

Echoidentification – Getting the Most Back From Sound

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What do you know about echolocation?

- Who can do it?
- How detailed is it?
- What can it detect?

Misconceptions

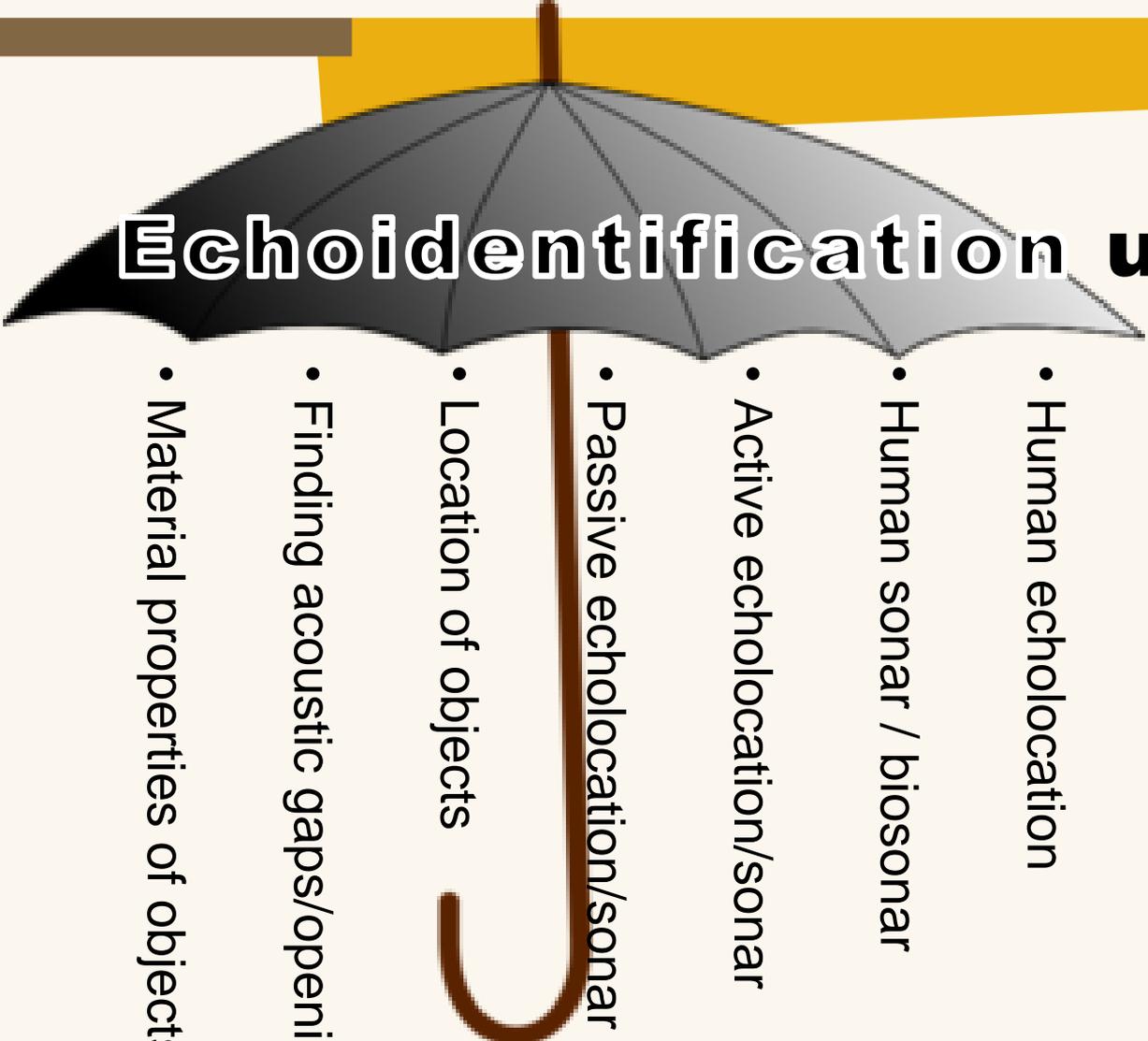
- It only is possible for an elite few.
- It tells only the locations of objects.
- It's made up. People fake it.
- People must have outstanding hearing to learn it.
- Only a few people are skilled enough to teach it.

- It can detect drop-offs.
 - **All levels of echoidentification, echolocation, or human sonar should be used TOGETHER WITH a primary mobility device. No one can detect drop-offs in the environment auditorily.**

The new name: echoidentification

- It doesn't matter which type you teach, as long as you enable clients to use it to increasingly higher abilities.
- Sonar (Sonic Navigation and Ranging) implied specific functions, but clients may use these techniques in many broad ways.
- Echolocation implied location (though some authors don't limit it in that way), and people can do much more with echoes.
- Some brands trademarked what they teach, we don't want to infringe on their programs or methods, but support more O&Mers teaching any of them.

Echoidentification umbrella



- Human echolocation
- Human sonar / biosonar
- Active echolocation/sonar
- Passive echolocation/sonar
- Location of objects
- Finding acoustic gaps/openings
- Material properties of objects

Who can echoidentify?

- **Everyone who can hear some of the reflected sound (echoes).**
- Studies show this can be learned by people with any level of vision (Tonelli, Brayda, & Gori, 2016)
 - People who are blind tend to perform better (Kolarik, Cirstea, Pardhan, & Moore, 2014; Nilsson & Schenkman, 2016)
- Hearing does not need to be perfect.
- Hearing does not need to be binaural for all tasks, though when binaural hearing is available, both ears are used in that way.

Size and Distance

- Nearby small objects can be detected, especially baseball size or larger.
- At greater distances, objects must be larger to be identified.
- The size-distance relationship is linear. Think about matching arc angles \sphericalangle
- Louder sharper clicks travel farther, quieter clicks work only in near space.

Shapes

- Finding edges
- Determining if a surface is concave or convex
 - Global shapes make more sense over time, as a person has repeated experiences.



Material Properties

- Soft or hard?
- This gets refined a lot over a few years of using the skill:
 - Leafy
 - Wood
 - Brick type things
 - Cloth or soft things
 - People are soft but a distinctive shape usually, especially the head and shoulders outline
- There's an unexpected relationship:
 - Felt, smooth glass, shiny hard plastics, and shiny metal sounds the same.
 - This is because the shiny surfaces scatter energy, and the reflected sound is similar to felt or cloth which absorb sound.

How is this taught?

- For kids, don't unteach it in the first place.
- Instead: support and refine.
- For older learners, detecting the presence of objects, then edges, then characteristics.
- Start close with hard objects, then move out or softer.

Special training for instructors

- None is required!
- O&Mers teach people to make sense of the environment through all available sensory systems.
- Several books are available on it, such as “Beginner’s guide to echolocation: Learning to see with your ears”.
- Guest speakers may be available to train professionals: WorldAccess for the Blind.

Shaping the skills

- Ask clients what they perceive.
- Provide feedback about the environment.
- Create opportunities to differentiate between two contrasts (next slide).
- Help the client increase the number of features they can differentiate.

Shaping the skills through contrasts

Simple Choice:

- object-space
- wall-gap
- hard-soft
- concave-convex
- near-far
- large-small

Complex Choice:

The trick question setup needs to be used sometimes.

- object-object
- hard-no object
- concave-no object
- near-no object
- large-no object

Active or passive

- It may be easier to start with active, where the person makes a noise and seeks the reflection.
- It gives the traveler the power to seek out distance information, and in the desired direction.
- Young children may be attending to passive echoes – start with whatever they already do, build it, then expand as needed.

Clicks

- Cane tips click, but reflected sound may miss the person's ears.
- Making a sharp loud click is useful, practice makes this easier.
- Clickers can work if someone can't make a click.
- Quiet continuous sounds work in near range when first learning edges.

Please teach echoidentification!



Blindness and Low Vision Studies

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