Speech Intelligibility, Loneliness, and Sense of Coherence Among Deaf and Hard-of-Hearing Children in Individual Inclusion and Group Inclusion

Tova Most
Tel Aviv University

This study examined the sense of coherence and loneliness of 19 children aged 12–14 years with severe to profound hearing loss. These feelings and their interrelations with speech intelligibility (SI) were examined in 2 settings: in special classes within regular schools (group inclusion) or individuals integrated into regular classes (individual inclusion). Two self-report measures (Loneliness Questionnaire and Sense of Coherence Scale) and one SI measure were utilized. Results indicated no significant differences between sense of coherence and loneliness scores of children in the 2 settings. Children in group inclusion received a significantly lower average SI score than did children who were in individual inclusion. Examination of the relations between SI and loneliness and coherence in each educational setting revealed no significant relations among these measures for the children in the group inclusion, whereas significant correlations did emerge for the children who were in individual inclusion. The study emphasized the importance of good SI not only for basic communication but also as a factor that affects the child’s social and emotional feelings. In selecting a school setting, it is important to look beyond academic factors and not to ignore the significant effect of SI on the child’s well being in school.

Among deaf and hard-of-hearing (deaf/hh) children in Israel today, 80% are included in regular education classrooms, 15% attend a special class located in a regular school, and only 5% attend special schools (Zandberg, 2005). The current predominance of individual inclusion results from two trends: recent intensive efforts to implement the Special Education Law (Al-Yagon & Margalit, 2001), which calls for maximum inclusion, and recent technological developments in sensory aids and assistive listening devices (hearing aids, cochlear implants, and frequency modulation systems), which have substantially improved use of the auditory channel. As a result of these technological developments, many deaf/hh children who, previously, could not use their residual hearing functionally recently became relevant candidates to benefit from auditory rehabilitation and therefore may successfully acquire spoken language. Consequently, education systems are now including these children in regular classes with normally hearing peers, where spoken language comprises the mode of communication.

As mentioned above, two different educational settings in Israel include deaf/hh children: special classes within regular schools (termed group inclusion) or individuals integrated into regular classes (termed individual inclusion). The individual inclusion track integrates deaf/hh children into regular classes in their neighborhoods. These children depend solely on spoken language for communication. In the group inclusion track, six to eight deaf/hh children are grouped in a special class that is located within a regular educational setting. These children spend most or all of the day in the small group of deaf/hh children, studying with a special teacher, but each child is also individually integrated with a larger group of hearing children within an age-appropriate regular class according to his or her capabilities (Plaut, 1994). Children in the group inclusion setting communicate through spoken language and/or simultaneous communication (speech and sign).
The individual inclusion track offers many advantages. For one, children attend school close to home with other children from their neighborhood, which lowers stigma and increases proximity to potential social partners (Plaut, 1994). In addition, children gain exposure to spoken language and social interactions with their peers who have normal hearing, which enhances their level of speech and language as well as their academic and social performance (Cambra, 2002; Luckner, 1991). Nevertheless, this type of inclusion may raise several difficulties. In the regular classroom where spoken language is the mode of communication, hearing loss may have adverse effects on children's functioning in various domains such as communication skills, academic achievements, and social behaviors (Bess, 1985; Bess, Dodd-Murphy, & Parker, 1998; Bess, Klee, & Culbertson, 1986; Blair, Peterson, & Viehweg, 1985; Davis, Elfenbein, Schumb, & Bentler, 1986).

With regard to socioemotional aspects, several studies have reported that deaf/hh children encounter difficulties acquiring spoken language, which often affects their communication abilities and social development and, in turn, the children’s friendship relations and social feelings. Antia and Kreimeyer (1992) reported that deaf/hh children described more sincere and rewarding relationships with other deaf/hh children, in comparison to relationships with hearing children. These children indicated that they felt more confident with children of the same hearing status. The researchers noted that the physical proximity to hearing children did not necessarily promote relationships with them. Although some researchers did not find differences between the social feelings of deaf/hh children and hearing in integrated programs (Kluwin, 1999; Mertens, 1989), most studies did report a more negative social experience among deaf/hh children than among hearing children in different integration programs (e.g., Antia, Kreimeyer, & Eldredge, 1993).

Spoken language constitutes the greatest obstacle in establishing social relations between deaf/hh children and their hearing peers. Deaf/hh students who were more skillful in their spoken language were found to experience better social integration with hearing students, compared to students less skilled at speech perception and production (Bat-Chava & Deignan, 2001; Stinson, Whitmore, & Kluwin, 1996).

A main factor in spoken language communication is speech intelligibility (SI). Many deaf/hh individuals have voice and speech characteristics that affect their SI (Bench, 1992; McGarr, 1987; Monsen, 1983). Most, Weisel, and Tur-Kaspa (1999) showed a linear relationship between SI in deaf/hh children and attitudes toward these children among nonexperienced school-aged listeners. That is, attitudes toward children with poorer SI were significantly less positive than those toward children with good SI. As SI increased, peers’ attitudes regarding these children’s cognitive abilities and personality features improved. In addition, the attitudes of hearing children who were exposed to deaf/hh children because they studied in the same school setting were more positive than those of hearing children who had not been exposed to deaf/hh children.

Some previous research reported that SI influences others’ ability to interact with a child. Markides (1989) found that, although 27% of deaf/hh children reported having a hearing friend, only 3% of hearing children reported having a deaf/hh friend. This finding may raise speculation that deaf/hh children may not experience mutual friendship. Hearing children explained that they do not have deaf/hh friends because they do not understand what deaf/hh children say. Markides also found that 51% of deaf/hh children described their good friend as a child with a similar hearing status. It appears that deaf/hh children who are included in the general educational system must exhibit a high level of SI in order to establish friendships (Markides, 1989; Stinson & Antia, 1999). Thus, in the case of deaf/hh children, communication ability and especially the ability to use spoken language for communication constitute a central factor affecting social relationships, particularly with hearing individuals.

This study aimed to expand the investigation of the relationship between inclusion setting and SI and to go beyond other children’s attitudes and tap the subjective socioemotional experiences of the deaf/hh children. We examined deaf/hh children in inclusive settings to determine how communication abilities were related to their emotional and social feelings such as a low sense of coherence and feelings of loneliness. Children’s social relationships with peers render an
effect on socioemotional variables such as loneliness and sense of coherence (e.g., Margalit & Efrati, 1996). Research into social and emotional aspects of inclusion may contribute to placement considerations when selecting the program for a child that will enable optimal academic and social benefits.

The loneliness experience may be considered a global indicator of dissatisfaction from the quality and/or quantity of individuals’ social interrelations (Asher, Parkhurst, Hymel, & Williams, 1990). Peplau and Perlman (1982) considered loneliness as the unpleasant experience when individuals perceive a discrepancy between their desired and accomplished patterns of social networks. Children may experience loneliness due to the unsatisfied need for close and intimate relationships with a small number of good and valued friends or it may be related to unfulfilled expectations for belonging to a larger and desired social group (Weiss, 1973).

Although loneliness indicates a subjective stressful experience, studies on deaf/hh individuals revealed that their negative emotional experience was often based on realistic social difficulties such as a poor social network, low social status, or peer rejection (Markides, 1989). Children’s experience of loneliness was reported in various studies examining different age groups with learning disabilities in different ecological conditions (Margalit, 1994), but to the best of our knowledge, subjective reports on loneliness have not been investigated for deaf/hh children.

Sense of coherence is a personal resource that is assumed to hold unique importance for understanding individuals’ coping with stressors (Margalit, 1994). It is considered to be an indicator of resilience and personal strength, with unique value at times of crisis and distress (Greeff & Van Der Merwe, 2004; Lindstrom & Eriksson, 2005). The sense of coherence construct is a generalized worldview reflecting the extent to which an individual has an enduring, dynamic confidence that (a) the stimuli deriving from the person’s internal and external environments are structured, predictable, and explicable; (b) resources are available to meet the demands posed by these stimuli; and (c) these demands are challenges worthy of investment and engagement, that is, comprehensibility, manageability, and meaningfulness (Antonovsky, 1979, 1987). An inclination to perceive the world as ordered and explicable enables the individual to develop a cognitive assessment of the difficulties stemming from stressors and facilitates the active search for appropriate coping strategies.

Studies have indicated that persons with a high level of coherence are less likely to perceive stressful situations as threatening and will be more likely to appraise such situations as manageable. In addition, individuals with a high level of coherence are also less likely to perceive stressful situations as provoking anxiety and anger, compared to individuals with a low level of coherence.

Age-appropriate social interrelations can be reached when children feel themselves coherent and competent and are willing to initiate and experiment with interrelations outside of their personal boundaries. Self-reported sense of coherence, social skills, and peers’ social acceptance were all found to be significant (negative) predictors of youngsters’ loneliness experience (Margalit, 1991).

In sum, this article focused on the self-reported emotional and social feelings of deaf/hh children themselves—specifically, their sense of coherence and loneliness—in relation to the children’s peers’ rated SI. These feelings and their interrelations with SI were examined in two different school settings: individual and group inclusion. First, we expected that the deaf/hh children in individual inclusion would feel lonelier and less coherent than those in group inclusion because, in the former setting, they were the only deaf/hh child in classrooms with hearing peers. These children may compare themselves to their hearing counterparts and feel less good about themselves. Second, considering that children in individual inclusion are integrated into regular classes with only hearing peers and therefore are more dependent on spoken language, we hypothesized that among these children, those with lower SI would feel less coherent and lonelier than those with higher SI. Thus, we assumed that better SI would be related to more positive emotional and social feelings: If they felt more understood, they would consequently feel more capable and more involved. We did not expect similar relations within the group inclusion setting because those children study with other deaf/hh
peers and do not depend solely on speech for their communication.

Method

Participants

Participants were 19 children (9 boys, 10 girls) aged 12–14 years who had binaural, sensorineural, severe to profound hearing loss ($M = 99\ dBHL$, $SD = 15$). Four children had cochlear implants, and 15 used binaural hearing aids. All children received speech and language therapy, either once or twice a week, in the school. The children had grade-equivalent reading levels and no handicapping condition other than hearing loss, according to their teachers’ reports. All the children were sufficiently proficient readers to understand the currently administered written questionnaires with only minor assistance. Ten children studied in a special class for deaf/hh children within a regular school, that is, group inclusion. These children communicated through simultaneous communication (spoken language and signs). Nine children were each individually included in regular classes within regular schools. These children used spoken language as their mean for communication.

Instruments

Two socioemotional self-report measures and one SI measure were utilized in this study. Although psychometrics for these instruments were lacking because they were not previously administered to the population of deaf/hh children, reading level was grade appropriate for both and help was available from the experimenter if necessary.

The first self-report measure, the Hebrew adaptation of the Loneliness and Social Dissatisfaction Questionnaire (Asher, Hymel, & Renshaw, 1984; Margalit, 1991) consisted of 16 primary items tapping a child’s feelings of loneliness (e.g., I have nobody to talk to in my class, I am lonely) and 8 filler items (e.g., I like school) that covered various activity areas. The scale asked children to rate how frequently they experienced the feeling described in an item, on a five-point scale ranging from 1 (never) to 5 (always). Asher et al. (1990) recommended the computation of a single total score tapping a global sense of loneliness. The range of scores was 16–80, where higher scores reflected more frequent feelings of loneliness. Internal consistency (Cronbach alpha) of the questionnaire was .86.

The second self-report measure comprised the adaption for children of the Sense of Coherence Scale (Antonovsky, 1987; Margalit & Efrati, 1996), consisting of 16 items tapping three dimensions of children’s sense of confidence in the world: (a) sense of comprehensibility—feelings that one understands one’s environment (e.g., I feel that I don’t understand what to do in class); (b) sense of manageability—feelings of control and confidence that positive rewards are available (e.g., When I want something, I’m sure I’ll get it); and (c) sense of meaningfulness—motivation and interest in investing effort in different tasks (e.g., I’m interested in lots of things). The scale asked children to rate how frequently they experienced the feeling described in an item, on a four-point scale ranging from 1 (never) to 4 (always). Antonovsky recommended the computation of a single total score tapping the global sense of coherence. The scores ranged between 16 and 64, where higher scores reflected a higher sense of coherence. Internal consistency (Cronbach alpha) was .72.

SI was measured using the following procedure. Each child was asked to read one short passage quietly to become familiar with it and then to read it aloud to be audio-recorded using a Sony TCM-5000EV tape recorder and a microphone that was held 5 cm away from the speaker’s mouth. Recordings comprised a total of five passages chosen from a fourth-grade Hebrew-reading textbook. These passages were simple and contained familiar vocabulary. To eliminate possible learning effects by the naive child judges who later repeatedly listened to the children’s speech recordings in order to evaluate intelligibility, each of four passages was recorded by four different participants and the fifth passage was recorded by three different participants. The passages were similar in length and language complexity.

The children’s 19 recordings were then presented to six naive listeners, children with normal hearing aged 12–14 years who had never been exposed to the speech of deaf/hh children. These six judges each evaluated each participant’s SI on a six-point scale from 1 (not intelligible) to 6 (very intelligible). Recordings were presented to listeners in a sequence that
maximally separated instances of the same passage so that previous exposure to content would not affect SI evaluations. The order of presentation differed for the different listeners. Interjudge reliability, examined using the Kendall measure, was found to be very high (.89). Each child’s SI score was determined by the mean scores of the six judges.

Procedure

The 19 participants were recruited via the Tel-Aviv branch of SHEMA, which is an Israeli nonprofit association serving school-age children with hearing loss aged 7–18 years. This organization receives the names of any children who fail the routine hearing-screening test administered to all first graders nationally. For this study, children from that list who were enrolled in general elementary schools in Tel-Aviv were recruited.

After receiving parental consent, a research assistant met with each of the 19 children individually for one session in a quiet room in their schools. After a short explanation (in either spoken language or simultaneous communication) and a few trial items, each of the children completed the two self-report questionnaires and performed a SI recording. The research assistant was present throughout the session to ensure that children could understand and perform the test items. Very few difficulties emerged; whenever necessary, items were either read aloud together with the child or were translated into sign language.

Results

Each participant received loneliness, sense of coherence, and SI scores.

The mean sense of coherence score was 48.60 (SD = 3.37) for children in the group inclusion and 49.11 (SD = 4.04) for children in individual inclusion settings. The mean loneliness score was 33.33 (SD = 10.06) for children in the group inclusion and 35.00 (SD = 10.37) for children in individual inclusion settings. A t test analysis revealed no significant differences between the sense of coherence and the loneliness scores of the children in the two groups—those attending a special class within a regular school and those attending regular classrooms (t(17) = 0.30, p > .05; t(17) = 0.35, p > .05, respectively). These insignificant differences were also obtained by using non-parametric analysis (Mann–Whitney). Examination of the relationship between the two questionnaires revealed a significant negative Pearson product–moment correlation (r = −.75, p < .001) between the two social feelings—loneliness and sense of coherence—across all the participants. Thus, children who felt lonelier also felt less coherent.

The t test analysis was used to examine the difference between the two settings’ SI scores. A significant difference emerged in the SI of the two groups (t(17) = 4.77, p < .001). Children in the group inclusion received a lower average SI score (2.0) than did children in individual inclusion (4.6; p < .01).

Examination of the relations between SI and social and emotional feelings (loneliness and coherence) was conducted separately in each educational setting using Pearson product–moment correlation tests. No significant relations emerged among these measures for the children in the group inclusion (r = −.16 for loneliness; r = −.08 for coherence; p > .05), whereas significant correlations did emerge for the children who were in individual inclusion (Loneliness: r = −.88, p < .01; coherence: r = .72, p < .05). Thus, individually integrated deaf/hh children who were rated by peers as having better SI rated themselves as feeling less lonely and as having more coherence.

Discussion

This research examined the subjective social feelings and peer-rated SI of deaf/hh children in two educational settings: group inclusion (special classes of deaf/hh children within regular schools) and individual inclusion in regular classrooms with only hearing children. In contrast to our first hypothesis, the current results concerning the children’s emotional and social feelings revealed no significant difference for either the sense of loneliness or the sense of coherence between children in the two educational settings. It is possible that the deaf/hh children in the two current educational settings felt similarly but that the sources of these feelings differed. It is possible that the more negative feelings of the children in the individual inclusion stemmed from feelings of ostracization or social rejection by their hearing peers, whereas the
more negative feelings among the children in the group inclusion may have resulted from a sense of isolation because they were not studying with the mainstream. Qualitative data on the sources and contents of their feelings could be enlightening. Future research would also do well to tap multiple sources of information on these issues beyond children’s self-reports, such as direct observations of children during school recess, sociometric measures from peers, or teacher evaluations of children’s social functioning. Furthermore, replication of the findings of this study by future research is essential in order to rule out the possibility that the current study’s small $n$ and lack of power yielded these insignificant results.

It should be noted that self-reports are affected by children’s subjective perceptions. For example, having one friend may be experienced by a certain child as lonely and insufficient but as rewarding by another child. Also, it is possible that some children who are not socially accepted are unaware of their condition (Asher et al., 1984). This may stem from lack of experience in better social relationships than those they currently maintain. Alternatively, perhaps children are dissatisfied with their social situation but have difficulties admitting their social feelings. All the above suggest the merit of additional measures that may or may not support children’s self-reports, thus presenting a broader view on these issues.

The current outcomes support previous results on a different population. Margalit (1998) examined the differential impacts of different types of inclusion on the loneliness experience of children at risk for developing learning disabilities in two ecological conditions: individual inclusion systems and group inclusion systems. Comparison between students at risk for developing learning disabilities and their typically developing peers revealed reports of higher levels of loneliness among the children at risk than among their peers. However, no significant differences emerged between the two groups of children at risk for developing learning disabilities who attended different educational environments regarding type of inclusion and support. Margalit suggested that the increased loneliness experience cannot be attributed to formal academic failure or to educational setting. She further suggested that the results may be regarded as a factor intrinsic to the disability conceptualization and to the deficit experience.

We decided to compare the children’s social and emotional feelings in the current study to those of children of similar ages (8–11 years) with and without learning disorders from the study of Al-Yagon and Mikulincer (2004). These researchers reported that the loneliness and sense of coherence values of children with learning disorders differed significantly from those of children without learning problems. The loneliness means for the deaf/hh children in this study ($34.21, SD = 9.97$) resembled those of children with learning disorders ($35.37, SD = 12.53, n = 98$) from the Al-Yagon and Mikulincer study and differed from the means of hearing children with normal development ($26.46, SD = 9.20, n = 107$) in that study. Likewise, the coherence means for the deaf/hh children in this study ($48.34, SD = 3.61$) resembled those of children with learning disorders ($47.38, SD = 6.43$) but differed from those of children with normal development ($52.22, SD = 5.68$) as reported in Al-Yagon and Mikulincer.

The similarity of findings for the deaf/hh children and the children at risk for learning disabilities suggests that the child’s differing status may lead to unique social and emotional feelings. In other words, the child who feels different from the rest of the group (in hearing or learning ability) appears to feel lonelier and less coherent. Educators should be aware of this and not assume that once a child is included in the regular class, he or she becomes an active and integral member of the group. Future studies would do well to examine the links between socioemotional feelings among deaf/hh children and their actual social behaviors and peer interactions. Based on such empirically derived connections, interventions could then help teachers initiate activities and opportunities to encourage interactions between the children and to foster more personal and intimate familiarity between children with and without hearing loss, in order to improve subjective feelings.

In line with our second hypothesis, the results of this study revealed a significant difference in the SI of the two groups. Children in the group inclusion received a lower average SI score (2.0) than did children in the individual inclusion (4.6). Children
in individual inclusion regularly rely solely on spoken language to interact in their speaking environment, whereas children in the group inclusion may use simultaneous communication and are not as dependent on their speech; hence, much more effort must be invested in the former group’s spoken modality. However, the current findings should not be interpreted to mean that the better SI of the children in the individual inclusion setting than of those in the group inclusion resulted from the programs themselves. Good SI is one of the factors that is considered when placing a child in one setting or another; therefore, cause–effect conclusions cannot be drawn.

Regarding the relations between SI and social and emotional feelings (loneliness and sense of coherence) separately in each educational setting, as we hypothesized, no significant relations emerged among these measures for the children in the group inclusion, whereas significant correlations did emerge for the children who were in individual inclusion. Prior research on subjective feelings in this population is lacking in the literature, but the current findings do support previous reports on deaf/hh children who had better speech production skills and therefore experienced better social interactions with hearing children (Stinson et al., 1996). Again, the links between feelings and social action need to be unraveled in future studies. However, it does appear that, in the group inclusion, the social feelings of the children were not dependent on their SI, probably because they had other means for communication (speech and signs).

Different types of inclusion for children reflect attempts to provide support for children at risk in the least restricting and stigmatizing environment. A major trend in recent educational programs has been the integration of deaf/hh children within a regular program with hearing children only. Underlying these integration efforts lies the assumption that the communication skills of deaf/hh children will be enhanced by exposure to hearing children and that integration with hearing children will better prepare deaf/hh children for future interactions with the hearing world. However, these integration efforts do not always consider the socioemotional impact on the child related to feeling constantly different, and possibly less coherent or lonelier, while in the company of hearing peers.

These subjective issues require further empirical investigation. Furthermore, the need for the child to be among other deaf/hh children should not be ignored. The smoother 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 (Bat-Chava & Deginan, 2001).

Moreover, the current results raise questions regarding the negative social experiences that children may encounter and the effectiveness of including one deaf/hh child in a regular class with only hearing children. The results of this study imply that perhaps difficulties in establishing and maintaining peer interactions, caused in part by poor SI, may prevent the child’s effective social behaviors with others and indeed lead to feelings such as loneliness. In fact, according to our previous results (Weisel, Most, & Efron, 2005), preschool deaf/hh children encountered more success in their interactions with other deaf/hh children than with hearing children. We then recommended that preschool educational programs that integrate children with hearing loss together with their hearing peers should be aware of these social difficulties that already occur at a very young age, and we suggested that professionals should consider incorporating early interventions in the area of social interaction. Other prior research reported the efficacy of intervention programs in the area of social skills targeting deaf/hh children and hearing children of various age groups (e.g., Antia & Kreimeyer, 1988; Antia et al., 1993; Messinheimer-Young & Kretschmer, 1994; Vandell, Anderson, Ehrhardt, & Wilson, 1982).

Conclusions drawn from the current study must be taken with caution, in light of the study’s preliminary nature and small sample. Despite the difficulty of gathering the requisite sample size to perform a parametrically sound study with statistically significant results in the deaf/hh population, the results of this study emphasized the importance of good SI not only for basic communication but also as a factor that affects the child’s social feelings, especially within the individual inclusion educational setting with only hearing children. In selecting a school setting, educators, speech and language therapists, and parents should look beyond academic factors and should not ignore the significant effect of SI on the child’s well
being in school and on the child’s normal social and emotional development.

References


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