



CHILDREN'S BEHAVIORAL AUDIOMETRY TECHNIQUES

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SUBJECTIVE METHODS

**Children
Behavioral
Audiometry**

OBJECTIVE METHODS:

**Otoacoustic
emissions**

**Tympanogram
Stapedius reflex**

**Auditory
steady
state
evoked
potentials**

**Auditory
evoked
potentials**

**THESE METHODS ARE COMPLEMENTARY
CROSS -CHECK PRINCIPLE (Jerger 1976)**

SUBJECTIVE METHODS

*Behavioral Audiometry

BEHAVIORAL AUDIOMETRY

What is this for?

- **Diagnosis**
 - **Monitoring the evolution of hearing loss**
 - **Assessment of treatment efficacy.**
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BEHAVIORAL AUDIOMETRY

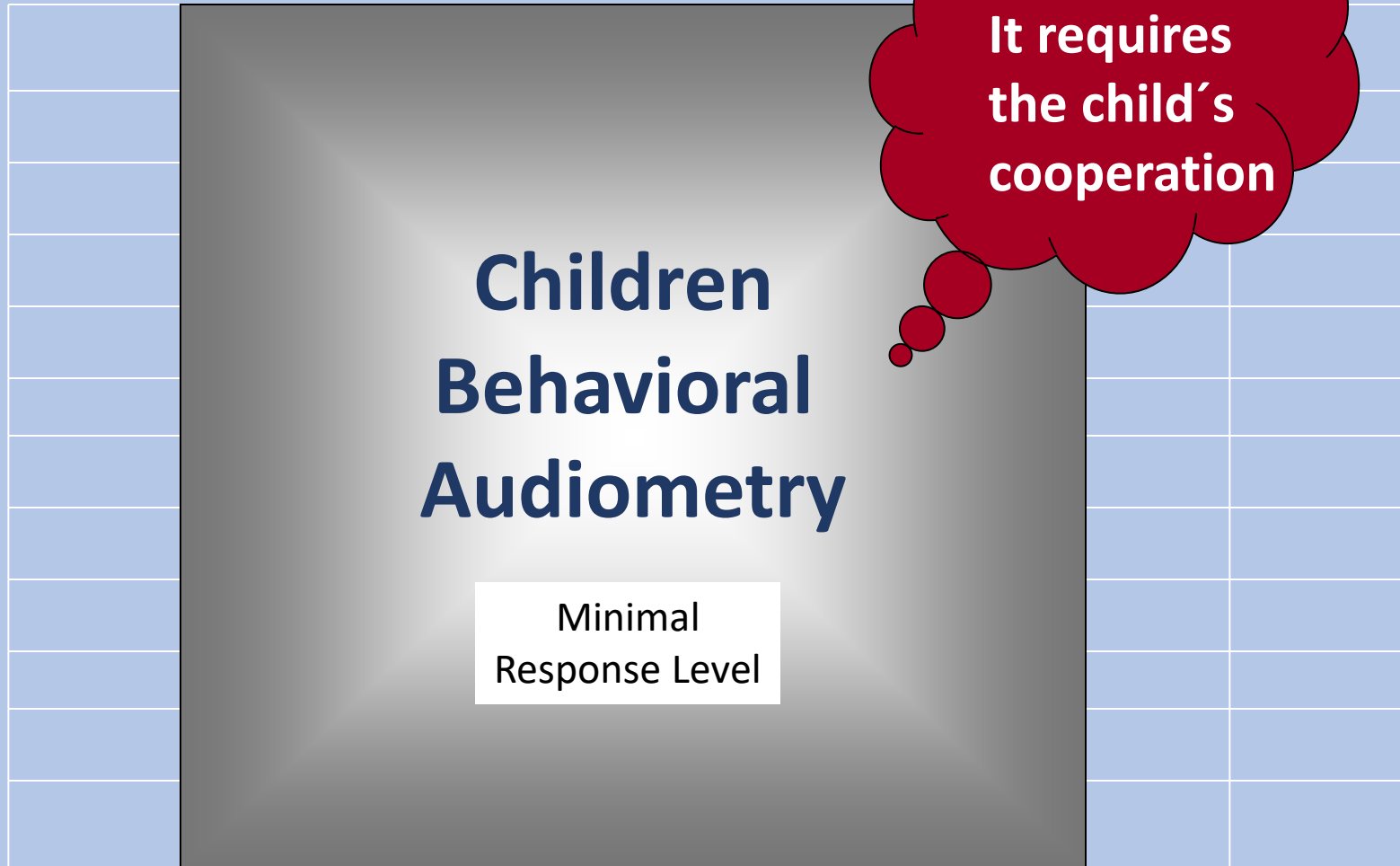
What does it mean?

**Response to sound through the
child's behavioral**

AUDIOGRAM

dB

0
10
20
30
40
50
60
70
80
90
100
110
120



It requires
the child's
cooperation

**Children
Behavioral
Audiometry**

Minimal
Response Level

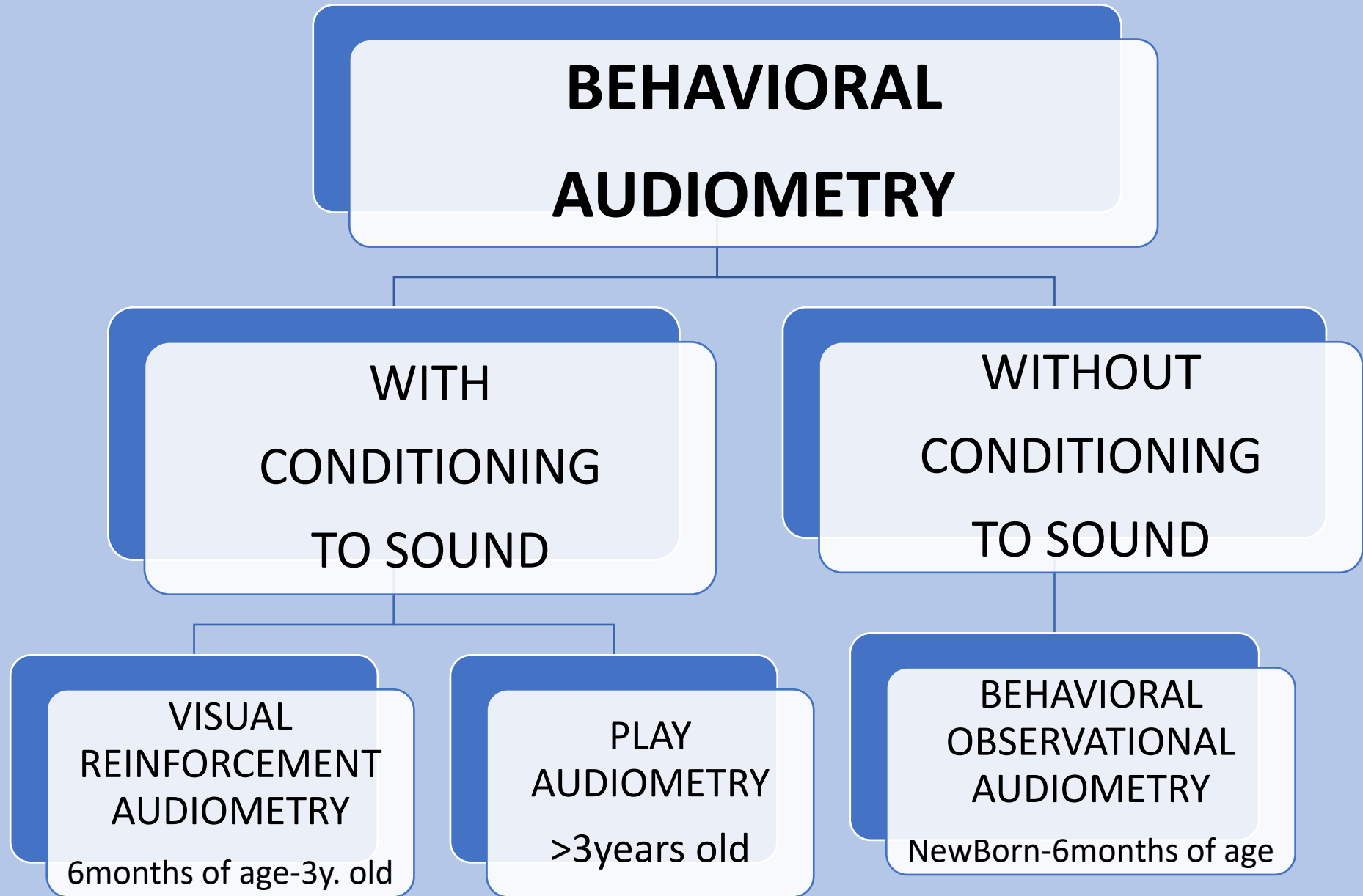
250 500 1000 2000 3000 4000 6000 8000

Hz

BEHAVIORAL AUDIOMETRY



Type of behavioral tests depend on child development age



BEHAVIORAL OBSERVATIONAL AUDIOMETRY

AGE: Newborn-6months

CONDITIONS

- Relaxed baby.
- Baby sitting on parent's knees.
- Quiet and calm room (soundproof booth)

SOUND STIMULUS

Insertphones/ Headphone 4 cm away.

Stimulus: Warble, Frequency band noise limits between 250 – 4k Hz.

Ling sounds, Spoken word (name).

Acoustically tested sound toys.

BEHAVIORAL OBSERVATIONAL AUDIOMETRY

RESPONSES

Changes in relation to its previous state:

- crying/ stop crying,
- sleeping/weaking up
- modify rhythm of sucking the pacifier
- Turn the eyes to the source of the sound ...

Behavioral Observation Audiometry



WITHOUT CONDITIONING SOUND

VISUAL REINFORCEMENT AUDIOMETRY

AGE: 6MONTHS-<3YEARS OLD.

CONDITIONS:

Child sitting on mother's/father's knees.

Child pay attention on a **toy**.

Assistant monitors child's attention.

SOUND STIMULATION:

Free field with speakers (45-90°) and/or **insertphones/bone vibrators**.

Sound: Warble or Pure or frequency band noise.

Spoken word: Ling's sounds, Name, vocabulary known by the child.

VISUAL REINFORCEMENT AUDIOMETRY

How does visual reinforcement audiometry work?

STIMULUS



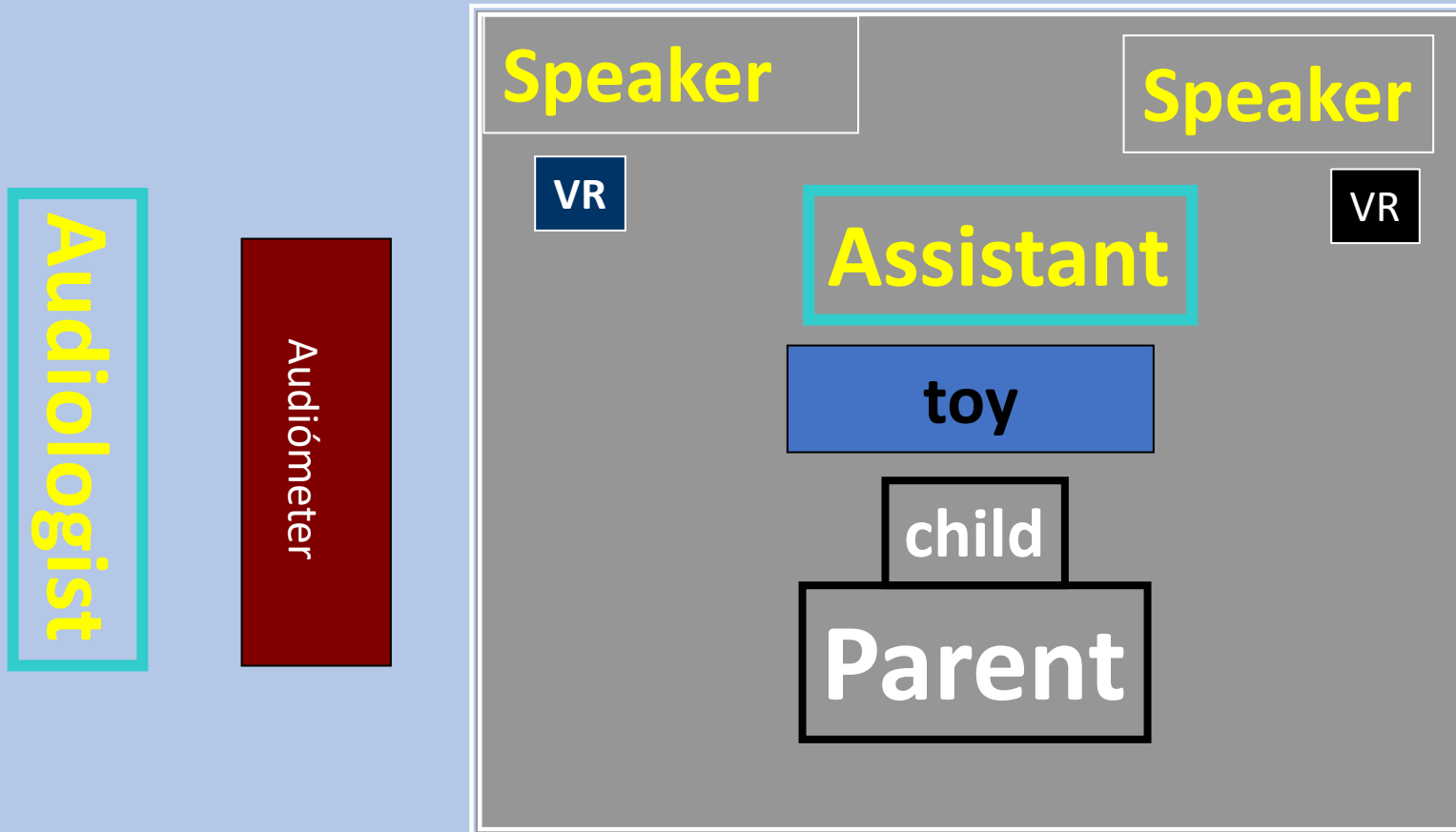
ANSWER



REINFORCER

- An auditory **stimulus** is presented and the child **responds** by turning his or her head toward a toy that lights up or moves, thus **reinforcing** the answer.

VISUAL REINFORCEMENT AUDIOMETRY



VISUAL REINFORCEMENT AUDIOMETRY



VISUAL REINFORCEMENT AUDIOMETRY






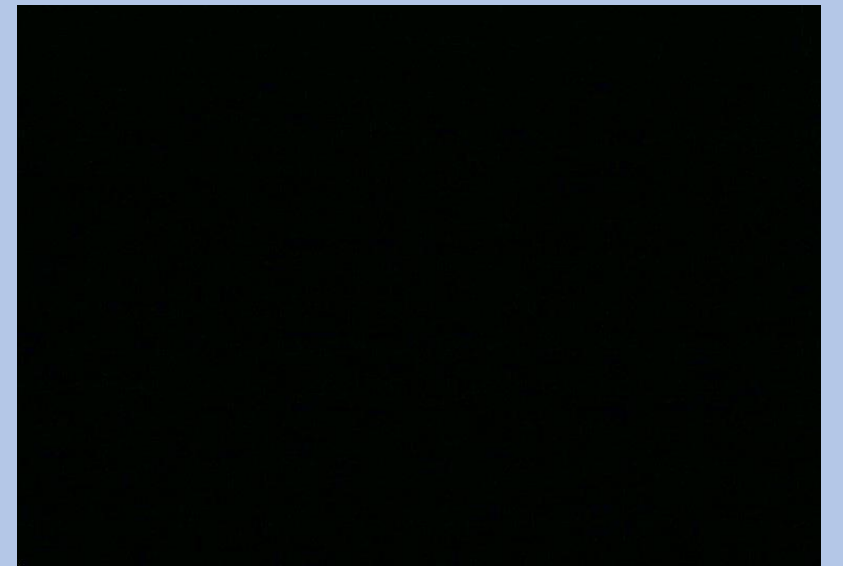
WITH CONDITIONING SOUND

PLAY AUDIOMETRY

Conditioned Response to the Game : *Edad: ≥ 3 años.*

CONDITIONS:

- Child sitting in chair.
- Play material in front of child on table.
- Assistant: Present/Absent
- Previous training. 
- No visual reinforcement.



PLAY AUDIOMETRY

SOUND STIMULUS:

- Free field with speakers at 45°/90° and/or insertphones/ bone vibrators.
- Initial stimulus at comfortable intensity and gradually decreasing.
- Variable interstimulus pauses: 1-10 sec.
- Relationship: Stimulus-Response.
- Response: close to threshold , it is the Minimal response level.

What toys to use?



PLAY AUDIOMETRY

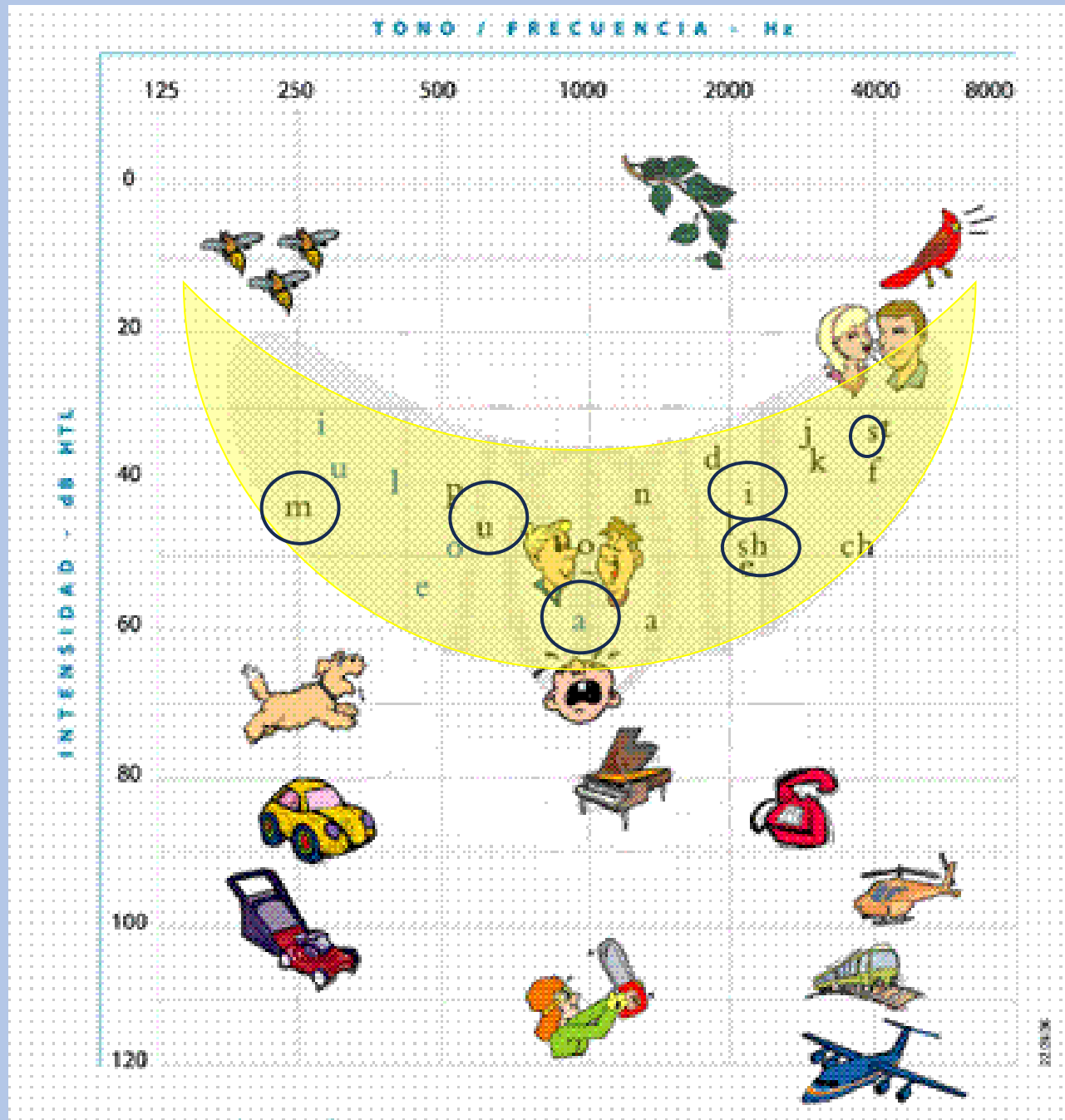


RELIABILITY

BABIES

- 3months old:
Worse threshold by 15-20 dB/all frequencies.
- 6month old:
250Hz remains elevated by 15dB.
High frequencies improves.

Nozza 2006



BEHAVIORAL AUDIOMETRY

LIMITATIONS:

- 1- Child habituation to sound.
- 2- Sometimes, difficulty to collaborate in obtaining a response.
- 3- Need for experienced personnel: 1-2 people supporting.
- 4- Time required .
- 5- The test must be repeated, but at different times.
- 6- Subjective interpretation

BEHAVIORAL OBSERVATION AUDIOMETRY

ADVANTAGES:

- 1- Non-invasive, it is playful.
- 2-Parents understanding the child's response to sound.
- 3-Frequency precision.



Thank you,
very much for your attention