

Hearing impairment



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Participants

Have you had any experience coming into contact with a deaf or hard of hearing person? Describe what part of communicating with them was the most difficult for you! How did you feel about your own ability to communicate with a person who cannot hear what you are saying?



Hidden impairment

It is very difficult to notice a hearing impairment when observing a person who has it, until the situation starts involving a communicational aspect.

This “invisibility” of impairment has its favourable and unfavourable consequences. Namely, a person is not stigmatized “from afar” because of their deficit. However, people from the social environment know the least about the impairments that are the least visible to them, so it is harder to imagine the difficulties that such person encounters in their everyday life. As a result, they are less able to anticipate the needs of a person with a hearing impairment and to adjust their own behaviour.

Hearing and listening



The term “hearing” denotes the ability, and refers to the correct functioning of hearing organ elements. It does not involve will or intention. The term “listening” denotes a voluntary activity, i.e., the interpretation of the sounds we heard using our sense of hearing. It involves awareness, intention, want, and interest.

Hearing



The term “hearing” denotes the sense used to perceive sounds and interpret their meaning. It involves detecting the transmission of vibrations, which are caused by sound waves, to the middle ear, as well as their conversion into a nerve impulse that is interpreted as a sensation in the cerebral cortex.

Sense of hearing and its anatomy



There are 5 anatomical parts related to the sense of hearing:

- Outer ear (auricle and external auditory canal)
- Middle ear
- Inner ear (cochlea and semicircular canals)
- Neural pathways
- Centres in the cerebral cortex

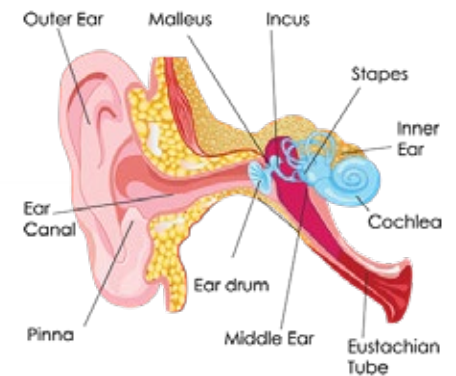
The auricle picks up sounds and directs them to the external auditory canal, which causes the eardrum to vibrate.

The vibrations are then transmitted over three auditory ossicles (hammer, anvil and stirrup) to the cochlea in the inner ear.

In the cochlea, the liquid filling it starts to move, creating waves that are then transmitted to the membrane where the sensory cells are located.

Sensory cells have hairs on their tips that bend as a result of vibration. At that moment, a bioelectric potential is created and sent to the brain through fibres in the form of a nerve impulse.

The image depicts parts of the ear
- outer, middle, inner.

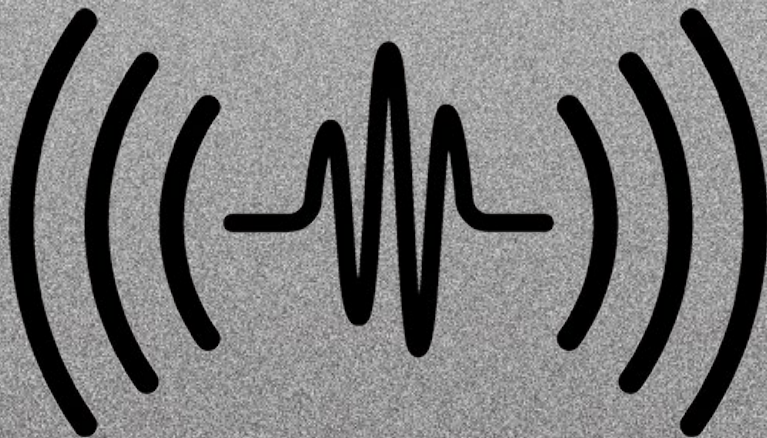


Auditory stimulus (sound)

An auditory stimulus, or sound, is a mechanical vibration of a body that is transmitted through a medium (air, water...) to the ear in the form of a mechanical wave. Humans are not capable of detecting all forms and aspects of vibration; they are only able to detect a certain range, which we call sound.

Ultrasound is composed of sound waves whose frequency is higher than the upper sensitivity limit of the human ear. Sound waves with frequencies higher than 109 Hz are known as hypersound. Infrasound is a sound whose frequency is lower than the lower sensitivity limit of the human ear.

Sound characteristics



There are a number of distinguishable aspects which we can use to describe sound, the most important of which are described below.

- **Loudness/intensity (dB):**

represents the amplitude of sound waves, i.e., the highest point of a sound wave.

The higher the amplitude, the higher the loudness. Loudness, or sound intensity, is measured in decibels (dB).

- **Pitch (Hz):**

represents the fundamental frequency (number of oscillations) of sound waves.

The higher the frequency, the higher the sound. Sound pitch is measured in hertz (Hz).

- **Colour:**

represents additional frequencies in the sound pattern. More specifically, in reality, sounds consist of a set of frequencies, one of which is usually the dominant one. These “accompanying” frequencies shape the colour of sound. Pure sound, i.e., sound composed of a single frequency, can only be obtained under experimental conditions.



Hearing impairment



Hearing impairment denotes the inability or reduced ability to receive, conduct and register auditory stimuli. Therefore, difficulty can develop in relation to these three processes. Reception of an acoustic stimulus may be hindered, e.g., due to a deformation of the outer part of the ear.

Also, a specific anomaly present in parts of the ear responsible for sound conduction or the transmission of electrical impulses to centres in the brain can result in an hearing impairment.

And finally, brain damage in the areas responsible for the sense of hearing may hinder the interpretation of a sound signal. The functionality of all individual anatomical parts related to the sense of hearing can be impaired due to damage, insufficient development or disease.

Hearing impairment is determined by measuring the threshold of hearing (dB) at individual frequencies (Hz).

The threshold of hearing is usually not the same for individual sound frequencies, which is why it is important to know the hearing ability of a person along the frequency range.

Different speech sounds have different frequencies, and a word consists of several speech sounds. Therefore, a person needs to have an appropriate listening level for a wide range of frequencies.

Normal speech takes place in the range of 40 to 70 dB in terms of loudness/intensity of the sound, or 250 to 5000 Hz in terms of its pitch.

Absolute threshold of hearing



The term “absolute threshold of hearing” denotes the lowest sound intensity (loudness) that the human ear can hear. Given that this term is directly related to loudness, it is measured in decibels (dB).

Human hearing, in general, is divided into three categories: **people with normal hearing**, **people who are hard of hearing** and **people with deafness**.

The absolute threshold of hearing for normal sounds falls within the range of 0 to 25 dB.

Hard of hearing category starts above 25 dB, with several degrees (mild, moderate and severe hearing loss) extending up to 90 dB. Anything above 90 dB indicates deafness.

This means that the term “deafness” is an artificially created term and is usually associated with a specific residue of sound, while the impairment itself cannot be overcome by using a hearing aid. True (clinical) deafness, which does not imply any residual hearing in any form, is extremely rare.



Hearing impairment



High-frequency sounds are extremely important for understanding speech. They carry 10% of sound energy and 90% of meaning.

They are called consonants and are distributed along the high-frequency range. Most people with hearing impairments have difficulty hearing them. Low-frequency sounds carry strength and energy, but they do not contribute much to the understanding of speech. They are called vowels and most people with a hearing impairment hear them well. A speaker trying to speak louder usually emphasizes the vowels (whose frequency is low), but that does not improve speech intelligibility.

Models of deafness

In considering the notion of hearing impairment, there are two main models: the medical/pathological model and the sociocultural model.

- **Medical/pathological model**

The medical/pathological model places the notion of deficit in the foreground. It describes deafness as a condition requiring treatment. The deficit is reduced by rehabilitation and compensated by assistive technology. The primary purpose of this model is to lessen the effect of the deficit by improving the use of the remaining listening and speaking capabilities.



- **The sociocultural model**

The sociocultural model places the notion of diversity in the foreground. It describes deafness as a trait which differentiates deaf people from hearing people and which represents the basis for belonging to the Deaf community.

The primary purpose of this model is to integrate diversity into one's own identity and to use other forms of communication, i.e., sign language.

Furthermore, the deficit model is, most often, accepted by people who have lost their hearing in the postlingual stage, that is, once the period of intensive language acquisition was finished (after having turned 2/3 years old).

On the other hand, the diversity model is, usually, accepted by people who were born deaf or who lost their hearing in the prelingual stage.

Participants

Form five groups to discuss the short-term and long-term consequences for the course of life of people with different forms of hearing impairment in different periods of life. The groups will address the following situations:

- **Maria:** congenital deafness
- **Mateo:** born hard of hearing
- **Lilly:** deafness in young adulthood
- **Tina:** hard of hearing in young adulthood
- **Mark:** presbycusis (age-related hearing loss)

Participants

Try to describe the effects of hearing impairment on the person in as much detail as possible (traits, wants, plans, life goals, relationships with other people, professional development, etc.). This is an exercise in imagination, whose aim is to engage the participants to deliberate about the possible effects of a hearing impairment. Since we are all different, so are the paths we take in life, so there are no right or wrong answers here.



Share your group's deliberations with others!

Hearing aid

The purpose of a hearing aid is to amplify the sounds coming from the environment. Its main parts are the microphone, the amplifier and the earpiece.

The microphone receives an auditory signal, which the amplifier amplifies (and performs digital signal processing), and the earpiece forwards the processed signal to the external auditory canal, towards the eardrum. The disadvantage of a hearing aid is that it can pick up a narrow range of acoustic stimuli frequencies.



Also, the acoustic stimuli that it manages to pick up are evenly amplified with regard to their intensity. Hearing people can direct their attention towards a source they are interested in, with more or less success, thus creating the experience of muffling the surrounding sounds. This is difficult to accomplish with a hearing aid.

Hearing aids can be worn on one or both ears and they are assigned the task of utilizing the existing capacities of residual hearing.

Modern hearing aids have a large number of programmes for adjusting the individual quality of sound perception (directed listening according to the sound source, environmental noise suppression, wind noise removal, increased high-frequency sound audibility, Bluetooth option for direct connection to sound-producing devices—mobile phones, TVs...)

Cochlear implant

The main purpose of a cochlear implant (artificial cochlea) is to convert environmental sounds to an electrical signal and, by means of an electrode implanted in the cochlea, transmit them to the brain via the auditory nerve.

Its main parts are external (microphone, speech processor, coil) and internal (receiver and electrode).



The microphone picks up the sounds and converts the acoustic signal into an electrical one, which is then sent to the speech processor, where it is coded and sent over the coil, through the skin, to the inner part of the artificial cochlea.

The receiver decodes the signal and converts it into an electrical stimulus, which is then sent to the electrode in the cochlea.

The electrode stimulates the auditory nerve, which transmits the stimulus to the brain.

A cochlear implant is implanted to prelingually deaf children and adults who have lost their hearing after having already acquired speech. There are elaborate criteria which must be met in order for a person to be eligible for artificial cochlea implantation.

A complex pre-operative treatment is mandatory in order to determine the severity of hearing loss and the presence of favourable and unfavourable circumstances for the both implantation itself and the rehabilitation process.

Also, complex and long-term rehabilitation following the implantation (verbotonal method) is mandatory. The implantation of the artificial cochlea itself is only the start of the process aiming to develop listening and speaking abilities and skills. It does not replace hearing.

The implantation of a cochlear implant does away with any residual hearing in the ear in which the cochlear implant is implanted.

Lip reading



Lip reading is a compensatory technique used by people with hearing impairment to receive information about the content presented by the speaker.

This technique has a number of negative aspects. As a result, the accuracy of the content transferred from the speaker to the message recipient is very low.

A very small number of sounds is clearly visible on the lips (to be precise, only 30% of them), and even those sounds that are clearly visible are often interchanged with others within their group in which they were placed according to the place of articulation (e.g., /b/, /p/ or /m/).

When we add other factors that affect the success of reading to that small number of clearly visible characters (for example, the distance from the speaker, viewing and lightning angle of the face, difference in pronunciation and movements underlying speech by different speakers, etc.) we can see that reading is not as easy as it might seem at first.

Also, a lipreader should be highly fluent in a given language, which people with hearing impairment rarely are.

Ultimately, the majority of this process comes down to inference from context, which depends more on the traits of the speaker and the physical environment than on the person's ability. It is a very strenuous, precarious and incomplete process.

Sign language

Sign language is a system of visual signs which, by making use of a special position (handshape), orientation, position and direction of hand movement, form the concept, or meaning, of a word.

Hands are not the only ones used for communicating in sign language; body and head posture and facial expressions are extremely important as well. It is not universal, as every foreign language has its own version of sign language. Each sign language has its own grammar rules and needs to be learned, like any other foreign language.



Participants

Choose whether you want to use the one-handed or two-handed alphabet and “spell out” your name.



Main difficulties



The most severe consequences of a hearing impairment are made manifest in language and speech, regardless of hearing and speech rehabilitation.

The more severe the impairment and the earlier its onset occurred, the greater the difficulties related to language and speech, which ultimately results in more serious consequences in terms of communication.

Hearing people who are in contact with people who have a hearing impairment may find the speech of deaf people difficult to comprehend or completely incomprehensible. This lower intelligibility of speech is a consequence of difficulties in sound pronunciation.

The degree of speech unintelligibility is directly related to the quality of listening. People will pronounce something as they heard it pronounced, so if they don't hear well, they can't speak well either.

This, in turn, is directly related to the age at which the hearing impairment occurred.

If a person lost their hearing after having acquired speech and language through listening, they will have no difficulty with linguistic expression. They will still retain speech, although their control over it will weaken over time.

A large part of the information they use to interpret external stimuli comes from non-verbal cues and the situational context. The lower the degree of hearing loss, the more a person relies on the auditory channel and uses compensatory sources of information to a lesser extent.

People with a greater degree of hearing impairment interpret environmental stimuli in large measure under the influence of their inner world, interpret occurrences in their own particular way, form projections and make more mistakes.

People who are hard of hearing are more accurate in their perception of reality, understand the message better and send clearer messages to people in their social environment.



Main difficulties

The speech of people with prelingual deafness is significantly different from the speech of persons who had the opportunity to hear speech and develop oral and linguistic abilities in the prelingual period.

Their pronunciation of sounds is irregular, their intonation is monotonous, their voice is strained, their speech is guttural, their breathing irregular and they take frequent pauses.

The person deviates from their central tone, there is a lack of variation, and the rhythm and stress put on the words and syllables in the sentence are out of sync with the content and purpose of the speech. Their speaking speed is lower and the quality of their voice is poorer.

Main difficulties

Listening enables the acquisition of two types of information, i.e., information related to the process of speaking (how something should be spoken) and information related to the content of what is said (what should be said).

People with prelingual deafness are unable to spontaneously acquire speech and language, and as a result, they also may have difficulties in understanding speech and language, a limited vocabulary, poor literacy and dysgrammatical properties.

Also, the process of unintentionally learning verbal material, whereby hearing people acquire 90% of information (as compared to 10% acquired by intentional learning/direct instruction), is prevented.

Seeing as the unintentional acquisition of the former, i.e., language and speech, is impossible, then any form of intentional learning, i.e., acquiring information, various types of content and knowledge, is prevented to a shocking extent, resulting in an overall low level of lesson and skill acquisition.



Emotional difficulties

Difficulties in spoken and linguistic communication do not have to necessarily lead to divergence in emotional and social development as well. Inappropriate behaviour of people from the social environment and failure to meet the needs of a deaf person may lead to psychosocial difficulties.

More difficulties are manifested by people who lost their hearing at a later age (traumatic event).

The success of adaptation by deaf people depends on 3 elements: standard communication system, education and attitudes of the people from the social environment.

The sooner a functional communication system (e.g., sign language) is introduced, enabling a deaf person to come into contact with the environment and stand up for themselves in order to satisfy their own needs, the more successful the adaptation will be.

This will increase the likelihood of enjoying the benefits of being involved in educational systems. And finally, if the attitudes of the social environment are non-discriminatory, devoid of prejudice and positive towards the person with a hearing impairment, the overall psychosocial development will be more adequate.



Cultural identity



Cultural identity denotes belonging to a certain community.

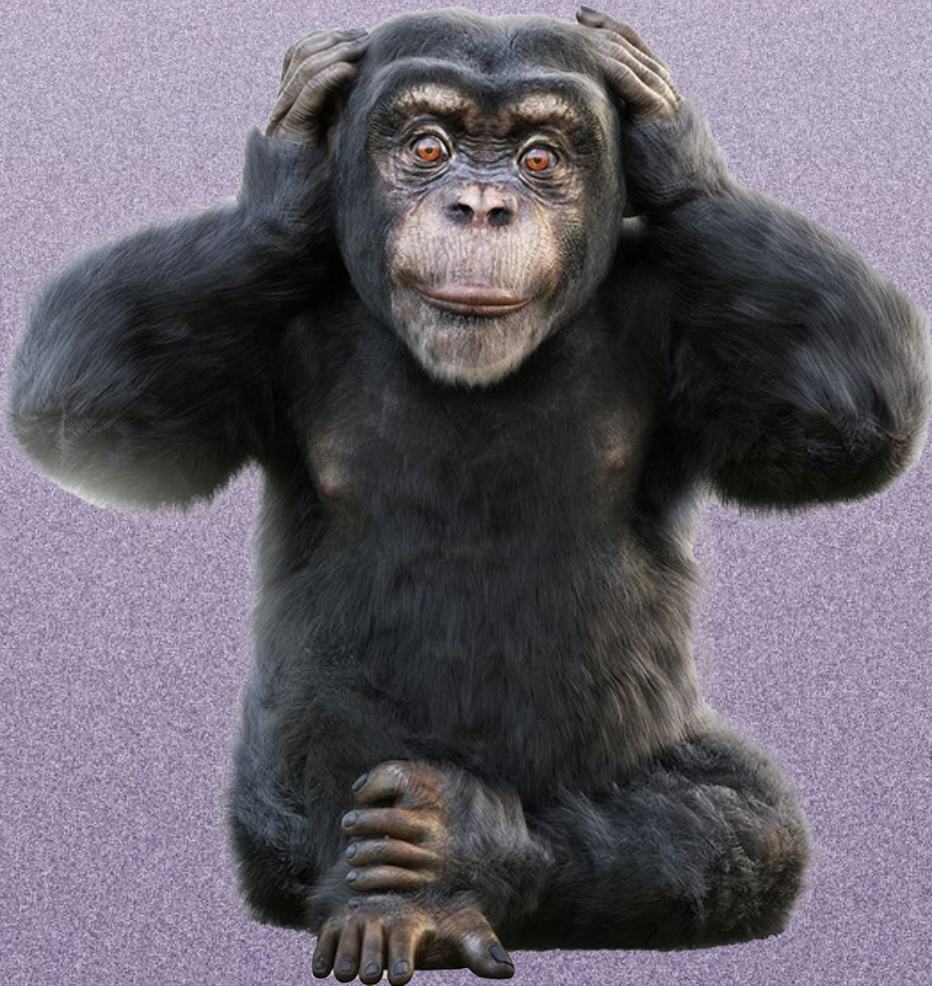
The population of people with hearing impairment is very heterogeneous in this regard. There are four types of identity noticeable among people with hearing impairments:

- **Deaf identity**
- **Hearing identity**
- **Bicultural identity**
- **Marginal identity**

It is important to know that this is more theoretical rather than actual division of hearing impaired population.

The aim of this division is to categorize behaviour so that people who had no previous contact with the hearing impaired, can better understand the differences among them.

Deaf identity



Deaf identity is most often assumed by people who are prelingually deaf.

This identity is characterized by a sense of pride in belonging to the Deaf culture, which they mostly idealize. They are critical of the hearing world and mistrustful of its members, they refuse to use speech, and do not accept deaf people who use speech, hearing aids or an artificial cochlea.

Members of the Deaf culture are active in effecting change in social attitudes towards deaf people and reducing stigmatization by the dominant group.

Hearing identity



Hearing identity can be assumed by deaf children of hearing parents, prelingually deaf who attended schools which utilize an oral approach or regular schools, and the postlingually deaf.

This identity is characterized by the orientation on hearing people, with whom they identify and socialize, negative attitudes and criticism towards deaf people, and a lack of interest in sign language.

Marginal identity

Marginal identity can be assumed by deaf children of hearing parents, deaf children who attended schools which utilize an oral approach or regular schools, and the long-term deaf following the implantation of an artificial cochlea.



This identity is characterized by a lack of identification with both deaf and hearing people. They have poor command of both spoken and sign language, have difficulty establishing and maintaining relationships with both deaf / hard of hearing and hearing people due to limited communication skills, and find themselves on the margins of both cultures.

This identity is associated with the least successful adaptation and a series of difficulties in the form of social confusion, emotional difficulties, behavioural disorders, low self-esteem and a sense of not belonging.

Bicultural identity

Bicultural identity is most often assumed by hard-of-hearing people.



This identity is characterized by equal identification with both deaf and hearing people, achieving successful social interaction with both groups, recognizing the importance of coexistence and accepting the values of both cultures.

They communicate in sign language in their families, attend regular schools and easily adapt to the hearing culture. This identity is associated with the most successful adaptation and a number of advantages in the form of emotional health, better communication skills and high self-esteem, which makes them more resistant to frustration.

Suggestions

The following are the rules of communication with people who have a hearing impairment:

- **Get their attention:** by patting them on the shoulder or waving your arms
- **Show your face:** don't turn your back, bow your head or cover your lips
- **Don't walk until you've said everything you wanted to:** reduced ability to gather visual information
- **A well-lit face:** turned towards the light source



- **Speak in standard language, not in dialect:** language is lacking for a deaf person anyway
- **Wait for your turn:** don't start talking before the deaf person has fixed their gaze on you
- **Do not shout:** understanding will not be improved by it, the vowels will be emphasized, and the person may interpret it as you being angry
- **Do not speak from afar, nor from too close a distance**
- **Act natural:** don't grimace excessively

- **Speak at a moderate pace**
- **Get away from the noise coming from the environment**
- **Be clear and concise:** limited vocabulary, poor language skills
- **Use simple gestures**
- **Use sign language, if you know it**
- **Repeat things patiently, as many times as needed**
- **If it's complicated, write it out**

Accommodation



Accommodation in the context of informal adult education:

Provide written materials, a typist or a sign language interpreter for people with hearing impairment.

The lighting in the premises is very important for people with hearing impairment since they often lipread, which cannot be done in the dark.

In addition, seating position is important for people with a hearing impairment.

Allow them to choose a position which does not leave their backs facing the door, so that they can visually perceive the whole group and the people approaching them. Organize spatial placement of participants so that all of their faces are within visual range of the person with a hearing impairment.

Use different telecommunications channels for people with hearing impairment to ensure that a sign language interpreter can be present if needed.

Provide a laptop and a fast typist who will sit next to the person with hearing impairment and write down everything that is said during the education.

Teaching methods and techniques



Teaching methods and techniques
in the context of informal adult
education:

- Explanation method
- Demonstration method

Explanation method

General suggestions for more successful communication with people who have a hearing impairment are applicable. If a sign language interpreter is present in the room, adjust the pace of your speech so that the interpreter can convey everything you are saying to the person with a hearing impairment.

If you are addressing a person with a hearing impairment who is using an interpreter, look at that person and address them directly, and not the interpreter. You are communicating with the participant, and the participant with the interpreter.

Due to various life and educational factors, an adult with hearing impairment may have agrammatical written and oral expression. Try to concentrate on the content and do not assess their mastery of language and grammar, unless they are the subject-matter of your educational programme.

Some people with a hearing impairment find written materials very useful and will appreciate it if you share your lecture notes with them in advance.

Let the participant with a hearing impairment know that it is okay to ask for anything they did not understand to be repeated or clarified, more than once if necessary. Keep an eye out on the non-verbal communication of the participant with a hearing impairment and do not hesitate to occasionally ask yourself if there is need for clarification or repetition.



Demonstration method

For people with hearing impairment, demonstration and experiential learning will be much more effective than any explanation. Your task is to supervise them while they gain that experience and to provide them with additional clarifications.

Participants

Imagine that you are the organizer of a drywall construction and installation course. A person who is hard of hearing to a high degree applied. What accommodation are you considering?





Addendum: Workshop exercises

Let Me Tell You a Story



Required materials: : story written on a piece of paper (newspaper article, etc.), a group of people

Instructions: A narrator reading the story and a volunteer listening to it are present in the room. Then, each person from the group enters the room individually and listens to the story as it is relayed by the previous person. That person relays the story from memory to the next person, and so on until the end. The last person recounts the story from memory to the whole group.

Purpose: When we convey a message to another person, it is important to convey it directly and as closely as possible in form to the message we conveyed to the people who are able to hear. Communication intermediaries should be avoided if they are not experts in mediation. Take your time to tell a joke to your deaf friend.



Addendum: Workshop exercises

Silent Room

Required materials: paper and pencil, people



Required materials: : coloured pencils or pastels, a piece of paper for each participant, 1 person giving instructions

Instructions: The person giving the instruction pronounces the words solely by mouthing them, without letting out a sound. Participants then have to lip-read the instruction and silently perform the task as they understood it. For example, “draw a small house with a red roof, blue windows and a yellow door.” Should the participants have any questions, they can ask them in the same way as they received the instruction.

Purpose: Although lip reading is sometimes very practical and makes it easier for us to communicate with deaf people, it is very inefficient and prone to errors. We should not rely exclusively on this communication method during the learning process. Therefore, make sure you were understood correctly!



Dig In: Hearing impairment



Deafness & Education
International



Deaf identities in disability
studies



A Quiet Place
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