Speech Intelligibility and Social Aspects of Deaf and Hard of Hearing Children

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Speech of Deaf/hh Children

As a result of their hearing loss, many deaf and hard of hearing individuals have specific voice and speech characteristics that differ from those of hearing people.

For example, they tend to omit or substitute consonants, they may have monotonous speech, and their voice may be characterized by inappropriate pitch or intensity.
The specific characteristics may affect their speech intelligibility. Therefore, they may encounter difficulties in communicating ideas through spoken language.

Beyond impeding communication, however, speech intelligibility may also have an impact on interpersonal functioning and on others’ perceptions of the speaker.
"The spread effect" is a phenomenon in which people perceive a certain dominant quality and base their entire evaluation of that person on that initial perception. Accordingly, hearing listeners tend to evaluate people based on how they sound. They assess the individuals' other qualities such as intelligence or achievements, based solely on how those individuals sound and speak.
Thus, as a result of the fact that deaf/hh individuals' voice and speech characteristics may differ from those of speakers with normal hearing, we may assume that speakers with hearing loss will be evaluated less positively than hearing speakers.
Listener's Experience

Another variable that may affect the attitudes of listeners toward speakers is the listener's experience level. Listeners who are more familiar with the speech of deaf/hh people may be less preoccupied by its atypical characteristics, and more able to focus and use contextual information to help them understand their speech.

It may be hypothesized, therefore, that experienced listeners will evaluate deaf/hh individuals more positively than inexperienced listeners.
The effect of speech intelligibility on attitudes, is particularly important regarding children in the educational system.

Nowadays, as a result of special education laws and recent technological developments with regard to sensory aids and assistive listening devices, deaf/hh children are predominantly included in classes with hearing peers, where spoken language is the primary mode of communication.
In Israel, for example, 80% of the deaf/hh children (including those with severe and profound hearing loss) are included in regular education classrooms. This movement toward integrating deaf/hh and hearing students is also evident in other countries.
Purpose

The purpose of this lecture is to examine the effect of speech intelligibility beyond its importance for successful communication. The lecture will focus on the social aspects of speech intelligibility.
I would like to present 2 studies that examined the effect of speech intelligibility on listeners' evaluations of personal qualities. In these studies the listener's experience was considered as well.

In the first study the listeners were adults differing in their level of experience with deaf/hh individuals. There were 30 inexperienced listeners who had no close relations with deaf/hh people and 30 experienced listeners who were professionals, either speech and language clinicians or teachers of the deaf.
In the second study the participants were high school students, who differed in their level of exposure to deaf/hh individuals.

The 70 “experienced” listeners were students in a general high school that included deaf/hh students. The inexperienced listeners were 70 high school students who had no contact with deaf/hh individuals.
The listeners in both studies listened to recorded speech materials, comprising a text that had been read aloud by children who differed in their hearing status and their speech intelligibility.

The listeners rated each speaker's personal qualities using a semantic differential scale of bipolar adjective pairs. Listeners were asked to choose the adjective that described the speaker's **Cognitive competence**: loser-1-2-3-4-5-6-successful, **Personality traits**: hesitant-1-2-3-4-5-6-daring, or dependent-1-2-3-4-5-6-independent.
At the end of the listening session, they listened once again to the same recorded passages and rated each speaker's speech intelligibility on a rating scale, ranging from very poor intelligibility (1) to very good intelligibility (6).
SI by professionals

SI by students

Experienced listeners
Inexperienced listeners

Deaf
Hard of hearing
Normal hearing

Integration school
Regular School
These outcomes on speech intelligibility suggest that the mere presence of classmates with hearing loss did not necessarily turn hearing students into more experienced listeners.

These results raise important questions with regard to the nature of everyday school life for deaf/hh students in mainstream programs. Does real significant social interaction occur between hearing students and deaf/hh students?
The results of both studies suggest that obtaining intelligible speech skills is essential not only for conveying ideas and communicating with hearing people but also for gaining and maintaining social status and adjustment in predominantly hearing and speaking environments.

It should be noted that the effect of speech on listeners’ attitudes toward speakers has been investigated among other populations, and similar results have emerged. For example, research on attitudes toward individuals who stutter showed that stuttering individuals were evaluated as having more negative personal characteristics such as dullness.
In the next following studies I will report on the socio-emotional experiences of deaf/hh children when they were interacting in a primarily hearing environment.
Many studies have documented that deaf/hh children who are mainstreamed in the regular educational systems feel socially isolated. Hearing children explain that they do not have deaf/hh friends because they cannot understand what they say.

Thus, the ability to use spoken language for communication appears to constitute a central factor affecting the social relationships of children who are deaf or hard of hearing, particularly with hearing individuals. As we know, reciprocal social interactions may lay the groundwork for children's socio-emotional development, particularly with regard to self-image and attitudes toward the self.
In the following study, we examined the relations between self-reported emotional and social feelings and the children’s speech intelligibility.

These relationships were examined among elementary school deaf/hh children (ages 12-14 years) in two different school settings: group inclusion (which are special classes of deaf/hh children located in regular schools) and individual inclusion (each individual with HL is included in a regular classroom with only hearing children).
Procedure

The children completed two self-report questionnaires:
1. The Loneliness and Social Dissatisfaction Questionnaire, including items like "I have nobody to talk to in my class" or "I am lonely".
2. The Sense of Coherence Scale which tapped global feelings of optimism about the child's sense of comprehensibility, manageability, and meaningfulness. It includes items like "I feel that I don't understand what to do in class".

The SI was rated by a group of same-age children with normal hearing, who had never been exposed to the speech of deaf/hh children, using the procedure I described before.
Coherence vs Lonliness

- Special class: Lonliness = 33.33, Coherence = 49.11
- Regular class: Lonliness = 35, Coherence = 48.6
It is possible that the deaf/hh children in the two educational settings scored similarly but that the sources of these feelings differed. Perhaps the negative feelings of the children in individual inclusion stemmed from being socially rejected by their hearing peers, whereas the negative feelings among the children in special classrooms within mainstream settings were a result of not studying with the mainstream students for the majority of the school day.
Regarding relations between speech intelligibility and socio-emotional measures, we found significant correlations for the children who were in individual inclusion: Those who had better speech intelligibility reported less loneliness and a higher sense of coherence.

In contrast, no such significant relations emerged among these measures for the children in special classroom settings. In this educational setting, the children had other means of communication available (sign language and/or mixed speech and signs).

Thus, poor speech intelligibility may prevent the child's effective social interaction with others, especially with respect to hearing peers.
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<tr>
<td>Hearing loss</td>
<td>$M$</td>
<td>$M$</td>
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<tr>
<td>Loneliness</td>
<td>34.2</td>
<td>35.4</td>
<td>26.5</td>
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<tr>
<td>Coherence</td>
<td>48.3</td>
<td>47.4</td>
<td>52.2</td>
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The similarity of findings for the deaf/hh children and the hearing children at risk for learning disorders suggests that, children who feel different from the rest of the group (in hearing or learning ability) appear to feel lonelier and less coherent.
One last study on younger children explored the relationship between speech intelligibility, social competence and loneliness among deaf/hh kindergartners who were enrolled in two educational settings: group inclusion and individual inclusion.

In this study, due to the children's young age, the teachers completed the socio-emotional questionnaires and they rated the children's speech intelligibility.
Participants

64 deaf/hh kindergarten children aged 4-7 years participated:
22 children were each individually integrated into a standard kindergarten classroom with hearing children.
42 children were in small groups of children with HL who were integrated into standard kindergarten classrooms.
Instruments

The teachers completed:

1. A questionnaire regarding their impression of the kindergartner's loneliness. For example: "The child is lonely".

2. A Social Competence Inventory (SCI) in which teachers evaluate the social competence of children with their classmates. This questionnaire includes items such as: "is good at preventing conflicts" or "suggests activities to peers".

3. Speech Intelligibility Scale. This scale includes questions regarding the level of speech intelligibility when talking to familiar and unfamiliar people on familiar and unfamiliar topics.
Procedure

For the group inclusion children, the teachers completed the SCI twice: once assessing the child with HL in relation to the children with NH in the class and once in relation to the other children with HL in the class.
### Social competence scores (Means and SD) of the children in the two kindergarten settings

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<th>Individual inclusion (N=22)</th>
<th>Group inclusion (N=42)</th>
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<td></td>
<td>$M$  ($SD$)</td>
<td>$M$  ($SD$)</td>
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<tr>
<td>SC with hearing children</td>
<td>3.44 (.80)</td>
<td>2.97 (.78)</td>
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<tr>
<td>SC with children with HL</td>
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<td>3.50 (.72)</td>
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Perceived Sense of Loneliness
The mean perceived loneliness scores of the children in individual and group inclusion were not significantly different.

Speech Intelligibility
The children in the group inclusion received a significantly lower speech intelligibility score than did the children in the individual inclusion.
Relations between speech intelligibility (SI) and socio-emotional measures in the different educational settings

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<th>Relations between SI and SC with NH</th>
<th>Individual inclusion (N=22)</th>
<th>Group inclusion (N=42)</th>
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<tr>
<td>Relations between SI and SC with children with HL</td>
<td>.42*</td>
<td>.31*</td>
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<tr>
<td>Relations between SI and sense of loneliness</td>
<td>-.39*</td>
<td>-.08</td>
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* $p < .05$
These findings support and supplement what has been reported on children in elementary school.

The study emphasizes that speech intelligibility is already important at a very young age. Good speech intelligibility is a factor that affects the child’s social feelings, especially within the individual inclusion educational setting where all the other children have NH.
It is important to detect children with HL that have social relationship difficulties as early as possible. This is because social competence and social development are associated with later social acceptability and better social skills in school. Also, there is evidence to link social competence and acceptance by peers to academic achievement, school adjustment, and well-being in adulthood.
In Summary

Altogether, the results of the studies suggest that speech intelligibility may be viewed as a factor that affects deaf/hh children’s social experiences and feelings when they are in a social context with hearing children. This was found at various ages and in different educational settings. SI also affects others' attitudes toward these individuals.
Educational Implications

In selecting a school setting, educators and parents should look beyond academic factors and should not ignore the significant effect of speech intelligibility on the child’s well-being in school, and on the child’s normal social and emotional development. They cannot assume that once a child is included in the regular class, he or she will become an active and integral member of the group. Mere mutual exposure may be insufficient, and interaction difficulties may prevent effective social interaction between deaf/hh and hearing students.
Speech intelligibility should be one of the prime objectives within educational and rehabilitation programs.

Educational programs that integrate children with HL with their hearing peers should take into account social difficulties that already occur at a young age, and professionals should consider incorporating early interventions in the area of social interaction.
And last, the need for children to spend time in the company of other deaf/hh children, from a very young age, should not be ignored.

Smother and more comfortable interactions with same-status peers have been shown to allow children to experience successful social interactions that may foster positive social development.