

## Pitch Discrimination / Selectivity Test Overview

The Pitch Discrimination Test was developed for those practitioners who do not use the Tomatis Listening Test\* so that they can have access to this valuable tool. The test of selectivity was traditionally performed using an audiometer. The client is asked to respond to successive tones by indicating whether the latter tone is higher or lower than the preceding tone. The test is administered from 8000 hertz to 125 hertz, testing first in the left ear and then the right ear.

The test of selectivity has immense clinical value. It can shed light on the emotional development of the client and provide guidance in selecting appropriate professional protocols. However, there are some drawbacks to using an audiometer for measuring selectivity. Namely, the patterns and progression of tones are fixed, making it possible for a client to guess correctly.

The new iLs Pitch Discrimination Test was developed to be easy to administer and yet truly reflect one's ability to perceive specific pitches. The tones are offered in random order, making it hard to guess based on a pattern. There are 2 tests, one for children and a slightly longer version for teens and adults, and a print out at the end of each test shows in which zone errors occurred.

### Taking the Pitch Discrimination Test (PDT)

**Description:** the Pitch Discrimination Test is on a CD for use with a personal computer. It is designed with multiple *pairs of tones* that are presented in a random fashion. The test for children is shorter than for adults due to differences in concentration and attention span. The pairs of tones are randomized throughout the auditory spectrum from 125 to 8000 hertz. A feature of this test is that the pairs of tones are scrambled each time the test is given, so there is no opportunity for anyone to memorize sequences. In addition, there is a summary of the client's performance provided at the conclusion of the test which can be printed for a permanent record.

**Getting Started:** To avoid browser incompatibility with the test, we recommend you download the Mozilla Firefox browser to your computer. This only takes a few minutes and will ensure the test works smoothly.

- Go to [www.mozilla.com](http://www.mozilla.com) and you will see a box on the homepage labeled "Free Download Firefox 3." Download and install Firefox 3 to your computer.

*\*For those who wish to add the Listening Test to their practices, iLs is offering an advanced 2-day course on the test, taught by Ron Minson, MD. This will provide a working understanding of the test as well as subtleties in the interpretation and meaning of selectivity.*

- Once you have downloaded and installed Firefox 3, insert the test CD.
- You will open 3 folders to reach the test: the “iLs-final” folder, then the folder labeled “distribute”, then the “iLs.html” folder.
- After bringing the test up on your computer screen, you will see the page displaying a button for test volume, a button to stop the volume test and then a choice between the child and adult test.\*\*

\*\* If the “iLs.html” file does not load at all, in Firefox, you will need to install both Java and Flash plug-ins for Firefox. If the file loads but you do not see a choice between *child* and *adult* tests, you will need to install just the Java plug-in, for Firefox. To do this, please follow these instructions:

Flash plug-in:

[Click here to visit the Flash player install website.](#)

Make sure you are using Firefox to do this. Once on the Adobe website, click the install button (the site automatically suggests a correct version). This will download the installer file to your computer. Double click to open the installer file and follow the installation instructions. After the install is complete, restart Firefox.

Java plug-in:

[Click here to visit the Java install website.](#)

Choose the Free Java Download option. Click the install button (the site automatically suggests a correct version). This will download the installer file to your computer. Double click to open the installer file and follow the installation instructions. After the install is complete, restart Firefox.

You will now want to make sure that your browser's cache is cleared each time you restart Firefox, which will allow it to run smoothly. To do this, click on *Tools* on the top bar, then select *Options*. Under *Options*, proceed to the *Privacy* tab and click on *Settings*. Check the box marked “cache,” then hit *ok*, and *ok* again.

If prompted, you should select Firefox to be your default browser, which will associate .html files (including the pitch discrimination test) to Firefox, allowing you to simply double click the html file to bring it up in Firefox.

If Firefox is not your default browser, or you do not wish to make it your default browser, right click on the “iLs.html” on the CD, and scroll down to *Open With*. If Firefox appears on this menu, click it to open the file with Firefox. If Firefox is not listed in the menu, select *Browse* and enter the folder named Mozilla Firefox. There, double click the file *firefox.exe* to open the document.

**Step 1** Highlighted in red is the sentence "**set the computer volume on low before playing the test sound**". This is very important to avoid shocking or harming the ears of the person being tested.

**Step 2** Near the top of the screen is a slider used to increase or decrease the volume of the test. **After you lower the volume on your computer** push the test volume button; then adjust the volume with the slider at the top right. It is preset to a “level 50”, an average volume for many computers. Increase the volume by moving the slide bar to the right and decrease the volume by sliding it to the left.

**Step 3** Select either the child or adult test. Use your discretion whether a child can do the adult version. The only difference is that the adult version is a little longer and requires a longer attention span. Generally, by age 13 – 14, even younger, a child will be able to do the adult version.

After selection of the test, the client is presented with a ‘Start’ button to begin testing pitch discrimination. Once ‘Start’ is pressed the test will begin immediately. There are three buttons for making the selection after hearing each pair of tones-- a button for higher, one for lower and one for “not sure”. The “not sure” button will be scored as an error. The left ear is tested first and then the right ear. There is no alternation between ears during this test.

**Step 4** After completing the Pitch Discrimination Test for both ears, a summary sheet will automatically appear that reveals the overall percentage correct for each ear and then a breakdown of these scores by the three zones of the Listening Test. Each zone will indicate the percentage correct and identify each pair of tones that was an error.

Select the button for “print” to have a permanent copy of test results for your records. Or, you can save the page as a “screen shot” for printing at some later time.

## **Pitch Discrimination Test Use & Interpretation**

**Instructions:** The client is instructed to listen carefully to the following *pairs of tones* and to respond whether the second tone is higher or lower than the first tone. The client will indicate their choice by selecting the “higher”, “lower” or “don’t know” button. The left ear will be tested first, then the right ear. (Note: the examiner may control the mouse for a younger child.)

An important part of the instruction is to tell the client to respond to their first impression and not try to figure it out cognitively, mentally or by voicing the tones. This is a perceptive test and not a cognitive test.

**Interpretation:** Pitch discrimination, or tonal differentiation, is an extremely important skill for auditory processing. Variation of pitch in our voice, whether talking or singing, depends upon this auditory function. Further, developing phonemic awareness and reading skills are impossible without the ability to know what sounds go with which letter, a subtler aspect of pitch differentiation.

Importantly, Dr Tomatis recognized that the ability to differentiate pitches improves developmentally from the lower frequencies to the higher frequencies. He called this process the “opening of selectivity”.

Once the Pitch Discrimination Test is completed, the practitioner has a copy of the results. Looking at the results, note the lowest frequency where an error was made.

This then determines the point at which the selectivity is closed. For example, if the error was with the tones 1000-750, the selectivity is “closed at 750 Hz”. The same is true if the error had occurred from 750-1000 as 750 Hz is the lower frequency in both examples.

Developmentally, Dr. Tomatis found that the selectivity should be opened to 750 Hz by 4 years of age, 1000 Hz by 5 years and so on as follows:

<u>Hertz</u>	<u>Age</u>
<b>1500</b>	<b>6</b>
<b>2000</b>	<b>7</b>
<b>3000</b>	<b>8</b>
<b>4000</b>	<b>9</b>
<b>6000</b>	<b>10</b>
<b>8000</b>	<b>11</b>

These ages are approximate, yet have served well to help understand the developmental age of the child, especially the emotional development. If the selectivity is closed earlier than the chronological age of the child, one might consider further testing to determine whether the emotional immaturity is, indeed, closer to the age suggested by the selectivity test.

A disparity between emotional and chronological years may be developmental; it may be due to trauma or illness; or, it may be due to stressors, such as starting school at age six in a child who is dyslexic. The emotional stress of being a non-reader in the face of others who are catching on how to read can lead to a kind of emotional shut down and suppression that may affect other developmental milestones. Therefore, a 9-year-old dyslexic child may, in fact, show selectivity closed at the 6-year-old level (1500 Hz); and, often, we find that much of the behavior is, indeed, more like that of a 6-year-old than a 9-year-old.

An increasingly common exception to the above is that many children being born over the last 10 to 15 years are developing processing and cognitive skills more rapidly than heretofore, so their selectivity will open ahead of their chronological age. Thus, a 6 or 7-year old may, in fact, be able to do the Pitch Discrimination Test without errors even in the high frequencies.