DOSO

Device Oriented Subjective Outcome Scale
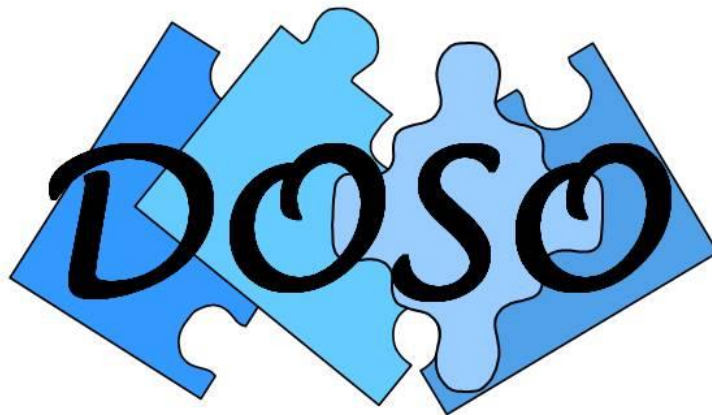
Software to administer and score the DOSO

2013

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First Edition: October 2012
Second Edition: September 2013

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Brief description of the DOSO questionnaire

The DOSO was developed for the purpose of measuring hearing aid outcome from the point of view of a hearing aid wearer. There are two short forms [DOSOs(a), DOSOs(b)] and one long form (DOSO) available for use.

DOSOs(a) and DOSOs(b) each consist of 28 items and produce 6 subscale-scores (*Speech Cues, Listening Effort, Pleasantness, Quietness, Convenience*, and *Use*). These subscales address different aspects of the hearing aid wearer's experiences based on speech understanding, sound quality, comfort, etc. DOSOs(a) and DOSOs(b) are equivalent forms. They differ only in the items for subscales: *Speech Cues* and *Listening Effort*.

DOSO includes all the items in the two short forms of the *Speech Cues* subscale and all the items in the two short forms of the *Listening Effort* subscale, as well as all the items in the *Pleasantness*, *Quietness*, *Convenience*, and *Use* subscales. This form comprises 40 items and produces scores for 6 subscales.

The 3 forms and the corresponding items for each subscale are listed in Table 1. The items for each subscale in each form are listed in the Appendix.

Subscale	Item number		
	DOSOs(a) **(28 items)**	**DOSOs(b)** **(28 items)**	**DOSO** **(40 items)**
Speech Cues	5, 6, 8, 9, 10, 15, 18	5, 6, 8, 9, 10, 15, 18	5, 6, 7, 9, 10, 11, 13, 15, 16, 18, 21, 24, 25, 29
Listening Effort	1, 17, 21, 22, 23	1, 17, 21, 22, 23	3, 19, 23, 27, 30, 31, 32, 33, 35, 36,
Pleasantness	3, 4, 7, 16	3, 4, 7, 16	2, 4, 8, 22,
Quietness	12, 13, 20, 24, 25	12, 13, 20, 24, 25	14, 17, 28, 34, 37
Convenience	2, 11, 14, 19	2, 11, 14, 19	1, 12, 20, 26,
Use	26, 27, 28	26, 27, 28	38, 39, 40

Table 1: Items for each subscale in each form

A criterion is set here that 2/3 or more of items in a subscale must be completed for a valid score (Table 2). Otherwise, no calculation will be applied for that subscale and "Not valid" will be displayed in the final score table.

Subscale	Number of items	
	DOSOs(a) (b)	DOSO
Speech Cues	5	10
Listening Effort	4	7
Pleasantness	3	3
Quietness	4	4
Convenience	3	3
Use	2	2

Table 2. Minimum number of items needed for valid scoring

The DOSO software program provides a way to: administer the questionnaire using a computer; score completed paper-and-pencil questionnaires; and examine the results using a graphical output.

System requirements and installation

The DOSO program is a 32-bit Microsoft Windows® application that can run on most systems with Microsoft Windows® 2000 or later. DOSO for Windows needs at least 1 MB of hard disk space for the program and associated files. A laser printer is recommended for the best quality printouts of DOSO data in graphical form but is not essential. A color printer will produce color graphics as on the screen graphs. To install the software, run SETUP.EXE from the DOSO directory of the installation CD.

Patient information screen

In this screen, patient information is entered. This screen is displayed when the DOSO is opened or by clicking the icon 🖺 on the top row of the screen. The information includes the patient's Last Name, First Name, Middle Name, Patient ID (if there is any), Test Form, Gender, and Birth Date.

Test conditions are entered in Condition1 and Condition2. If only one condition is measured, condition 2 may be left blank. Information about the test, fitted ear, coupling strategy, date of test, and user experience, can also be entered in this section. Additional information could be entered to the space in the bottom text box labeled as "Comments." An example of the Patient information screen is given in Figure 1.

Figure 1. Patient information screen

Response entry screen

In this screen, the patient's responses are entered (Figure 2). This screen is displayed by clicking the icon ▦ on the top row of the screen. Information for each test condition is displayed. Responses from a paper version form are entered to the software by using a computer mouse to click the responses for each item in each condition. Scroll the slider bar down to display the rest of the items. If for some reason you would like to

erase the responses you entered, click on the corresponding button on the bottom of the screen to clear your entries.

Figure 2. Response entry screen

Results screen

In this screen, the subscale scores for the entered responses are displayed (Figures 3
and 4). This screen is displayed by clicking the icon [icon] on the top row of the screen.
Patient information and test condition information is displayed on the right side of the
screen. Subscale scores and the corresponding number of missing items for each
condition are displayed on the bottom. The subscale scores for each condition also are
plotted against the norm which is displayed as a Box-and-Whisker plot (Figure 3).

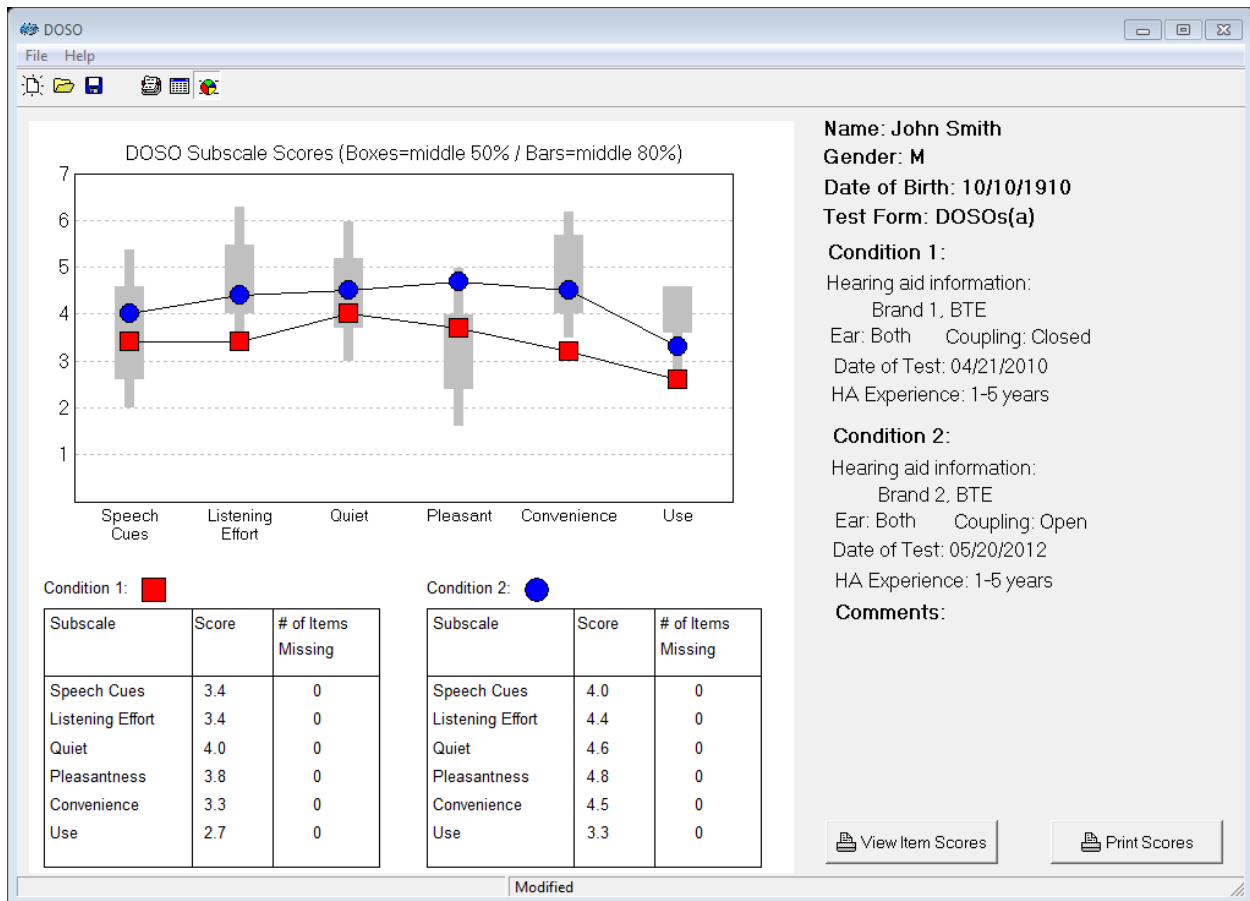Figure 3. Results screen (Subscale score screen)

The "View Item Scores" button on the bottom right of the screen brings up a screen
showing the items grouped according to subscales and some words from the text of its
individual items (Figure 4). The patient's response for each item is shown compared
with the normative group's mean score and range of scores from the 25th to the 75th
percentiles.

The "View Item Scores" program feature could be used to investigate a subscale of concern or of particular interest to the clinician. For instance, if a patient's score on a subscale varied substantially from the norm, the clinician could view the responses to the individual items in that subscale to see which items were causing this result.
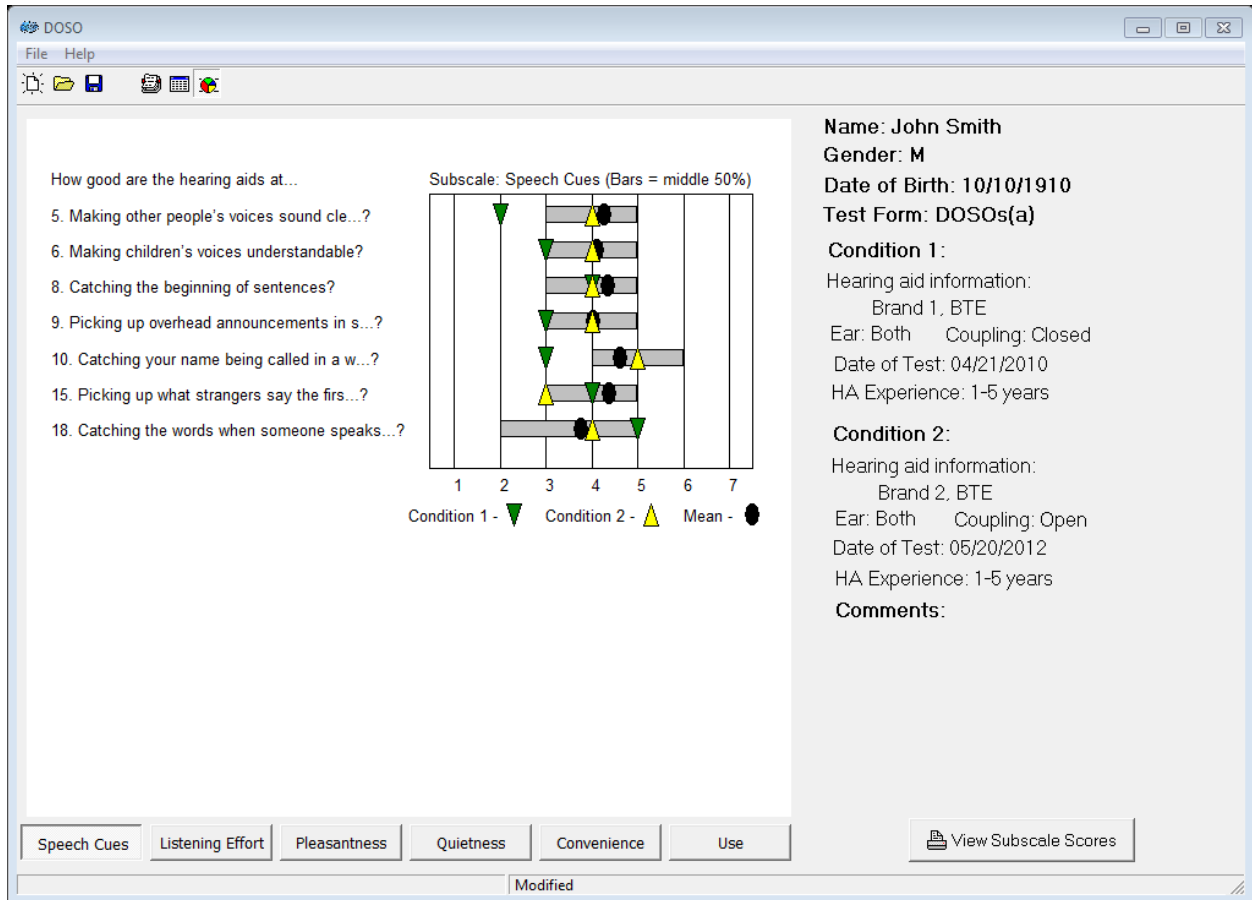

Figure 4. Results screen (individual item score screen)

The "View Subscale Scores" button returns the user to the original Graph screen.

Printing Results

A hard copy of results including patient information, test condition, scores, and graphs as shown in Figure 3 may be obtained by clicking the button "Print Scores" (Figure 3).

Scoring strategy

For items rated with the 7-point response scale, numbers from 1 to 7 are assigned to the scale from A to G, respectively (A=1; B=2; C=3; D=4; E=5; F=6; and G=7). Thus, the patient's responses in the 7-point scale are converted into scores from 1 to 7.

For the 3 items for subscale Use, numbers from 1 to 5 are assigned to the 5 alternatives. Specifically, the number 1 is assigned to the alternative which represents the smallest amount of use while the number 5 assigned to the alternative which represents the largest amount of use (see Table 3).

26. How many days a week do you <u>usually</u> wear hearing aids?	27. On the days you use hearing aids, how many hours do you usually wear them?	28. In situations where you need to improve your hearing, how often do you wear hearing aids?
☐ None 1	☐ 1-4 hrs. 1	☐ Always (100%) 5
☐ 1-2 days 2	☐ 5-6 hrs. 2	☐ Usually (75%) 4
☐ 3-4 days 3	☐ 7-8 hrs. 3	☐ Sometimes (50%) 3
☐ 5-6 days 4	☐ 9-10 hrs. 4	☐ Rarely (25%) 2
☐ Every day 5	☐ 11 hrs. or more 5	☐ Never (0%) 1

Table 3. Scoring strategy for the 3 items for subscale Use.

For all item scores, a bigger number is associated with a better outcome.

After completing the response conversion, scores for each subscale are calculated by averaging the scores for the items within each subscale. If responses to some of the items are missing, the subscale score is calculated by averaging the scores for the items with valid responses. The calculation results are rounded to one decimal place.

Appendix: Items & Subscales

DOSOs(a)

Speech Cues

05. Making other people's voices sound clear in a moving car?

06. Making children's voices understandable?

08. Catching the beginning of sentences?

09. Picking up overhead announcements in stores?

10. Catching your name being called in a waiting room?

15. Picking up what strangers say the first time?

18. Catching the words when someone speaks from another room?

Listening Effort

01. Making loud speech clear?

17. Improving enjoyment of everyday activities?

21. Recognizing different voices?

22. Reducing misunderstandings during conversations?

23. Making conversation easier?

Pleasantness

03. Providing a pleasing sound quality?

04. Making music pleasant?

07. Making your voice sound natural to you?

16. Keeping the sound of your voice comfortable to you?

Quietness

12. Keeping background noise to a minimum.

13. Cutting out background noise in a restaurant?

25. Keeping loud sounds from being uncomfortable?

20. Making loud music tolerable?

24. Keeping wind noise from being annoying?

Convenience

02. Not whistling during use?

11. Making the batteries easy to change?

14. Not using up batteries too fast?

19. Being easy to put in and take out of your ears?

Use

26. How many days a week do you usually wear hearing aids?

27. On the days you use hearing aids, how many hours do you usually wear them?

28. In situations where you need to improve your hearing, how often do you wear hearing aids?

DOSOs(b)

Speech Cues

05. Eliminating the need to have someone else explain what was said?

06. Picking up speech when the talker's lips are not visible?

08. Catching what waiters say in a busy restaurant?

09. Catching what someone says on the first try?

10. Picking up soft sounds that follow loud ones?

15. Picking up what someone says across a large room?

18. Catching a person's name when they are introduced?

Listening Effort

01. Making speech clear in a face-to-face conversation?

17. Picking up sounds that are missed without them?

21. Making the television sound clear?

22. Keeping the volume at a pleasing level?

23. Distinguishing between male and female voices?

Pleasantness

03. Providing a pleasing sound quality?

04. Making music pleasant?

07. Making your voice sound natural to you?

16. Keeping the sound of your voice comfortable to you?

Quietness

12. Keeping background noise to a minimum.

13. Cutting out background noise in a restaurant?

20. Making loud music tolerable?

24. Keeping wind noise from being annoying?

25. Keeping loud sounds from being uncomfortable?

Convenience

02. Not whistling during use?

11. Making the batteries easy to change?

14. Not using up batteries too fast?

19. Being easy to put in and take out of your ears?

Use

26. How many days a week do you usually wear hearing aids?

27. On the days you use hearing aids, how many hours do you usually wear them?

28. In situations where you need to improve your hearing, how often do you wear hearing aids?

DOSO

Speech Cues

05. Eliminating the need to have someone else explain what was said?

06. Making other people's voices sound clear in a moving car?

07. Making children's voices understandable?

09. Catching the beginning of sentences?

10. Picking up overhead announcements in stores?

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15. Catching what waiters say in a busy restaurant?

16. Catching what someone says on the first try?

18. Picking up soft sounds that follow loud ones?

21. Picking up what strangers say the first time?

24. Catching the words when someone speaks from another room?

25. Picking up what someone says across a large room?

29. Catching a person's name when they are introduced?

Listening Effort

03. Making loud speech clear?

19. Making speech clear in a face-to-face conversation?

23. Improving enjoyment of everyday activities?

27. Picking up sounds that are missed without them?

30. Recognizing different voices?

31. Reducing misunderstandings during conversations?

32. Making the television sound clear?

33. Making conversation easier?

35. Keeping the volume at a pleasing level?

36. Distinguishing between male and female voices?

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02. Providing a pleasing sound quality?

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08. Making your voice sound natural to you?

22. Keeping the sound of your voice comfortable to you?

Quietness

14. Keeping background noise to a minimum.

17. Cutting out background noise in a restaurant?

28. Making loud music tolerable?

34. Keeping wind noise from being annoying?

37. Keeping loud sounds from being uncomfortable?

Convenience

01. Not whistling during use?

12. Making the batteries easy to change?

20. Not using up batteries too fast?

26. Being easy to put in and take out of your ears?

Use

38. How many days a week do you usually wear hearing aids?

39. On the days you use hearing aids, how many hours do you usually wear them?

40. In situations where you need to improve your hearing, how often do you wear hearing aids?

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