VFS-A-40) that provides a single, unidimensional, score reflecting overall (Total) listening-related fatigue.

The VFS-A-10 can be used for research and clinical purposes. However, the small number of test items may make the VFS-A-10 more appropriate for clinical use than the VFS-A-40. In contrast, the Total score from the VFS-A-40 provides more information than the VFS-A-10 and, thus, may be more sensitive to differences in listening-related fatigue between individuals and test conditions. VFS-A-40 subscale scores may also be useful for those interested in the social, cognitive, physical or emotional aspects of listening-related fatigue. However, a factor analysis based on data from 567 respondents (Hornsby, et al., 2021) did not support the concept of listening-related fatigue as a multidimensional construct. All 40 items loaded heavily onto a single factor. Despite this, there may be some cases where domain-specific information is useful. As such the VFS-A-40 allows for calculating a total score as well as subscale scores.

A suite of scales is also available to assess listening-related fatigue in children: 1) VFS-C (child self-report), 2) VFS-P (parent proxy-report) and 3) VFS-T (teacher proxy report). Additional information about these scales can be found here: <https://www.vumc.org/vfs>

Administering the VFSs for adults

VFS respondents (users) may read and answer the questions independently. However, if there are concerns regarding a respondents' reading abilities, the examiner may read the items aloud to the respondent.

Respondents should reflect back on the past **WEEK** (or a typical week if the past week has been very unusual) and choose the response that best describes how **often** they have felt or acted a given way during that time period or how strongly they **agree or disagree** with a given statement. Both the VFS-A-40 and VFS-A-10 use a 5-point (0-4) Likert **frequency** scale with the following qualitative response options:

ANSWER OPTIONS	Never/ Almost Never (0)	Rarely (1)	Sometimes (2)	Often (3)	Almost Always/ Always (4)
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In addition, a subset of VFS-A-40 items ask respondents to rate how strongly they agree/disagree with a given statement using a 5-point Likert **agreement** scale with the following qualitative response options:

ANSWER OPTIONS	Strongly Disagree (0)	Disagree (1)	Neither Disagree Nor Agree (2)	Agree (3)	Strongly Agree (4)
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Respondents should select a single response option as “in-between” responses (e.g. “Sometimes/Often” or “2.5”) cannot be used. Respondents should be encouraged to complete each item to the best of their ability.

Scoring the VFSs for adults

Both versions of the VFS-A can be scored using two approaches: Summed scoring and IRT scoring.

Summed Scoring: Both versions of the VFS-A can be scored by simply summing the item responses (0-4) across all scale, or subscale, items. **It is anticipated that clinicians will primarily utilize the summed scoring method.** The **VFS-A-40** provides a Total and four subscale listening-related fatigue scores.

VFS-A-40 Subscale scores: To calculate Emotional (E), Social (S), Cognitive (C) and Physical (P) subscale scores simply sum the responses for each item in a given category. Subscale scores can range from 0 to 40.

Emotional Subscale Score = Sum of Items 10, 12, 17, 18, 20, 25, 27, 32, 36, 39.

Social Subscale Score = Sum of Items 6, 8, 9, 11, 22, 26, 34, 35, 38, 40.

Cognitive Subscale Score = Sum of Items 1, 2, 3, 7, 13, 14, 28, 29, 33, 37.

Physical Subscale Score = Sum of Items 4, 5, 15, 16, 19, 21, 23, 24, 30, 31.

VFS-A-40 Total Score: = Sum of all subscale scores. Total scores can range from 0 to 160.

The **VFS-A-10** provides a total listening-related fatigue score. The total score is obtained by simply summing the responses to each item on the scale.

Across all scales, *higher* summed scores indicate *more* frequent problems with listening-related fatigue. Given that each scale has a different number of test items, as noted above, the maximum summed score varies across scales. Thus, summed scores should be compared to the scale specific standardization samples (see VFS-A Interpretation section).

Summed scores CANNOT be calculated unless ALL test items are answered (i.e., no missing scores).

Item Response Theory (IRT) Scoring

Participant responses can also be scored using an IRT (item response theory) approach. IRT scale scores have distinct advantages compared to summed scores which may make them especially useful for research investigations. Most importantly, IRT scale scores provide a more precise estimate of an individual’s listening-related fatigue. When calculating a summed score, every scale item is equally weighted in its contribution to the total, or subscale, score. This scoring approach ignores the fact that some scale items provide a more precise estimate of an individual’s listening-related fatigue than others. In contrast, IRT scoring weights the

response to each scale item based on the item's information and discrimination ability and thus provides a more precise estimate of a given individual's listening-related fatigue (Hornsby et al., 2021). In addition, unlike summed scoring, IRT scores can be estimated even if responses to 1-2 items are missing.

IRT scale scores are similar to standardized scaled scores, such as z-scores. **For the VFS, an IRT scale score of 0 reflects the mean magnitude of listening-related fatigue across, in theory, all respondents in the population. Thus, IRT scores of -3 and +3 would suggest very low and very high ratings of listening-related fatigue, respectively.**

Given the potential increased sensitivity of an IRT scoring method, researchers may find this approach particularly useful. As noted above, calculating IRT scale scores requires the use of statistical software capable of IRT analysis. Our laboratory has developed custom software for this purpose which may be of interest to researchers. It is available for free download on our website (<https://www.vumc.org/vfs>).

Interpreting VFS-A Summed Scores

Given the VFS-A-40 is most appropriate for research purposes, the following guidance is most relevant for clinical interpretation of VFS-A-10 summed scores. We do, however, provide guidance for interpreting VFS-A-40 **total** scores should that information be of interest to researchers using the scale. A quick guide to administration, interpretation, & clinical follow-up recommendations based on **VFS-A-10** summed scores is provided in a separate document also available on our website (<https://www.vumc.org/vfs>):

Hornsby, B., Davis, H., Camarata, S., & Bess, F.H. (2026). The Vanderbilt Fatigue Scale for Adults- 10-item version (VFS-A-10): A Quick Guide to Administration, Interpretation, & Clinical Follow-up, Vanderbilt University Medical Center, Vanderbilt Bill Wilkerson Center (Version 1), <https://www.vumc.org/vfs>.

Qualitative interpretation based on the frequency of fatigue-related complaints:

As noted above, the VFS-A-10 uses a 5-point Likert response format to ascertain the frequency of listening-related fatigue problems the individual experiences during a typical week. Response options range from 0 (meaning they never/almost never experience these problems) to 4 (meaning they always/almost always experience these problems). Scores of 1, 2 or 3 indicate they experience the specific situation rarely, sometimes, or often, respectively. Thus, scores can range from 0-40 with **higher summed scores** suggesting the individual is experiencing **more frequent listening-related fatigue problems**.

For example, given the VFS-A-10 has 10 items, a score of 40 tells us the person is "Always/Almost Always" experiencing fatigue-related issues- we know this because the only way you can get a score of 40 is by selecting "Always/Almost Always" in response to all 10 items. Likewise, a score of 0 means the person "Never" experiences any of the fatigue-related problems they were queried about. Following this logic, if an individual gets a VFS-A-10 summed score ≤ 15 (i.e., a score of 0-15), they likely selected "Never" (0) or "Rarely" (1) to most test items (and perhaps occasionally a higher rating). This suggests that while problems with listening-related fatigue may occur, they are relatively rare or, with a score of 0, they never occur for this individual. In contrast, to get a VFS-A-10 summed score ≥ 25 (i.e., a score of 25-40) the individual likely selected often (3) or

always/almost always (4) to most items (and perhaps occasionally a lower rating), suggesting that listening-related fatigue problems occur very frequently for this individual during a typical week.

The same approach can be used with the VFS-A-40. Since this scale has 40 items scores range from 0 (the person “Never” experiences any of the fatigue-related problems they were queried about) to 160 (the person “Always/Almost Always” experiences all of the fatigue-related problems they were queried about). VFS-A-40 scores of ≥ 100 , corresponding to VFS-A-10 scores of ≥ 25 , suggests that listening-related fatigue problems are occurring very frequently for this individual during a typical week (i.e., many issues are occurring “often” or “almost always”). Research in adults using both the VFS-A-40 (unpublished data from the VFS-A-40 development and validation data set; Hornsby et al., 2021) and the VFS-A-10 (Hornsby et al., 2023) has shown that such frequent fatigue-related issues are quite rare in individuals without hearing loss.

Given this, as one approach (see additional approaches below) for identifying individuals whose fatigue-related issues may warrant additional follow-up we suggest cut-offs of summed scores ≥ 25 (VFS-A-10) or ≥ 100 (VFS-A-40) be used. Individuals with scores falling in these ranges are experiencing frequent fatigue-related problems (i.e., multiple fatigue issues occurring “often” or “almost always”) during a typical week which could have negative functional or psychosocial consequences. This concept is important for clinicians to keep this in mind when administering and interpreting any version of the VFS.

Quantitative interpretation based on comparison to a standardization sample:

Another way to determine whether a patient’s fatigue is concerning, is to compare their VFS score to “normative” scores, i.e., scores from people who don’t have hearing loss or any other fatigue-related condition. A common approach is to collect data from a “normative sample” and use cut-offs, or cut-points, that are 1, 1.5, or 2 standard deviations (SD) above a “normative” mean value. Given the VFS’s are designed to be used by the adult population, optimally the demographic characteristics of our sample would mirror the general population. Since such data are not available for the VFS, we instead use convenience sampling data collected as part of the development and validation studies for the VFS-A-40 (Hornsby et al., 2021; N=143 of the sample of 580 adults) and VFS-A-10 (Hornsby et al., 2023; N=220 of the sample of 607 adults) to develop quantitative cut-off scores.

A review of scores from our standardization samples revealed distributions that were highly skewed towards lower scores for both the VFS-A-10 (see Figure 2 in Hornsby et al., 2023) and VFS-A-40 (see Figure 6 in Hornsby et al., 2024). As noted previously, VFS scores suggesting very frequent problems with listening-related fatigue (e.g., VFS-A-10 scores ≥ 25 or VFS-A-40 scores ≥ 100) were quite rare in our samples of adults without hearing loss. Median scores were 5 (max 40) and 15.5 (max 160) for the VFS-A-10 and VFS-A-40 standardization samples, respectively (See Table X). Given the means and standard deviations of our standardization samples we chose to use the more conservative value of the mean score + 2 standard deviations (SD) as a cut-off for identifying those experiencing significant listening-related fatigue problems. Using 1 or 1.5 SDs would create cut-off values that, while uncommon for adults without hearing loss, suggest (potentially inappropriately) that relatively infrequent fatigue issues were problematic.

For example, a 1 SD cut-off score for the VFS-A-10 would be a score >13 [mean (7) + 1 SD (6) = 13]. Recall, as described above, scores ≤ 15 suggest that while problems with listening-related fatigue may occur for this individual, they are relatively infrequent in most situations during a typical week. It is not clear that this type of infrequent fatigue would have a functional impact on daily activities or quality of life. A similar result is obtained using VFS-A-40 means and SD data.

In contrast, using a 2 SD cutoff criterion leads to cut-off criteria of 20 and 81, for the VFS-A-10 and VFS-A-40, respectively. Scores in this range suggest fatigue-related issues are occurring at least “sometimes” and potentially more often, in multiple situations during a typical week. Scores higher than these cut-offs are very rare for adults without hearing loss. Such frequent fatigue-related issues may be more likely to have negative functional effects and thus also provide a reasonable cut-off for identifying individuals who may warrant potential follow-up. Table 1 provides a summary of VFS-A-10 and VFS-A-40 cut-off scores that can be used to identify individuals experiencing significant listening-related fatigue issues and who may warrant monitoring or additional follow-up.

Table 1. VFS-A Qualitative and Quantitative cutoff criterion. Quantitative criterion (scores $\geq$ mean + 2 SD) are based on standardization sample responses obtained as part of the development and validation process for the VFS-A-10 and VFS-A-40 (see text above and original papers (Hornsby et al., 2021 and 2023 for details).

			Cut-point Criteria	
VFS-Scale	Mean (Median)	St. Dev. (SD)	$\geq$ mean + 2 SD	$\geq$ “Frequent” fatigue problems*
VFS-A-10	6.9 (5)	6.2	≥ 20	≥ 25
VFS-A-40	25.7 (15.5)	27.3	≥ 81	≥ 100

*“Frequent” fatigue problem cut-offs reflect the mid-point between scores that would be obtained if a respondent selected “Sometimes” or “Often” in response to all test items on a given scale. See text above for details.

Follow-up “interview” questions:

In addition to assessing the frequency of fatigue-related complaints, after reviewing item responses, we recommend that clinicians conduct follow-up “interview” questioning whenever a respondent selects “Often” or “Almost Always” to **ANY** scale item- regardless of their total score. The goal of the follow-up questioning is to assess the functional impact of the individual’s fatigue-related issue(s) and, if warranted, identify appropriate targets for counseling or intervention. To assess the functional impact of the fatigue-related issue(s), we recommend you ask follow-up questions to identify when, where, and how the patient experiences their fatigue.

For example, consider a case where the VFS-A-10 was administered and the patient selected “Often” in response to the test item: “I feel worn out from everyday listening”. The clinician might ask, “Can you give me some examples of where you are and what you are doing when this happens to you?” Other follow-up

questions might include: “Are there certain activities or times at work or during your day when you feel this way? What do you do when you are feeling worn out from listening?”

The goal of this type of follow-up is to identify specific settings, situations, or behaviors that are potentially problematic and may be appropriate targets for counseling or intervention.

Accessing the VFS-A

In summary, the VFS-A-10 and VFS-A-40 are standardized measures that can be used to assess fatigue associated with a patient’s listening difficulties. VFS-A scores can be used to identify individuals experiencing severe and recurrent listening-related fatigue and to monitor changes in fatigue over time following intervention.

All versions of the VFS (adult and pediatric scales) are copyrighted and may not be rented, leased, sold, sub-licensed, or distributed for commercial purposes. Those interested in using the scales for personal, educational, research, or clinical purposes can access all scales from their original publications (see reference list) or from the VFS website (<https://www.vumc.org/vfs>).

Contact Information

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