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INTERACTIONS OF DEAF PRESCHOOLERS:
A COMPARISON OF THE COMMUNICATIVE BEHAVIORS
OF DEAF CHILDREN OF DEAF PARENTS
AND OF DEAF CHILDREN OF HEARING PARENTS

This exploratory study examined the communicative behaviors of deaf children of deaf parents (DCDP) and of hearing parents (DCHP) by observing child-child dyads in free-play situations. DCDP-DCDP pairs were compared with DCHP-DCHP pairs. Dyadic peer interactions were recorded on videotape. The finding indicated that there were no differences between DCDP and DCHP connected with communicative competence from the point of view of Polish Sign Language (PJM). However, statistically significant differences were found between the two groups with regard to some basic additional categories of communicative behaviors and of pragmatically non-manual behaviors. For example, DCDP were much more likely to form communicative utterances categorized in reference to absent objects, events, and persons. The results of this study suggest a change in the program of educating deaf children, taking into account the positive role of sign language in their psychological development.

Key words: communication competence, child discourse, deaf child, sign language

From the studies of a deaf child's communicative competence

Communicative competence is defined as language users' ideal knowledge of the rules of use according to a social situation (Hymes, 1972; Campell & Wales, 1980). What is characteristic of the child's ability to use a language is the so-called contextual appropriateness that is adjusting an utterance to a situational context. As Shugar and Smoczyńska (1980) as well as Przetacznik-Gierowska (1992, 1993) claim, the development of a child's communicative competence is correlated with the development of his/her linguistic competence. Acquiring language structures, the child develops the ability to use language effectively and appropriately to a situation, in the process of interaction with other members of a given community.

There are extensive data on the development of communicative competence in a hearing child, manifested in operational, thematic or narrative discourse that is both symmetrical (child-child) and asymmetrical (child-adult) in nature (Bokus, 1983, 1987, 1991; Shugar & Bokus, 1988; Bokus & Haman, 1992). Relatively little, however, is known about diversified communicative competence in deaf children of deaf parents (DCDP) and deaf children of hearing parents (DCHP) learning sign language. The majority of DCHP are subject to a limited discourse experience with their family members, due to not using PJM (Polski Język Migowy – Polish Sign Language). This raises a question about the extent of communicative competence demonstrated by these children in comparison with DCDP.

Evaluating the quality of mother-child dialogue interactions, Meadow *et al.* (1981) compared four groups of subjects: (1) – deaf children of hearing parents using spoken language; (2) – deaf children of hearing parents communicating in SEE[1]; (3) – deaf children of deaf parents using American Sign Language (ASL) and (4) – hearing children of hearing parents[2]. The results of their study did not reveal any significant difference between deaf children of deaf parents and hearing children of hearing parents. In these groups interactions were frequent; the children exhibited creative activity in initiating and maintaining a dialogue; they created compound utterances referring to both current and not current situations. Group (2), however, obtained average results – outrunning group (1), but could not equal groups (3) and (4). Group (1) definitely differed from the other groups in that their interactions were impoverished – the speaking children's utterances did not refer to the situation displaced in space and/or time: their conversations with their mothers strongly adhered to "here and now". Similar conclusions stem from Nienhuys *et al.* (1984), this being an implication that the limitations in social interactions among deaf children may not stem directly from their deafness, but from lack of adjustment to the preferred communication between the parties.

What needs mentioning is the fact that deaf parents and especially mothers, as natural sign language users (just as hearing parents of hearing children), while in contact with a deaf child use the so-called *motherese*, that is speech addressed to the child: they appropriately react to the child's responses, effectively adjusting both non-manual and linguistic means to the child's linguistic level and cognitive abilities (Reilly & Bellugi, 1996). In the process of communication with a deaf child, deaf parents use strategies involving: (1) using facial expression and body language; (2) using a hand or moving their body aimed at attracting attention to themselves; (3) touching the child so as to attract his/her visual attention; (4) using pointing

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[1] Acronym SEE, standing for Sign Exact English, means transliterated English sign language, its equivalent in Poland being the sign-language system (SJM).

[2] A group of deaf children of hearing parents (1) exposed to oral model communicated with their parents only in spoken language, whereas group of deaf children of hearing parents (2) communicated with their parents by means of transliterated English sign language (SEE), speaking and signing at the same time. A group of deaf children of deaf parents (3) contacted their parents in ASL which is natural sign language.

gesture to steer the child's attention; (5) reducing the frequency of communication with the child depending on his/her perceptual abilities; (6) building short utterances; (7) moving themselves and moving objects into the child's field of visual perception; (8) placing hands or face in the child's field of visual perception; (9) using additional signs, gestures for emphasizing linguistic phrases; (10) simplifying utterances addressed to the child (Tomaszewski, 2006). Everyday interactions both with older peers and adult deaf people as natural sign language users play an important role in the development of a deaf child's communicative competence in sign language.

A study by Prinz and Prinz (1985) revealed that regardless of sensory modality, young deaf children demonstrate ability to initiate peer interactions. Deaf children using sign language manifest ability to adjust linguistic means to various situations. They can also appropriately respond to the expectations of their communication partner and use the turn-taking rules, as well as diverse gaze types depending on the course of a conversation. Moreover, it was observed that children were able to maintain conversation while communicating in sign language. The ability of signing deaf children to initiate, maintain and finish the conversation is comparable to that of hearing children using spoken language.

The results of the above studies suggest that deaf children of hearing parents acquire discourse abilities from deaf children of deaf parents. This finds confirmation in the study of Slobin (1975), according to which children are able to effectively acquire language not only from adults, but also from peers and older children.

Łukaszewicz (2003) analyzed communicative behaviors between deaf and hearing peers. The deaf preschoolers studied were educated by means of the bilingual education method and they used Polish Sign Language (PJM). The results of the analysis of their communicative behaviors demonstrated that the children were able to establish social contact and enter into a satisfying relation with each other. The deaf children creatively adjusted the form of their utterances to various situations they found themselves in. During interaction with hearing peers they gave up the use of sign language. In order to create effective communication with hearing peers, the children entered into contact using objects (34% of all behaviors), gestures (26%) and attracting attention or by vocalizations (16%). When these behaviors turned out to be unsuccessful, the deaf children corrected their actions so as to achieve their aim. They did not withdraw from the situation when communication was hindered – they first initiated a relation.

The results of the research on communicative competence in deaf children show that deaf children of school age (7-8) are sensitive to the interlocutor situation (Tarwacka, Tomaszewski, & Bokus, in preparation). It was observed that, during the narrative discourse of a child and an adult, students using PJM could describe a picture story one way if watching it together with an adult (especially a deaf one) and another way if they were the only source of information to others. The

fact that the adult person had no perceptual access to pictures inclined many deaf children to construct more detailed utterances including more complex grammatical constructions in PJM as compared to situations where the subject of observation was visible to the adult. The child's sensitivity to the situation of the communication partner proves that the child has reached the appropriate level of the theory of mind (Bokus & Shugar, 1998).

Although we know that deaf children are as effective communicators in sign language as their hearing peers in spoken language, not much research focuses on the similarities or differences in the discourse skills of deaf children of deaf parents (DCDP) and deaf children of hearing parents (DCHP) and in use of sign language by these children in a social context. Hence, the purpose of the present study was a preliminary analysis of conversational skills in profoundly deaf preschoolers who communicate in PJM.

Method

Research questions and variable indicators

This work raises the issues of creating PJM discourse by preschool deaf children. The aim of the research was to check whether and how deaf preschoolers display their communicative competence during play.

The research questions concerning signs of communicative competence in deaf children we wanted to address were as follows:

1) Do deaf children of deaf parents (DCDP) and deaf children of hearing parents (DCHP) display communicative competence towards themselves during symmetrical discourse (DCDP/DCDP or DCHP/DCHP), and if so, how do they do this?
2) Which utterances with specified communicative functions most often occur in these types of dyads?
3) Do DCDP and DCHP differ from each other in their preferences for communicative behaviors? If so, what are those differences?

To analyze the signs of deaf children's communicative competence in social interactions the following variables were taken into account:

Independent variable: type of interacting dyad. Two combinations of interactive dyad in the context of **the hearing condition of their parents** (deaf / hearing) were introduced: some dyads were comprised of deaf children of deaf parents (dyads like DCDP/DCDP), and other dyads were comprised of deaf children of hearing parents (dyads like DCHP/DCHP);

Dependent variable: incidence of **utterances with different communicative functions**. Coding functional communication categories was worked out. The coders distinguished communicative behaviors from other behaviors. Communicative behaviors were defined as *visual action* (i.e. signs, gestures, facial expressions, or attentional touch). These actions were done intentionally for the sole purpose of

Table 1. Definitions of functional communication coding categories

Category	Definitions and examples
1. Reference present objects	Messages describing the properties of directly accessible objects/people; reference to direct situations, present tense (e.g. "The jump rope is too long.", "You are stupid.")
2. Agree/Acknowledge	Uttterances confirming or denying the partner's messages (e.g. "Yes, this teddy bear is very fluffy." "No, you may not take my colored pencil."
3. Command attention	Utterances aimed at drawing the other person's attention to something (e.g. "Look what I have drawn.")
4. Solicited choice response	Answering to questions (e.g. "What color is this?" Brown.")
5. Behavior request	Utterances aimed at inducing the partner to behave according to the speaker's will (e.g. "Give me a block.", "Can you share this with me?")
6. Reference to self	Messages about the speaker him/herself (e.g. "I like apples.", "I want to rest now.")
7. Reference to others	Messages about the interaction partner (e.g. "You are building a house.", "You like to run.")
8. Register approval	Expression of praise for the interaction partner (e.g. "You are arranging the blocks very well.")
9. Register disapproval	Expression of dissatisfaction with the other person (e.g. "Don't touch it!", "I don't want to play with you anymore."
10. Questions	Spontaneously asked questions (e.g. "What are you doing?", "What is your name?")
11. Teach/Instruct	Explanation of the modus operandi and the operation of an article (e.g. "I will show you how to do it.", "You have to take it to pieces first.")

communicating something to the partner. Two criteria according to Goldin-Meadow and Mylander (1984) were used to discriminate communicative behaviors from other social behaviors. First, the behavior had to be intentionally directed to the partner. Second, the act could not be an action with an object that served a purpose other than communication. Communicative behaviors were divided into utterances using pause boundaries. Each utterance was coded for type of communication used by deaf children.

The research on communicative competence in deaf children included analysis which consisted in isolating the communication functions in children's utterances with using categories developed by Meadow et al. for different communication behaviors that can be found in deaf preschoolers (1981). These authors have developed a dozen or so basic categories of interactive behaviors that can be observed in deaf children during dyad interactions. These categories and their definitions are presented in the Table 1.

Table 2. Definitions of additional functional communication coding categories

Reference to absent objects, events, persons	Messages referring to out-of-sight objects, persons and events; imagination, notions, symbolic play, past and future tenses (e.g. "I will go to the movie theater with Dad.", "I have a swing at home.", "Let's play mother, you be the mother."
Reference to generalized other	Reference to undefined things or persons (e.g. "Everybody likes ice-cream." "Someone has daubed it."
Imitate	Repeating another person's utterances

Apart from the above basic categories of communication behaviors, Meadow et al. (1981) considered also additional categories (see Table 2).

All the categories of communication behaviors identified by the research mentioned above include utterances that consist of signs, gestures, words and non-manual components. Separate categories including pragmatically significant non-manual messages are also considered in this work. These messages are utterances composed only of morphologically self-contained non-manual elements like: face expression, body language[3]. Such behaviors perform three different communication functions presented in Table 3.

Participants

Two groups of child–child dyads were included in the data analysis that follow: Group 1 is comprised of 8 deaf children of deaf parents (DCDP); Group 2 includes 8 deaf children of hearing parents (DCHP). All the children were evaluated in DCDP-DCDP and DCHP-DCHP dyads. The investigation was performed in comparison between four pairs (dyads) in each group. The children ranged in age from 5.6 to 6.2 years. The mean age was 5.9 years. Eight of the sixteen children participating were girls and 8 boys, equally distributed in DCDP and DCHP dyads. These children met the following criteria: nonverbal intelligence within the normal range (as estimated by school records); hearing level no better than 80-90 decibels average in the speech range (500 to 4000hz) in the better ear; deafness occurred prior to language acquisition; no additional known handicaps (e.g. blindness, cerebral palsy). They attended a kindergarten program in the Institute of the Deaf in Warsaw. This program emphasizes a bilingual approach: teachers and parents utilized sign communication with deaf children who were taught both Polish Sign Language (PJM) and Polish (PJM, the natural language of deaf preschoolers, is the language of instruction; Polish is taught as a second language through a unique combination of signing, reading and writing methods). The difference between the two groups is that DCHP were in contact with

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[3] Non-manual components function not only as syntax components or overlap with a single sign or a sequence of signs on the morphological level but they also function as self-contained (non-manual) signs (Tomaszewski, submitted).

Table 3. Definitions of non-manual behaviors performing three different communication functions

Confirmation or denial	Confirmation by nodding or squinting ("Yes, yes…", "Okay…"); denial by head shaking, eyebrows knitting or nose wrinkling as the sign of negation ("No, no…", Oh no!")
Questions	Eyebrows arching and head nodding ("Yes?", "Okay?)
Requests, orders, suggestions	Eyebrows frowned obliquely ("Please…")

PJM mainly in interactions with peers and teachers, while DCDP had contact with PJM from birth in interactions with their parents. For hearing parents PJM is not a native tongue but it constitutes the second language which they encountered only after accession of their child to preschool education.

Procedures

Each child–child dyad (DCDP-DCDP pairs and DCHP-DCHP pairs) was ushered into a playroom – familiar room in a school for the deaf. This playroom contained a large variety of toys: dishes, costumes, dress-up clothing, dolls, blocks, and trucks. The interactions were recorded on videotape. The situation was as follows: the children were instructed by a deaf researcher in the sign language to play and converse together while the researcher were busy. After a warm-up session, the dyads were videotaped for approximately 25 minutes each. The videotapes were later transcribed by two deaf individuals. The transcriptions served as a basis for characterizing children's communicative behaviors. Two independent judges coded each communicative behavior produced during these sessions in terms of both sign language linguistics and functional communication categories. Criteria for including a description of a given behavior were worked out: The result was taken into account only for those behaviors for which judges were in agreement.

Results

Basic categories

Statistical analyses of group differences were performed using the Mann-Whitney U test. This test determines the significance of group differences between DCDP and DCHP in the frequency of occurrence of their communicative behaviors. The dependent measures in the investigation were the summed occurrences of the communicative behaviors in each category.

The analysis of communication behaviors involved the following three parts:
 – Basic categories of communication behaviors;
 – Additional categories of communication behaviors;
 – Pragmatically significant non-manual messages.

Table 4. The number of basic categories of communication behaviors appearing in all dyads

| | Basic categories of communication behaviors | | | | | | | | | | |
	RPO	A/A	CA	SCR	BR	RS	RO	RA	RD	Q	T/I	Total
DCDP	79	84	220	26	147	85	111	18	5	76	5	856
DCHP	205	71	87	5	167	202	80	11	45	93	2	968
Sum	284	155	307	31	314	287	191	29	50	169	7	1824

Explaining symbols:
RPO – Reference present objects; A/A – Agree/Acknowledge; CA – Command attention; SCR – Solicited choice response; BR – Behavior request; RS – Reference to self; RO – Reference to others; RA – Register approval; RD – Register disapproval; Q – Questions; T/I – Teach/Instruct

The total number of communication behaviors (within the basic categories) in the two researched groups was 1824 (see Table 4).

Considering the basic category of communication behaviors, the highest incidence was noted for the category of orders, commands and requests (behavior request), while communication behaviors aimed at conveying instructions and explaining the methods of operating on objects (teach/instruct) were shown to be at the lowest incidence in the group of children participating in the study. Other basic behavioral categories with incidence demonstrated to be close to behaviors in the category of orders, commands and requests were: commanding attention, reference to self, and reference to present objects.

The analysis of the communication behaviors observed in the two researched groups: deaf children of deaf parents (DCDP) and deaf children of hearing parents (DCHP), i.e. in the DCDP/DCDP dyad and the DCHP/DCHP dyad (see Appendix: Table 1A and 2A) involved the sum totals of all the basic categories of communication behaviors. The DCHP/DCHP dyads exhibited more behaviors than the DCDP/DCD dyads. However, the statistical analysis of the data did not show any significant difference in the total incidence of communication behaviors (see Appendix, Table 3A). Consequently, in pragmatic terms, DCDP and DCHP do not differ in their communication skills.

The quantitative analysis of the data indicated that there is a statistically significant difference between the deaf children of deaf parents group (DCDP) and the deaf children of hearing parents group (DCHP) in the frequency of referencing present objects in communication behavior. It was observed that, in comparison with DCDP, DCHP constructed many more communicative utterances referring to the "here and now," discussing events taking place in the present. For instance, the children pointed to objects in the "here and now" situation, referring to them and describing their visual appearance in PJM (e.g. "This car is big.", "This shirt is blue.").

Figure 1. The number of basic categories of communication behaviors appearing in DCDP and DCHP groups
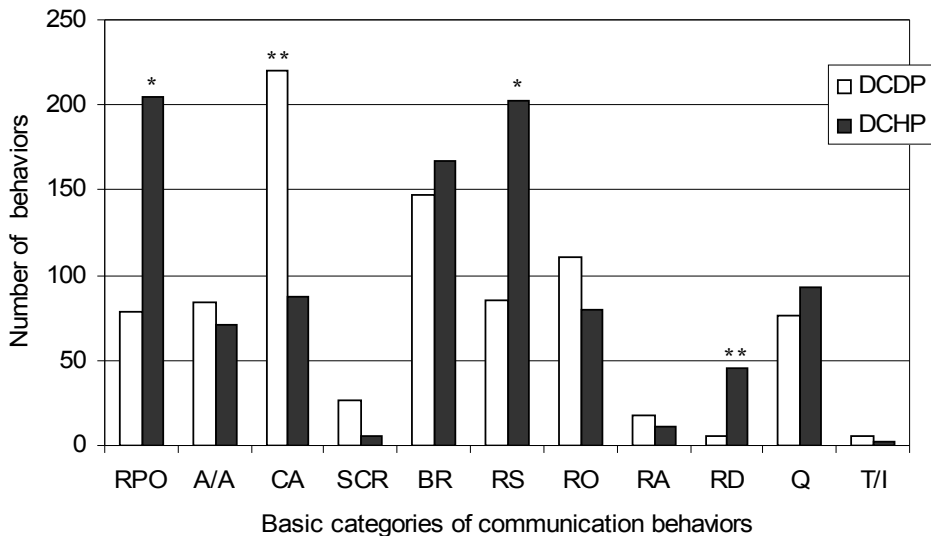
Explaining symbols: * – one star for p < 0,05 ; ** – two stars for p < 0,01

There was no difference in the number of communication behaviors of the agree/acknowledge category in reference to the partner's behavior for DCDP and DCHP.

The analysis of the data gathered for the specific category of demanding attention showed that the children used sign language or gesticulation to attract the partner's attention much more frequently in the DCDP group than in the DCHP group. This kind of communication behavior involved not only gesticulation but also specific PJM signs (e.g. ZOBACZ-ZOBACZ (LOOK-LOOK)), used to direct the discourse partner's gaze towards the object acted upon.

No difference regarding solicited choice response behaviors was found between the DCDP and DCHP groups. There was a higher number of communicative utterances of that category in the deaf children of deaf parents group compared with the deaf children of hearing parents group.

The analysis of the data indicates that there is no statistical difference between the DCDP group and the DCHP group in the communication behavior category of behavior requests. The incidence of communication behaviors of that category during interaction with a discourse partner was approximately identical.

A significant difference between the two groups was noted for the reference to self category. Deaf children of hearing parents referred to themselves much more frequently than deaf children of deaf parents, asserting their presence in the course of play discourse.

Table 5. The number of additional categories of communication behaviors appearing in all dyads

	Additional categories of communication behaviors			
	RAO	RGO	I	Total
DCDP	173	12	—	185
DCHP	40	—	—	40
Sum	213	12	—	225

Explaining symbols:
RAO – Reference to absent objects, events, persons; RGO – Reference to a generalized other; I – Imitate

The comparison of the deaf children of hearing parents group and the deaf children of deaf parents group did not indicate any statistically significant difference in the following categories: reference to other and register approval. Both DCDP and DCHP used approximately the same number of communicative utterances referring to the interlocutor, or to individuals not present in the "here and now" situation, as well as producing approximately the same number of utterances meant to express approval or praise for the discourse partner.

A significant difference was observed in the category of register disapproval (behaviors expressing dissatisfaction or criticism). DCHP expressed their dissatisfaction with the cooperation with the discourse partner, or their criticism of the partner more frequently than DCDP.

The communication behaviors of the questions and teach/instruct categories were not marked by a significant difference in incidence of these behaviors between the two groups.

Additional categories

Analysis of additional categories of communication behaviors, considered as supplementary categories, as delineated by Meadow et al. (1981), involved the comparison of the deaf children of deaf parents group and the deaf children of hearing parents group.

The total number of communication behaviors found in both the researched groups was 225 (Table 5). The most frequently observed behavioral category of the additional behavioral categories was reference to absent objects, events, and persons, while during the entire observation the subject children exhibited behaviors of the reference to a generalized other category least frequently. Behaviors consisting of imitating the discourse partner (imitate) did not occur in any of the children observed.

Analysis of the additional communication behaviors observed in the DCDP and DCHP groups included the sum totals of all the additional categories of communication behaviors. The DCDP group exhibited many more instances of additional

Figure 2. The number of additional categories of communication behaviors appearing in DCDP and DCHP groups
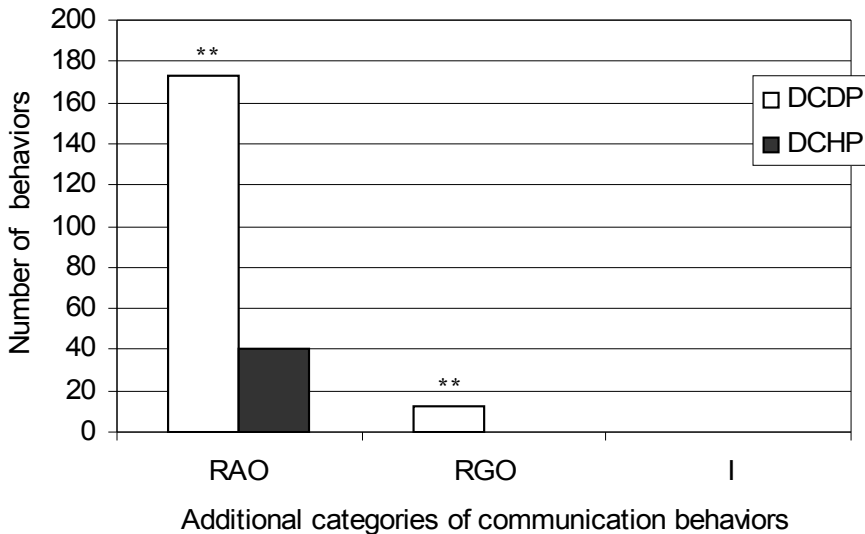
Explaining symbols: * – one star for p<0,05 ; ** – two stars for p<0,01

communication behaviors than the DCHP group. The statistical analysis of the data indicates a significant difference between these two groups in the frequency of the incidence of all the additional communication behavior categories (see Appendix, Table 4A).

In the course of the analysis of the data it was revealed that there is a statistically significant difference between the DCDP and the DCHP group in reference to the absent objects, events, persons category. It was observed that DCDP formed many more utterances that did not refer to the "here and now" situation than DCHP. DCDP were more frequent to engage in past or future-time reference to objects, persons or events, which can be referred to as the phenomenon of decontextualization. For instance, DCDP created conditional-type utterances depicting future-time events (e.g. "After we wash the doll, she will go to bed"). It is worth pointing out that the analysis of utterances referring to non-present events revealed the interesting phenomenon of a time-shift in sign language: DCDP referred to future events much more frequently than DCHP (Z(16) = -3,383, p = 0,001; n = 136 for DCDP; n = 8 for DCHP), who in turn demonstrated a preference for depicting past events (among DCHP n = 32 for past events)..

The two groups demonstrated a difference in the number of communicative utterances of the reference to a generalized other category. Only DCDP constructed utterances that could be analyzed as relating to what was happening in the process

Table 6. The number of pragmatically significant non-manual messages appearing in all dyads

| | Categories of pragmatically significant non-manual messages | | | |
	C/D	Q	R/O/S	Total
DCDP	196	51	7	254
DCHP	67	8	—	75
Sum	263	59	7	329

Symbols:
C/D – Confirmation or denial; Q – Questions; R/O/S – Requests/Orders/Suggestions

of the dyadic interaction among the children (e.g. "Someone has broken it.", "Someone has stolen it.", "Watch it so that nobody steals it.").

Children participating in the study did not exhibit any communication behavior that could be categorized as imitating the discourse partner (*imitate*), and so, zero was the result noted for this category.

Pragmatically non-manual behaviors

The analysis of the following category of pragmatically significant non-manual communication showed that the total number of such communication behaviors was 329 (Table 6).

Among the pragmatically significant non-manual communication behaviors, the most frequently displayed were the agreeing/acknowledging and disagreeing behaviors, and the least frequently displayed non-manual communication behaviors were those of the requests, commands and suggestions category. There was, however, some incidence of communicative utterances of the questions category, pragmatically directed at the discourse partner.

The pragmatic analysis of the significant non-manual communication behaviors observed in the DCDP and DCHP groups involved the sum totals of all the non-manual utterance categories. The DCDP group exhibited considerably more non-manual behaviors than the DCHP group. The statistical analysis of the data indicates a significant difference between these groups in the total incidence of non-manual communication behaviors.

The incidence of the specific categories of non-manual behaviors is marked by a statistically significant difference between the DCDP group and the DCHP group in all the categories: confirmation or denial, questions, and requests, orders and suggestions. DCDP formed communicative utterances acknowledging the partner or disagreeing with the partner's actions using their facial expressions and body language, and used non-manual signals to ask questions, much more frequently than the DCHP group. For the last category it was only DCDP who expressed their pragmatic intention non-manually, which was not observed in DCHP.

Figure 3. The number of categories of pragmatically significant non-manual messages appearing in DCDP and DCHP group
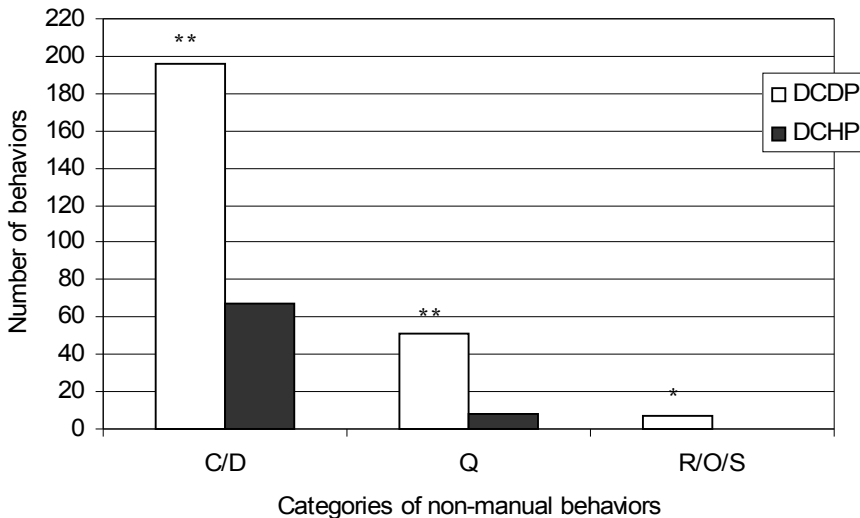
Explaining symbols: * – one star for p<0,05 ; ** – two stars for p<0,01

Conclusions

The study of communicative competence in DCDP and DCHP yield interesting results. The analysis of communication behaviors exhibited by the two groups did not indicate any significant difference in the incidence of all the categories of communication behaviors in discourse situations. Arguably, it can be postulated that there are no differences between DCDP and DCHP regarding communicative competence. Both these groups were able to use sign language to initiate communicative utterances such as *requests, suggestions and questions*, as well as to maintain the conversation by responding to questions, expressing confirmation, negation, etc. Accordingly, although most DCHP are subjected to a limited discourse experience with family members due to the lack of PJM use, they can develop versatile language use in their interactions with various other discourse partners, such as deaf peers, older mates, and deaf adults. Pragmatic strategies are a natural component of social conversation. The results of the study would seem to prove Przetacznik-Gierowska's (1992) claim that communicative competence is a species-specific inborn skill, employed and developed by the child in various discourse interactions.

It was only in the analysis of specific communication behaviors that several statistical differences between the two researched groups were found. These involved temporally and spatially displaced utterances (displacement). DCDP were

much more likely to form communicative utterances categorized as *reference to absent objects, events, and persons*, as well as *reference to a generalized other*. In the *reference to present objects* category, DCHP created many more utterances referring to "here and now" situations. DCDP were exposed to PJM from infancy, and according to Tomaszewski and Rosik (2002) PJM is a language rich in tense marking for past, present and future tenses. Consequently, DCDP were able to form PJM utterances referring not only to events in the present but also to past and future events. Conversely, DCHP were not exposed to PJM prior to enrollment in a preschool with predominantly sign-language education, and as such, they could have been exposed to "rigid" use of communicative utterances restricted to present tense. Limited in their access to spoken language, preferred by their parents as a means of communication, DCHP could find it a challenge to break off from the "here and now" situation to form utterances with a different temporal reference, i.e. past or future. This is congruent with the studies presented by Meadow et al. (1981), which showed that hearing parents with no command of a sign language tended to limit their conversations with their children to reference to the present, and did not frequently engage in conversations referring to past or future events. The reason for this does not lie in the child's deafness itself but in the misalignment of the preferred communication channels for the child and the parent. Limited or non-existent access to natural language can lead to inferior development of the cognitive mechanism of temporal displacement in the deaf child, which can in turn lead to a slower development of the ability to use language to express thought referring to past or future (Tomaszewski, 2007).

It is worth noting that the analysis of the communication behaviors of DCDP and DCHP in *reference to the absent objects, events and persons* category demonstrated an interesting phenomenon: DCDP referred to future events significantly more frequently than DCHP who preferred the presentation of past events. Utterances containing reference to past events are easier to create, from a cognitive-developmental point of view, as every individual possesses an array of stored experiences, which always includes past events. It is more challenging for the child to construct a linguistic presentation of future-time reference if the child's parents do not provide the kind of linguistic communication that could stimulate the development of cognitive and linguistic skills in the child, which are necessary to induce it to use language to present its plans for the future.

The category of *reference to self* revealed a significant difference between the two groups. DCHP much more frequently constructed utterances referring to their own operation on objects and their subjective attitude to the environment. By doing so, they asserted their presence or individuality in the play situation. Accordingly, this kind of communication behavior served a personal function for the DCHP. A child devoid of natural access to language must have experienced emotional difficulty in satisfying the need for self-expression or acting out social roles, e.g. in a hearing family environment. The full contact with the sign language that the

children received in the preschool period provided them with a chance to "make up for" the previous lack of opportunities to develop their self-esteem, act out various social roles, and most importantly, to develop the ability to function in a peer and family environment. The sign-language environment allows deaf children to build an image of themselves as someone unique, as opposed to the conceptualization of deafness as inferiority. Consequently, it can be argued that the positive role of sign language in the psychological development of the deaf child partly consists in the ability of sign language to grant the child an opportunity to develop an identity as a deaf person and to build a positive self-image.

The research showed that DCDP engaged in *reference to other* behaviors much more frequently than in *reference to self* behaviors, with the opposite tendency observed in DCHP who exhibited more reference to self communication behaviors. This phenomenon shows that the more the young child is included in adult and child groups in the process of linguistic interaction, the sooner its egocentrism gives way to more socialized forms of behavior. The deaf child, brought up in an environment characterized by sign-language communication, will learn to suppress its self-centeredness to overcome its reluctance to cooperate with peers. By contrast, a deaf child of hearing parents is not presented with such an opportunity, and needs to learn self-expression the moment it enters the sign-language environment. Only after developing a sense of self-esteem and communicative and social skills it will be able to develop the ability to de-centralize, i.e. the ability to take on others' perspective and so, to be able to express opinions on the problems, thoughts and experiences of others. Importantly, it was also observed that the DCHP group was likely to engage in egocentric behavior by expressing their dissatisfaction with cooperation with their partners and by criticizing their partners. This could be caused by the fact that in social interactions DCHP experience an "imposed need" to break their resistance to abandoning the tendency to try to adjust the partner's behavior to suit their own needs.

The *non-manual behaviors*, encountered in both groups, were pragmatically significant messages. DCDP took precedence over DCHP in all the categories of such behaviors, engaging much more frequently in non-manual messages, i.e. agreeing/ acknowledging and disagreeing, questions, requests and commands. This communication was so successful that the children were able to effectively influence their partner's behavior by only using facial expressions or body language, without using manual signs. What follows is that deaf children participate in the formation of text as a product of discourse employing not merely verbal means (sign language or spoken words), but also non-verbal means, such as facial expressions and body language. Non-manual behaviors play an important linguistic and pragmatic role in text-construction in interactive discourse based on the visual and gestural modality. The results of this research suggest the need to undertake further research into the role of gesticulation, posture and facial expression in the process of text construction - not only in deaf but also in hearing children during action, thematic and narrative discourse.

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Appendix

Table 1A. The number of basic categories of communication behaviors appearing in DCDP-DCDP dyads

DCDP	Basic categories of communication behaviors											
	RPO	A/A	CA	SCR	BR	RS	RO	RA	RD	Q	T/I	total
Ch1	12	5	29	5	9	1	11	5	1	2	—	80
Ch2	9	13	20	—	21	12	3	2	—	12	2	94
Ch3	5	10	22	9	13	5	2	—	1	12	—	79
Ch4	10	10	36	3	23	4	2	2	1	20	2	113
Ch5	14	10	21	—	22	21	40	—	1	18	1	148
Ch6	16	28	28	8	26	25	25	5	—	3	—	164
Ch7	2	5	34	1	9	—	—	1	—	2	—	56
Ch8	11	3	30	—	24	28	28	3	1	7	—	122
sum	79	84	220	26	147	85	111	18	5	76	5	856

Table 2A. The number of basic categories of communication behaviors appearing in DCHP-DCHP dyads

DCHP	Basic categories of communication behaviors											
	RPO	A/A	CA	SCR	BR	RS	RO	RA	RD	Q	T/I	total
Ch1	12	11	23	1	30	29	9	1	1	20	1	138
Ch2	18	7	4	3	26	15	5	1	9	6	1	95
Ch3	25	11	17	—	11	37	12	4	19	7	—	143
Ch4	9	1	5	—	14	8	8	3	2	2	—	52
Ch5	27	3	11	—	9	13	1	1	4	10	—	79
Ch6	26	12	14	—	17	34	1	—	4	8	—	116
Ch7	55	19	10	—	44	38	30	—	4	29	—	229
Ch8	33	7	3	—	16	28	14	1	2	11	—	116
sum	205	71	87	5	167	202	80	11	45	93	2	968

Table 3A. Analysis of the results and the significance of the differences between the groups of DCDP and DCHP in the category of basic communication behaviors

Basic categories of communication behaviors	Z	p	Account of ifferences
Reference present objects	-2,524	0,012	DCDP < DCHP
Agree/acknowledge	-0,053	0,958	DCDP ≈ DCHP
Command attention	-3,046	0,002	DCDP > DCHP
Solicited choice response	-1,464	0,143	DCDP ≈ DCHP
Behavior reques	-0,369	0,712	DCDP ≈ DCHP
Reference to self	-2,260	0,024	DCDP < DCHP
Reference to others	-0,105	0,916	DCDP ≈ DCHP
Register approval	-0,915	0,360	DCDP ≈ DCHP
Register disapproval	-3,203	0,001	DCDP < DCHP
Questions	-0,317	0,751	DCDP ≈ DCHP
Teach/instruct	-0,770	0,441	DCDP ≈ DCHP
Communication behavior – total	-0,368	0,713	DCDP ≈ DCHP

Table 4A. Analysis of the results and the significance of the differences between the groups of DCDP and DCHP in additional categories of basic communication behaviors

Additional categories of communication behaviors	Z	p	Account of differences
Reference to absent objects, events, persons	-2,789	0,005	DCDP > DCHP
Reference to a generalized other	-2,908	0,004	DCDP > DCHP
Imitate	—	—	—
Additional communication behaviors – total	-2,901	0,004	DCDP > DCHP

Table 5A. Analysis of the results and the significance of the differences between the groups of DCDP and DCHP in categories of pragmatically significant non-manual messages

Categories of pragmatically significant non-manual messages	Z	p	Account of differences
Confirmation or denial	-2,945	0,003	DCDP > DCHP
Questions	-2,992	0,003	DCDP > DCHP
Requests, orders, suggestions	-2,568	0,01	DCDP > DCHP
Non-manual behaviors - total	-3,213	0,001	DCDP > DCHP