

PSY-2007S
Auditory Experimentation

week 3 – Forced Choice Procedures



Forced choice procedures

The 3 Fechner methods (constant stimuli, limits, adaptation) rely on the test subject's report: Yes, I hear it / No, I don't...

You have to count on the person's **cooperation**.
You have no way to **verify** the response.
The person may be wrong about his own impressions...

In forced choice procedures, the subject has to **prove** that he or she can detect/discriminate the stimulus by identifying some other stimulus characteristic.

For instance: a sound may come from the left or right loudspeaker – the subject does not have to say whether he or she heard the sound, but where it came from!

Forced choice procedures

Forced choice procedures usually measure a lower threshold than Fechner's methods.

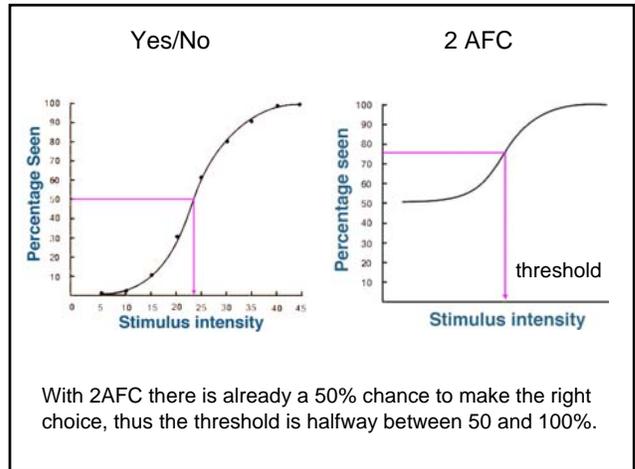
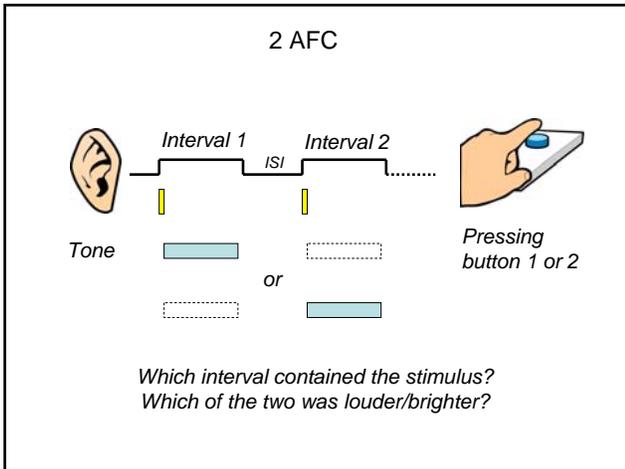
The nervous system registers more information that does not reach conscious perception!
Using the previous example, people will complain that they don't hear a sound and they are just guessing which loudspeaker, but they will be guessing correctly above chance!

Forced choice procedures

Again: The subject proves that he or she can detect/discriminate the stimulus by correctly identifying some other stimulus characteristic.

Problem: If the subject does *not* correctly identify this other characteristic, is it because the sound was below the threshold or because the subjects has problems with the other characteristic (like identifying which loudspeaker the sound came from)?

A good solution is to present several sounds in sequence and which in which position the target was.



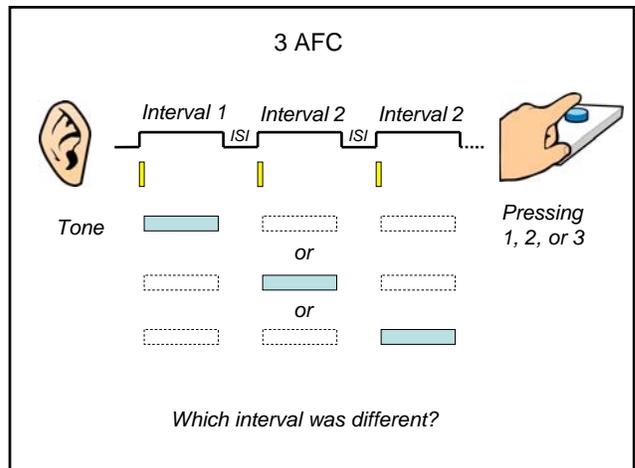
2 AFC

Advantages:

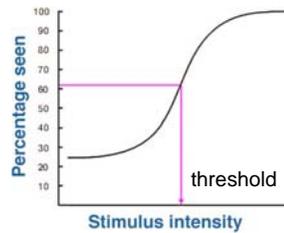
More objective than the Fechner methods. (We have proved that the subject heard the sound.)

No bias.
Bias is the tendency to respond in a certain way then not sure. For instance one person might only say "No, I did not hear the sound" when he or she was not quite sure, while another person might more easily say "Yes" in the same situation. Even if the two have the same hearing threshold, their measurements will differ!

With 2AFC the tendency to respond one way or the other does not affect the chance to hit the right button. The measurement is thus more accurate.



3 AFC



With 3AFC (4AFC) there is already a 33% (25%) chance to make the right choice, thus the threshold is halfway between 33% (25%) and 100%.

3 AFC

Big advantage over 2AFC:

You just need to ask which interval was different. You don't need to explain or even mention the acoustic cue in the stimulus that you are interested in. This is important when the cues are unknown (speech) or hard to describe (taste), when working with children or patients, or when comparing groups whose bias might differ (elderly people are more reluctant to say "yes, I hear it", Rees 1971).

Disadvantage of 2/3AFC: It takes more time to present two or three stimuli than just one per trial. (But even the yes/no procedure takes long if you do it up-down transformed.)

Forced choice methods can be combined with some of Fechner's methods.

The **forced choice staircase** is by far the most popular paradigm for psychophysical tests today!