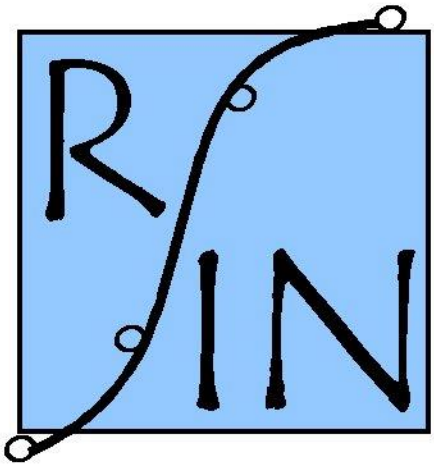
RSIN

version 1.0 for Windows

the Revised Speech in Noise Test

For administering and scoring the RSIN Test



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The RSIN Program

The Revised Speech in Noise (RSIN) Test is a modified version of the SIN (Speech in Noise) Test, originally described by Killion and Villchur (1993). The original SIN Test requires the listener to identify key words in sentences that are presented at four signal-to-noise ratios (SNRs) with multi-talker babble as the background noise. There are 9 blocks of sentences. Data published by Bentler (2001) established that most of the nine blocks do not produce equivalent scores.

In this revised version of the test, the RSIN Test, sentences have been reallocated to improve equivalence across test blocks. Additionally, in order to increase reliability, test blocks are combined into sets of two, called Modified Dual Blocks (MDBs).

There are four MDBs of test sentences. Unused original test material is employed for practice. The SIN Test audio compact disk is required for test administration. See page 3 for ordering information.

The RSIN test capitalizes on the advantages of the SIN Test while obtaining more reliable and sensitive data. However, these advantages are obtained at the price of additional test time. Therefore, the RSIN test is probably more suited to research applications than to clinical ones.

SYSTEM REQUIREMENTS AND INSTALLATION

The RSIN program is a 32-bit Microsoft Windows®[1] application that can run on most systems with Microsoft Windows® 95 or later. The RSIN program 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 RSIN 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 disk or directory that contains the RSIN setup program.

[1] Windows is a registered trademark of Microsoft Corporation.

RUNNING THE PROGRAM

The RSIN program opens displaying a blank Client Information screen. At the top of the screen is the Main Menu bar. "File" and "Help" are pull-down menus of program options. Use the mouse to select a menu item. *Note that you must close any CD player software running before you open the RSIN program.*

File contains the selections:

1. New
2. Load
3. Save
4. Save As
5. Exit (Alt + X)

Help contains the selections:

1. Contents
2. Using Help
3. About

FILE: From this menu, the user can load an existing file, start a new file, save files, and exit and close the program

New: When the program is first opened, it is ready to take edits for a new file. This menu option is primarily used when you are finished with an already loaded file and you wish to create a new file.

Load: Selecting this option opens a window to allow the user to load a previously stored data file. Use the window to access the appropriate subdirectory (folder) and select a file to open.

Save: This option saves the current file and any edits without exiting the program. When the user selects the "Save" option of the program, a data entry window opens where the filename must be typed in. The filename is not read from the identification field on the Client Information screen.

Data files are automatically given an .sin extension. Only one set of data can be stored in a file. Therefore, if there is more than one administration of the RSIN for the same patient, the filenames must be different.

Save as: This option is used to save a copy of a data file under a different name. There will then be two copies of the data file under two different filenames. Type in the new filename and then select "OK".

Exit: Select this or type <Alt + X> to exit the RSIN program.

Below the Main Menu bar is an icon toolbar for quick access to program functions. Grouped to the left are the icon buttons for the file handling options Create a new file, Load an existing file, and Save the current file. Grouped to the right are the icons for running the SIN test and

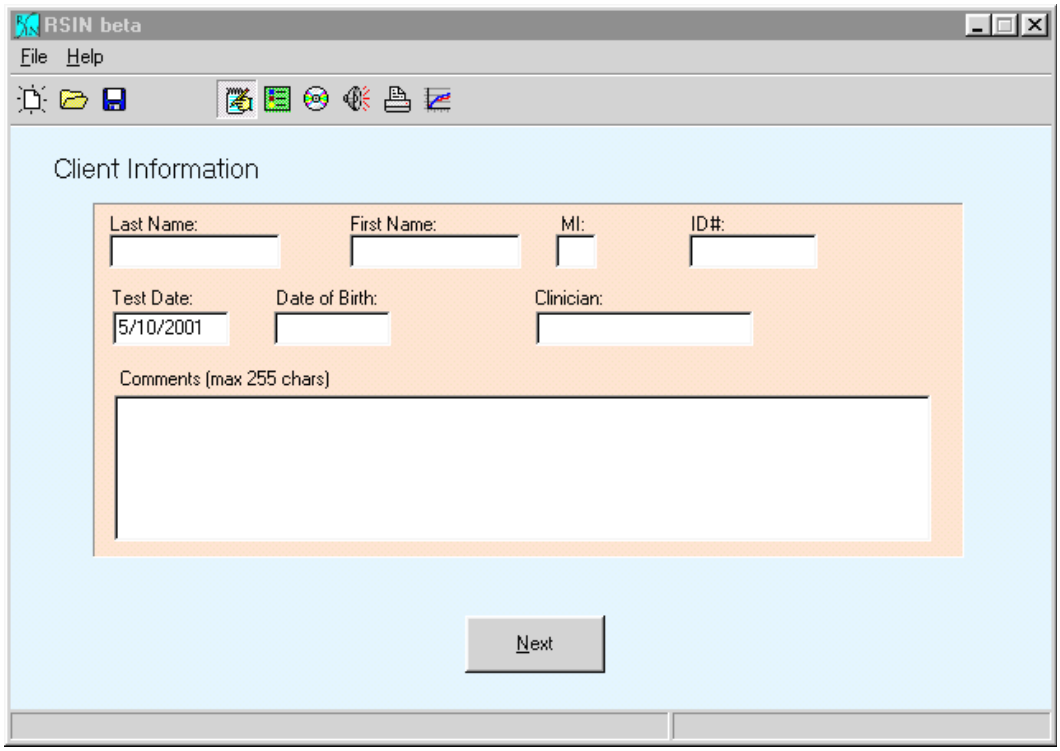
viewing results. They are Edit Client Information, Select Test Conditions, Calibrate with SIN CD, Run SIN Test, Display and/or print scores, and View WRAU Graphs. The Menu bar and the Toolbar are always available no matter which screen is displayed.

On any data entry screen, moving around the various fields is done with the mouse or with the Tab key. Moving within a field is done with the mouse or the cursor keys. To press a button click on it with the mouse or press the Alt key simultaneously with the underlined letter on the button. Throughout the remainder of these instructions, the Tab key will be referred to by <Tab>, the Enter key by <Enter>, etc. The combination of <Alt> plus the underlined letter of a command will be referred to by <Alt+"underlined letter">.

All screens have buttons at the bottom for switching between the screens and other purposes. The functions for these buttons vary depending on which functions may need to be accessed from a particular screen. More details will be provided in the following explanations for the various screens.

CLIENT INFORMATION

To move around the Client Information screen, use the <Tab> key or the mouse. <Tab> moves from field to field and <Shift + Tab> moves backwards through the edit fields. There are edit fields available for the client's name, an identification number or name, the test date, the client's date of birth, the clinician's name and comments. The ID# does not name the file. This is done when you save the file.

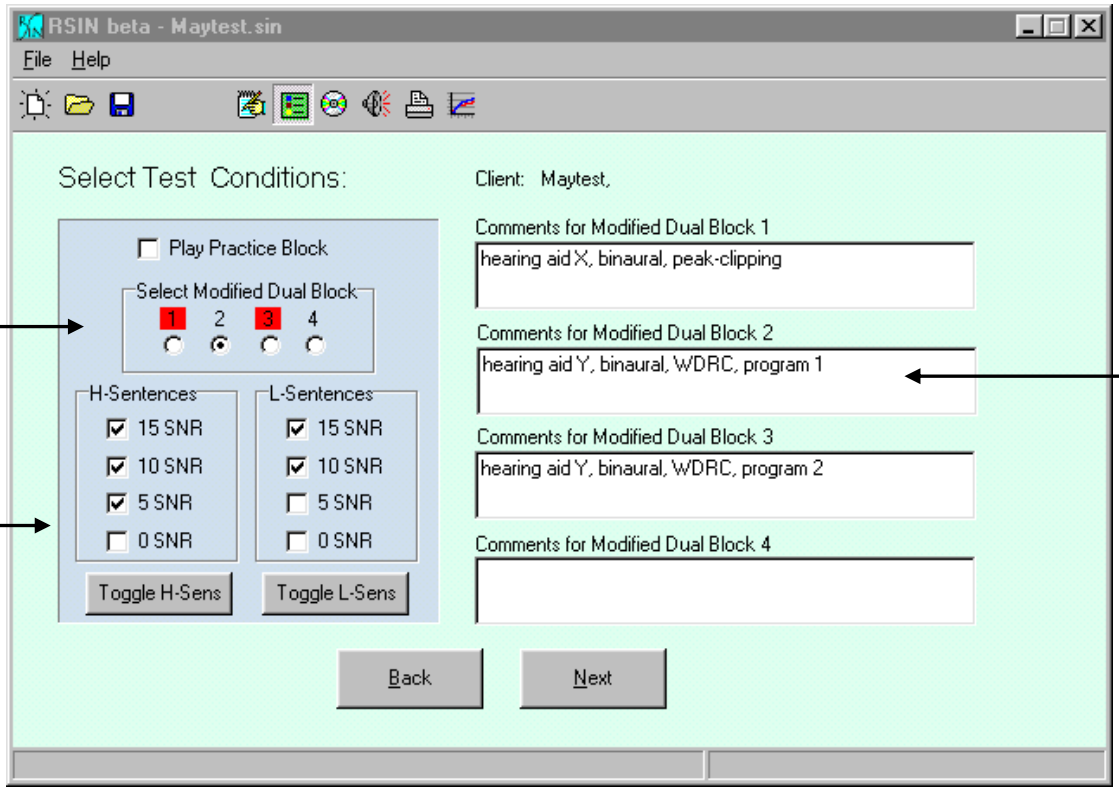


The "Next" button at the bottom of the screen will open the Select Test Conditions screen. The "Next" and "Back" buttons occurring on various screens will sequence through the screens in the same order as the icons on the toolbar at the top of the window.

SELECT TEST CONDITIONS

From this screen, the clinician can set up the test configuration. On the SIN Test CD, test sentences were recorded at "soft" and "loud" levels 30 dB apart. This program refers to the "soft" level sentences as "L-Sens" and the "loud" level sentences as "H-Sens." Each of these levels is presented at four signal-to-noise ratios (SNRs). Only one Modified Dual Block (MDB) may be configured at a time. Select one of the four MDBs on the left of the screen. After an MDB has been tested, its number is highlighted in a red block.

The default setting is to play a practice block of five sentences. Deselect this option if you do not want to include the practice sentences.



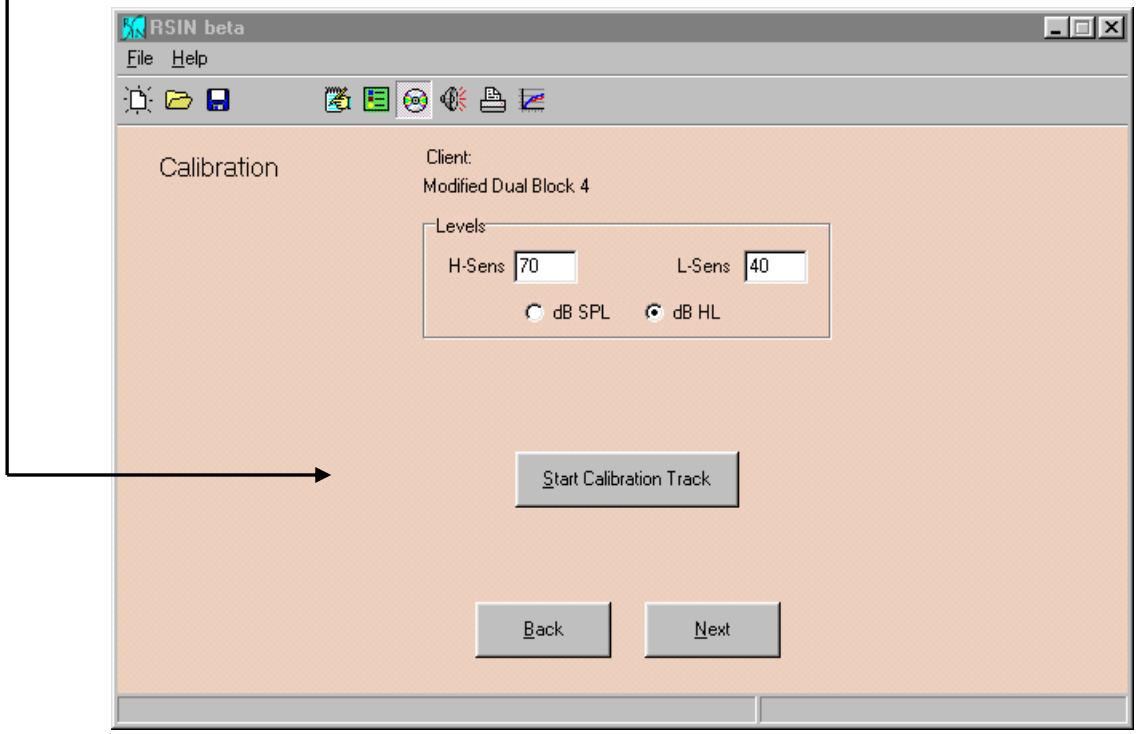
Below the area to select the MDB, the clinician selects which of the SNR conditions to include in the testing for the H-Sens and L-Sens sentences. The Toggle buttons can be used to select or deselect all the SNRs. When an MDB that has already been partially tested is selected, the SNRs that were tested are highlighted in red.

A comment field for each MDB is provided. The clinician can use this to note pertinent information for the test situation, such as which hearing aid or hearing aid parameters were used for each MDB tested, whether testing was unilateral or bilateral, etc. These comments will be included on the test results printout.

CALIBRATION

Please refer to the booklet included with the SIN Test CD for information regarding calibration of the test signal. It is the tester's responsibility to set up instrumentation and calibrate the equipment in order to produce the desired test presentation level. *Please note that the RSIN software does not control any of the instrumentation other than accessing an audio selection from the CD*. The Calibration screen only provides a means for making a record of calibration information and the presentation levels that were used for administration of the test sentences.

The "Start Calibration Track" button is used to play the 1k Hz calibration tone at the beginning of Track 1. The button toggles the signal off and on. The calibration tone lasts about 20 seconds on the CD, but the program will loop the presentation for continuous play. Test sentences on the CD were recorded at "loud" and "soft" levels 30 dB apart. If the VU meter is set to 0 and the attenuator on the audiometer set to 70 dB HL, the output for the calibration tone should be 83 dB SPL for the high level sentences.

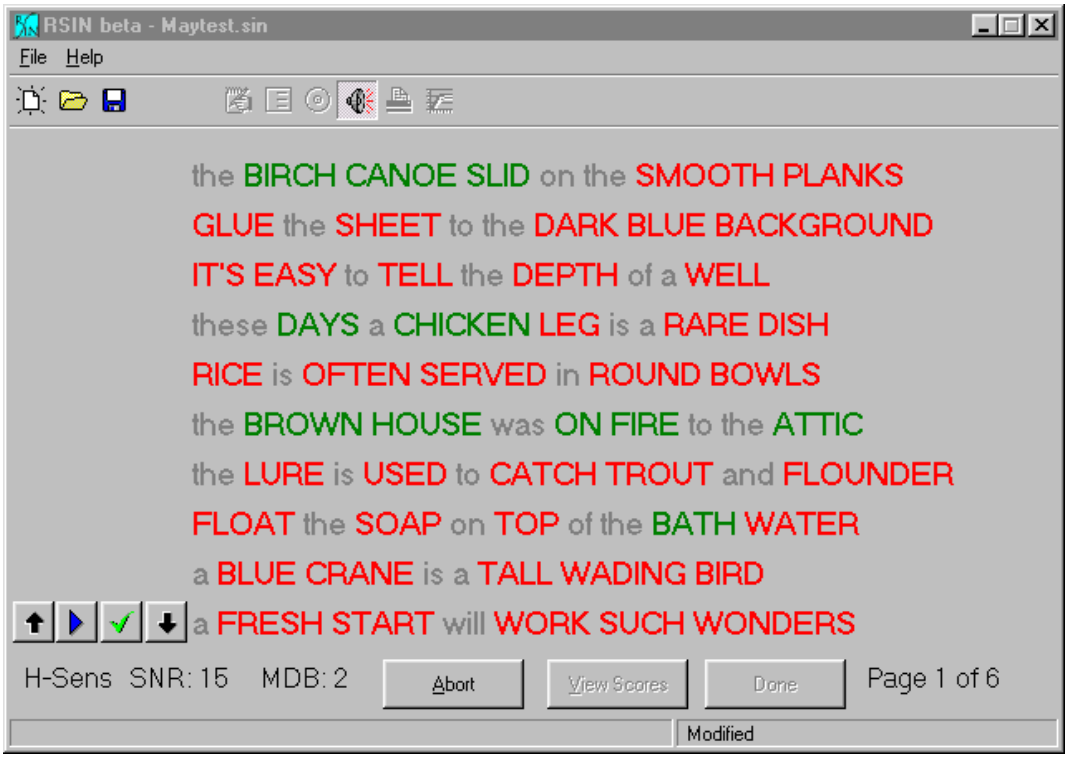


The default calibration values on this screen of the RSIN program are those suggested by Etymōtic Research: 70 dB HL/83 dB SPL ("fairly loud speech") for the high level sentences (H-Sens) and 40 dB HL/53 dB SPL ("fairly soft speech") for the low level sentences (L-Sens). To achieve these presentation levels, the audiometer dial would be set to 70 dB HL, after equipment calibration, and remain there throughout testing. The L-sentences would be presented at 40 dB HL automatically because of the recording levels.

It should be noted, however, that with appropriate calibration and equipment set-up, the test material can be presented at whatever presentation level and/or relationship the tester requires. If the clinician wishes to test at some other level, for example 50 dB HL (63 dB SPL) for normal conversational speech, the default values may be changed to record the test conditions used. Keep in mind that the L-Sentences were recorded at a low level and if they are presented at a high level, the noise floor of the recording may be audible as a background hissing noise.

RUNNING THE RSIN TEST

When "Run SIN Test" is selected, the program will run through the testing in the order that the MDB was configured. The order of testing will be the practice block (if selected), the H-Sentences from +15 SNR down through 0 SNR, and then the L-Sentences from +15 SNR down through 0 SNR. Each condition will have its own scoring screen. At the bottom left of the screen, is a notation showing what is being tested: H-Sentences or L-Sentences, the SNR condition, and the MDB#.



To the left of the sentences are the 4 control buttons for administering the test. The control buttons must be in line with a sentence in order to play or to score it. The first is an up arrow, used to return to a previous sentence. For example, this would be used to adjust the scoring when the clinician had already advanced to the next sentence but the client then provides a correct word from the previous sentence. Next is the "play sentence" button marked with a triangle. The checkmark button will toggle all 5 key words as correct or incorrect. The down arrow moves control down to the next sentence

Instructions: The following instructions were used in the research conducted in the development of the RSIN program:

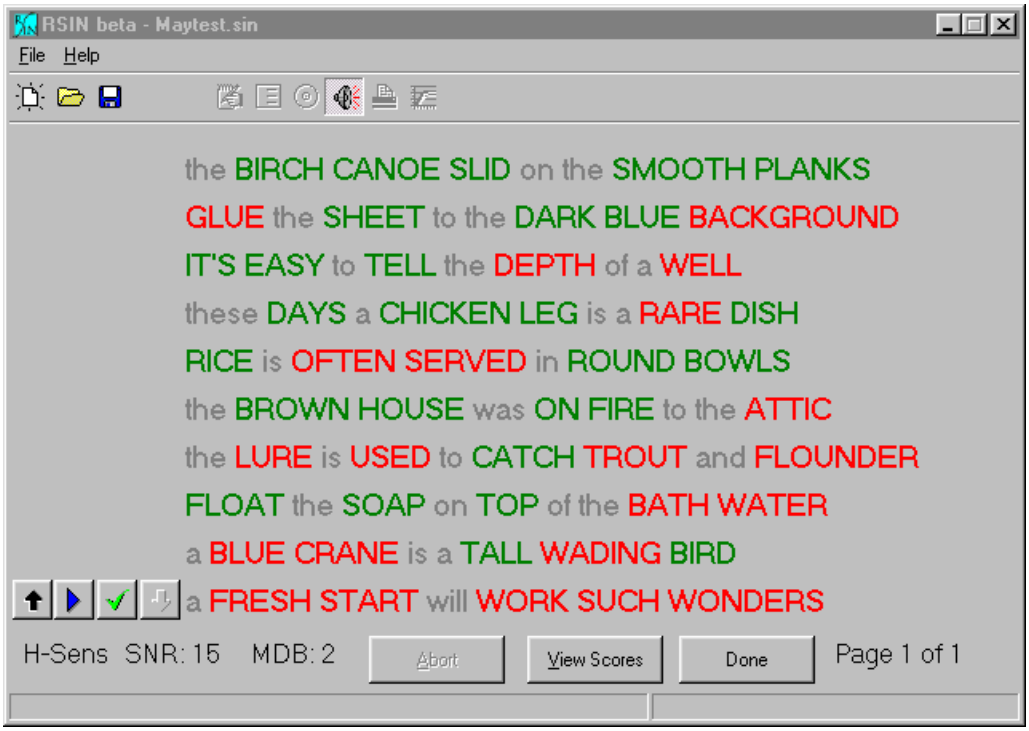
> Imagine that you are at a party. You are going to listen to one female friend with several other people talking in the background. This friend can be easily identified during the first few sentences because her voice is louder than the others.
>
> We want you to repeat the sentence spoken by your friend. The people talking in the background will gradually get louder, making it difficult to identify your friend's voice

This is a difficult test and you may not be able to repeat all the words. Repeat as much of each sentence as possible (even a word or part of a word), even if you need to guess.

Scoring: All sentences for the condition appear on the screen with 5 key words per sentence in bold capital letters. When an item (sentence) has been played, all the key words turn red (incorrect). Click on a key word with the mouse to change it to correct status (green). The client does not have to produce a complete sentence, and getting the correct word order in the sentence is not necessary. Half-credit is given for words that have the same root but are in a different form from the key word. For example, CAT instead of CATS is half-correct, or WALKED instead of WALK is half-correct. On the other hand, PATS instead of CATS or TALK instead of WALK would be incorrect.

A right mouse click toggles between red (incorrect) & yellow (half credit). A left click toggles between green (correct) & yellow (half credit).

red = incorrect
green = fully correct
yellow = half credit

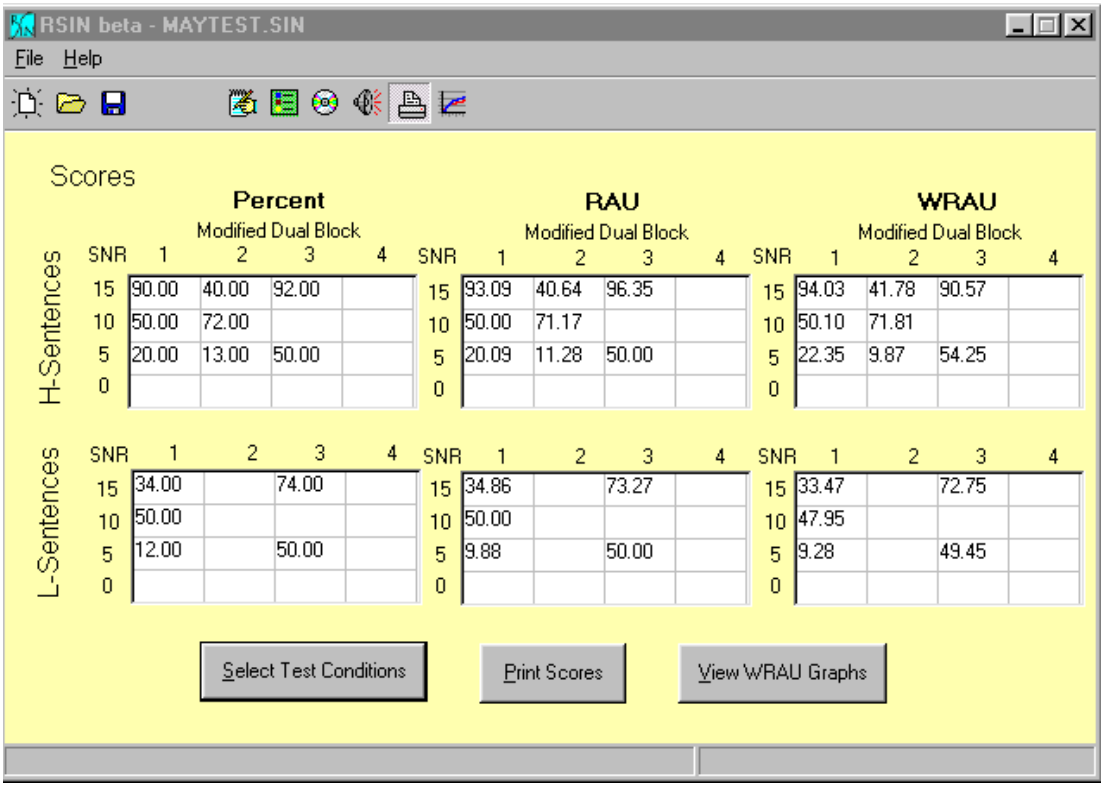


Below the sentences are 3 buttons. Only the "Abort" button is accessible until testing for the MDB has been finished. *Please note that when you select "Abort", all testing for that MDB will be lost.* When the last sentence on a screen has been played and scored, click on the down arrow and the program moves to the next test condition screen. When the last sentence of the final test condition has been played, clicking on the down arrow activates the "View Scores" and "Done" buttons. The "Done" button reactivates the icons on the toolbar at the top of the screen. The "View Scores" button accesses the screen showing the tables of scores.

DISPLAY AND PRINT SCORES

Scores for each condition tested are produced in 3 tables, expressing the score in percent correct, in RAU (rationalized arcsine units), Studebaker (1985), and in WRAU (weighted rau), Cox et al (2001). The weighted rau is used to make the sentence blocks more equivalent. At the bottom of the screen are 3 buttons which can be used to print these scores, view the graphed WRAU scores, or select additional test conditions.

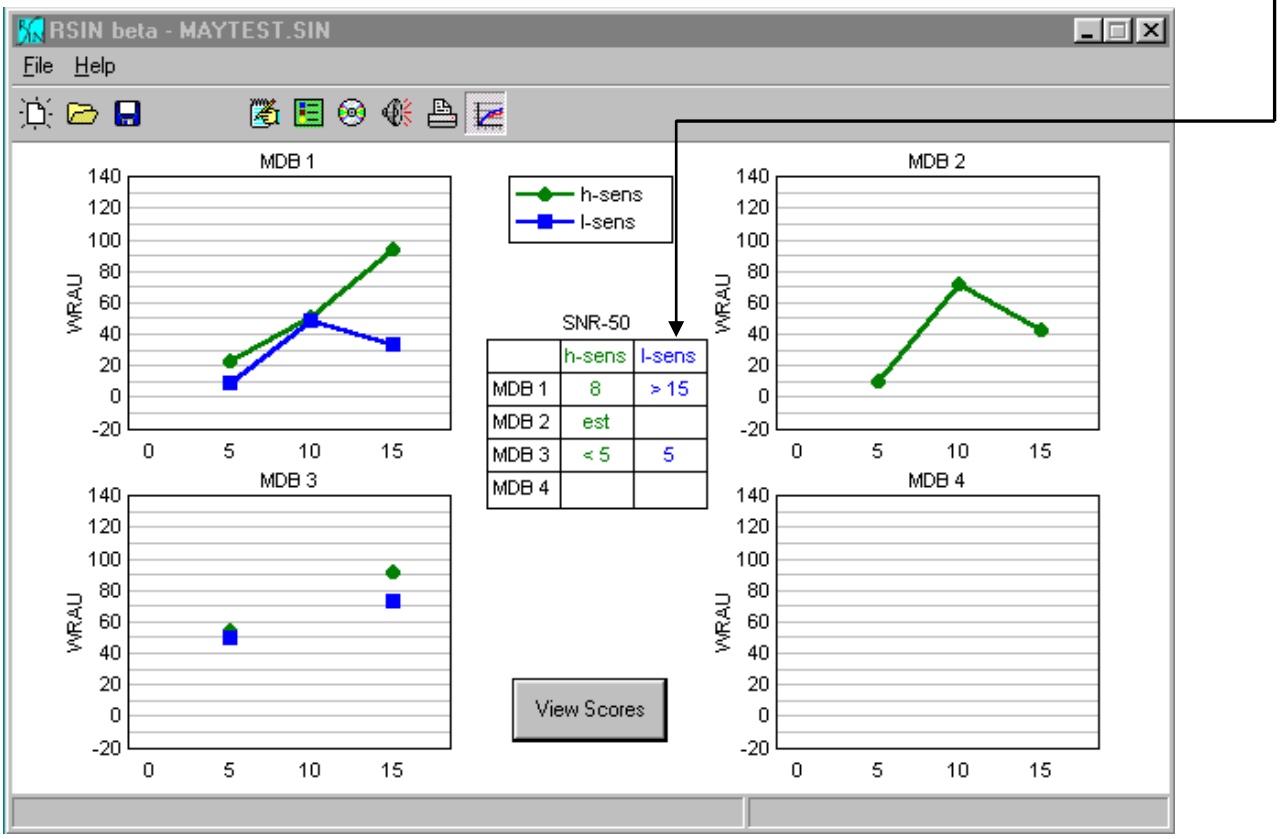
The "Print" button yields a 2-page printout. The tables of scores along with the calibration levels and comments are on one page. The graphs of the WRAU scores for each MBD are on the other page.



VIEW WRAU GRAPHS

Each MDB has a separate graph. The wrau scores are graphed for each SNR, with separate lines for the H-Sentence scores and the L-Sentence scores.

Additionally, the program uses the client's scores to compute the SNR which would produce a wrau score of 50 (the SNR-50). This is listed in an additional table. If all scores are below 50, this SNR is reported as >the highest SNR tested. If all scores are above 50, this SNR is reported as <the lowest SNR tested. If the scores are not monotonic around 50, "est" appears in the SNR-50 table and the clinician would need to look at the graph and estimate visually for that condition.



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