Mothers’ Stress and Expectations as a Function of Time Since Child’s Cochlear Implantation

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This study examined stress, attitudes, and expectations among mothers of deaf children who underwent cochlear implantation (CI), as related to time elapsed since surgery. Participants were 64 mothers of such children at different points in the implantation process: candidates, 0–3 years postimplantation, and more than 3 years later. Expectations in communication and academic domains decreased as time since implantation passed. No differences emerged in stress levels between the 3 groups. Higher levels of mothers’ and fathers’ education correlated with lower stress levels. Older mothers expressed lower levels on the cohesion dimension of family functioning. Findings suggested the need to consider mothers’ expectations in the rehabilitation process and to encourage mothers’ realistic expectations with regard to the effects of CI.

Cochlear implantation (CI) of children with hearing difficulties and its ensuing rehabilitation requirements affect family climate. Research has shown that, at the beginning of the process, parents’ expectations from implantation tend to be high (Kampfe et al., 1993), accompanied by anxiety experienced by both parents and child (Bray, Neault, & Kenna, 1997; Russell, Coffin, & Kenna, 1999). Later on, facing the demanding rehabilitation process, the family’s level of stress increases (Beadle, Shores, & Wood, 2000), especially if their high expectations are not met. The aforedescribed development of family reactions is interesting in light of research that showed a general improvement in the functioning of both the family and the implanted child after CI (Beadle et al., 2000; Faber & Grøntved, 2000). This study sought to further examine the effect of CI use on mothers’ stress and expectations by investigating mothers of deaf children before implantation, in the first 3 years after implantation, and more than 3 years later.

Family Cohesion and Adaptability

Family is often considered as a system that must respond to its members’ needs (Whitchurch & Constuntine, 1993). The ability of the family to function effectively depends on its resources and on its ability to change its power structure and its members’ role relationships according to social and developmental pressures (Olson, Russel, & Sprenkle, 1980, 1983; Olson, Sprenkle, & Russel, 1979). The circumplex model of Olson et al. (1979) of the family system suggested that families are characterized along two dimensions: adaptability and cohesion. Adaptability reflects the family’s flexibility and ability to change, whereas cohesion reflects the emotional connections among family members. According to this model, families with very high or very low levels of adaptability and cohesion are less balanced and show a lower degree of functioning than families with moderate levels on these two dimensions. However, Whitchurch and Constuntine (1993) proposed that families with very high levels of adaptability and cohesion are not necessarily dysfunctional, especially in stressful situations. Stressful situations can be chronic, like poverty, or...

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temporary, like hospitalization of a family member. The presence of a child with special needs is often viewed as an ongoing source of stress (Baxter & Kahn, 1999).

Stress in Families With a Child With Special Needs

The level of stress experienced by the family with a child who has special needs is related to the child’s characteristics, the nature of the interactions with the child, and the parents’ internal factors. Child characteristics include temperament (Abidin, 1995) and the type and severity of the child’s condition (Margalit, 1994). Parent–child interactions refer to the amount and level of stimuli that the parents present to the child. Margalit (1994) noted that parents who presented too few stimuli or stimuli that were below the child’s developmental stage often caused more delay in the child’s development, thus increasing the child’s difficulties further. Parents’ personality traits and moods, such as depression and anxiety, also contribute to the level of stress they experience.

It has long been recognized that the diagnosis of a young child as deaf is a stressful event in the life of the family that might pose a threat to family adjustment and cohesion (Bloom, 1966). According to the systemic approach on which the model of Olson et al. (1979) is based, the hearing impairment “belongs” to all the members of the family, not only to the child himself or herself (Henderson & Hendershot, 1991). Family members perceive themselves in relation to the hearing impairment (Israelite, 1986). Reactions to the initial deaf diagnosis frequently include feelings of shame, sadness, anger, and helplessness (Weisel & Zandberg, 2002), especially in families who had no previous contact with deaf people or knowledge about deafness (Feher-Prout, 1996). As the child grows, parents face numerous stressors: the need to become involved in rehabilitation and educational decisions, such as the preferred mode of communication, various technological aids (Calderon & Greenberg, 1999), and optimal educational setting, and the investment of money and time in frequent visits to speech and language clinics. All these stressors can cause parental feelings of frustration and depression as well as social isolation (Qittner, 1991). Indeed, Qittner found higher levels of stress among mothers of deaf children than among mothers of hearing children with regard to their overall functioning as parents, to the child’s difficulties, and to the parents’ interactions with the child.

Stress in Families With Deaf Children

Despite these potential stressors, research on families with deaf children has not yielded consistent results. Pipp-Siegel, Sedey, and Yoshinaga-Itano (2002) did not find higher stress levels among mothers of deaf children who received early intervention support than among mothers of hearing children. Furthermore, they did not find a linear relationship between degree of hearing loss and stress level. In fact, stress levels were found to be higher if the children had more hearing, perhaps because mothers may anticipate their children with more hearing to hear all information. When this anticipation was not met, additional stress was created. Moreover, Mapp and Hudson (1997) even found low levels of stress among parents of deaf students in residential schools, especially among frequent churchgoers and among regular sign language users. Likewise, Meadow-Orlans (1994) reported similar levels of stress related to child rearing among parents of deaf children and parents of hearing children, although mothers of deaf children did report a higher level of depression and higher general life stress compared to their husbands and compared to mothers of hearing children.

These inconsistent findings suggest that factors other than the hearing impairment itself contribute to the level of stress in the family. Such factors include the quality of communication within the family (Mapp & Hudson, 1997), the use of sign language by family members (Pipp-Siegel et al., 2002), and the availability of social support (Lederberg & Golbach, 2001). Higher levels of family stress were found to be associated with the child’s young age (Lederberg & Golbachi, 2001; Pipp-Siegel et al., 2002), additional handicapping conditions, less severe hearing loss, and lower language and communication abilities (Pipp-Siegel et al., 2002).

CI and Stress

Recent years have witnessed a growing number of studies about the specific effects of CI on families’ stress. In general, CI is a safe procedure with a low
rate of complications (Campisi, James, Hayward, Blaser, & Papsin, 2004; Haensel, Engelke, Ottenjann, & Westhofen, 2005). It improves the performance of implanted children in the perception and production of speech, language, and communication (Kluwin & Stewart, 2000) and in reading (Spencer, Tomblin, & Gantz, 2000). In addition, Kluwin and Stewart (2000) as well as Chmiel, Sutton, and Jenkins (2000) reported significant post-CI improvements in the children’s social life and general life quality. Nevertheless, these improvements do not eliminate stressors from the process of adjustment to the CI and of raising a child with CI.

One source of stress comprises the gap between parents’ expectations from the CI and its actual results. Feher-Prout (1996) and Kampfe et al. (1993) noted that parents tended to ignore the fact that CI does not help all deaf children and the fact that it does not eradicate or cure the hearing loss. Parents often expected that their child would function like a hearing child, when in fact the child functioned like a hard of hearing child. Incesulu, Vural, and Erkam (2003) found that some of the parents in their study expected the child to hear and speak normally right after the CI’s first fitting and adjustment.

Another source of stress comprises the surgery itself. Although the risk involved is not high (Campisi et al., 2004; Haensel et al., 2005), parents need to cope with the natural anxiety and worries that such a procedure elicits. Despite access to several sources of clear information about the surgical procedure and the rehabilitation process, many family members often feel confused (Bray et al., 1997; Incesulu et al., 2003; Russell et al., 1999).

CI, Stress, and Expectations

The central role played by the family throughout the implantation and rehabilitation processes, as emphasized by medical and rehabilitation staff, may be perceived as another source of stress. Parents are responsible for the relationships between the implanted child and professionals, and family members must adjust to the often dramatic changes in the child’s behavior and communication abilities (Allegretti, 2002). This emphasis on the family can be interpreted as placing the main responsibility for the CI’s success on the family’s shoulders. The perception of the family role as a stressor might be especially pronounced when the family’s expectations from the CI are not met (Nicholas & Geers, 2003). In other words, parents’ feelings of stress may be related to the degree of improvement in the child’s communication and behavior. Less improvement in these areas has been associated with an increase in the family’s feelings of stress (Incesulu et al., 2003; Knussen & Sloper, 1992).

Although parents’ stress may possibly increase after implantation, especially when their expectations are not met, as mentioned above, research has generally shown that parental stress tended to decrease and family functioning to improve after the CI procedure. Incesulu et al. (2003), for example, found that from 1 year after implantation, parents’ anxiety level decreased over time. Nicholas and Geers (2003) showed positive attitudes toward and perceptions of the CI among parents of children who were implanted for more than 4 years. Faber and Grøntved (2000) reported significant improvements in families’ life quality and in the amount of interaction with the implanted child when CI was performed more than 1 year prior to the study. Importantly, previous studies that examined stress levels in families with implanted children were conducted at least 6 months after CI, did not investigate pre-CI family measures, and did not explore the relationships between expectations and stress while considering the stages before and after implantation. The goals of this study were to narrow these gaps in the literature by examining the effect of CI before the implantation of the child and at two points in time after the procedure. This examination considered possible changes over time in family climate (cohesion and adaptability), mothers’ stress, and mothers’ attitudes and expectations.

Method

Participants

Families were recruited from a list of children who were candidates for implantation or had been implanted, obtained from the Center for Preschool Education of Deaf Children in the central region of Israel. Mothers of children whose names appeared on the list were approached by the researchers, and 64 agreed to participate.
The 64 participants were mothers of 32 boys and 32 girls (aged 9 months to 14 years 6 months, median = 5 years). As seen in the background information about the mothers and children presented in Table 1, children were candidates for CI (n = 10) or had already been implanted (n = 54) either up to 3 years before the study (n = 31) or 3–9 years before the study (n = 23). The division of the post-CI group at the 3-year mark was based on research showing that although improvement in communication is often demonstrated several months after implantation, it takes time, generally about 2 or 3 years, until this improvement renders an effect on the child’s social and family environments (e.g., Faber & Grøntved, 2000; Nicholas & Geers, 2003). In addition, considering children’s young age at the time of implantation, 3 years later, all children were expected to have developed enough language skill for daily interactions, which would enable an examination of the CI’s effect on various aspects of their life. No significant differences were found with regard to the percentages of boys and girls in the three groups, but children’s age differences emerged between groups. As expected, candidates were the youngest, and those implanted more than 3 years before the study were the oldest.

Differences also emerged between the three groups of mothers regarding their age. As expected, Scheffe post hoc comparisons revealed that mothers of children who were implanted more than 3 years before the study were older than mothers of children who were implanted up to 3 years before the study. No significant differences emerged between the groups for mothers’ years of education.

Table 1  Demographic information on mothers and children in the three groups

<table>
<thead>
<tr>
<th></th>
<th>Candidates pre-CI (n = 10)</th>
<th>&lt;3 Years post-CI (n = 31)</th>
<th>&gt;3 Years post-CI (n = 23)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Mothers’ age</td>
<td>34.70</td>
<td>8.07</td>
<td>32.03</td>
<td>5.28</td>
</tr>
<tr>
<td>Mothers’ years of education</td>
<td>14.20</td>
<td>2.30</td>
<td>14.32</td>
<td>2.26</td>
</tr>
<tr>
<td>Children’s age</td>
<td>19.80</td>
<td>8.57</td>
<td>55.97</td>
<td>30.44</td>
</tr>
<tr>
<td>Children’s gender</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Boys</td>
<td>3</td>
<td>30.0</td>
<td>16</td>
<td>51.6</td>
</tr>
<tr>
<td>Girls</td>
<td>7</td>
<td>70.0</td>
<td>15</td>
<td>48.4</td>
</tr>
</tbody>
</table>

*p < .05, ***p < .001.

Instruments

The participating mothers completed four questionnaires.

Demographic questionnaire. This included questions about the mother’s age, years of education, and occupation and about the child’s age, gender, age at onset of hearing impairment, and time passed since CI (for those already implanted).

Family Adaptability and Cohesion Evaluation Scales. The third version of the questionnaire of Olson et al. (1983) consisted of 20 items that measured family adaptability (10 items, e.g., “Our family tries different ways to deal with problems”) and family cohesion (10 items, e.g., “Members of our family ask each other for help”). Teicheman and Navon (1990) translated the questionnaire into Hebrew and reported internal consistency (Cronbach alpha) coefficients of .85 and .67 for the cohesion and adaptability scales, respectively. Mothers rated each item on a five-point Likert-type scale ranging from almost never (1) to almost always (5). Scores were averaged for each scale, with higher scores indicating higher adaptability or higher degree of cohesion. A moderate correlation (r = .34, p < .01) emerged in this study between the two scales.

Parental Stress Index/Short Form. For the purpose of this study, Abidin’s (1995) Parental Stress Index/Short Form (PSI/SF) questionnaire underwent back-and-forth translation from English to Hebrew by two bilingual graduate students in educational psychology.
Table 2  Attitudes toward CI (parental expectations) questionnaire

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description of attitudes/expectations</th>
<th>Sample items</th>
<th>Number of items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Child's ability to communicate following CI</td>
<td>A child with CI will be able to talk very clearly</td>
<td>10</td>
<td>.78</td>
</tr>
<tr>
<td>Self-image</td>
<td>Self-image of the implanted child</td>
<td>Children with CI have low self-esteem</td>
<td>6</td>
<td>.65</td>
</tr>
<tr>
<td>Social adjustment</td>
<td>Social adjustment of the child with CI among both deaf peers and hearing peers</td>
<td>A child with CI will be able to make new friends easily</td>
<td>9</td>
<td>.68</td>
</tr>
<tr>
<td>Academic achievement</td>
<td>Future academic achievement of the implanted child</td>
<td>Academic achievements of children with CI will be very good</td>
<td>7</td>
<td>.84</td>
</tr>
<tr>
<td>Home atmosphere</td>
<td>Climate and functioning of the implanted child's family</td>
<td>After CI, the child's relationships with family will improve</td>
<td>4</td>
<td>.71</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>Demands of the rehabilitation program following the CI</td>
<td>The rehabilitation process following the CI is long and requires intensive training</td>
<td>4</td>
<td>.65</td>
</tr>
</tbody>
</table>

A few minor corrections of the Hebrew version were made following this procedure. The PSI/SF included three scales of 12 items each: parental distress (e.g., “There are many things in my life that bother me”), dysfunctional interaction with the child (e.g., “Since I have this child I feel that I can’t do things that that I like to do”), and perception of the child’s problems (e.g., “My child usually gets up in a bad mood”). Mothers rated each item on a five-point scale ranging from **strongly disagree** (1) to **strongly agree** (5). Scores were averaged for each scale, and a total score was calculated for all 36 items, with higher scores indicating a higher level of stress. Internal consistency (Cronbach alpha) coefficients were .91 in the Abidin study and .89 in this study.

**Attitudes toward CI.** This questionnaire (Most, Weisel, & Ben-Yitzhak, 2004) evaluated attitudes toward and expectations from children with CI. The questionnaire was constructed by a team of three researchers in the field of deaf education and rehabilitation (for more information about the test’s construction, see Ben-Yitzhak, Most, & Weisel, 2005). The 40 items tapped six domains: communication, home atmosphere, self-image, rehabilitation demands, social adjustment, and academic achievement. Participants responded to each item on a Likert-type scale ranging from **totally disagree** (1) to **totally agree** (6). Scores were averaged for each domain, with higher scores indicating higher expectations (after reversing the relevant items). Table 2 presents each domain’s content description, number of items, a sample item, and Cronbach alpha coefficient of internal consistency.

**Procedure**

Mothers received the questionnaires via the educational centers where their children were enrolled. The mothers completed the questionnaires individually at home and returned them to the educational center in sealed envelopes to ensure anonymity.

**Results**

To examine the assumption that the three groups of mothers would differ in their reported stress levels, a one-way analysis of variance (ANOVA) was conducted, with time passed since the CI as the independent variable and stress as the dependent variable. As seen in Table 3, no differences emerged between the three groups in their levels of stress.

To examine the assumption that stress would be affected by the level of family cohesion and adaptability, the three groups of participants were first compared for their mean cohesion and adaptability levels, as presented in Table 3. No differences emerged
between the groups on either of these two variables. Next, Pearson correlations were calculated between stress and each of the two family measures, cohesion and adaptability. A significant but small negative correlation emerged between family cohesion and maternal stress ($r = -0.28, p < 0.05$). Mothers who reported a higher level of cohesion in their family also reported a lower level of stress. No significant correlation emerged between family adaptability and stress. Note that nonlinear relationships between cohesion and adaptability and stress were examined by regression analyses as well but failed to reveal such relationships.

Pearson correlations were calculated between family cohesion and adaptability and each of the six measures of mothers’ expectations regarding CI (the attitudes toward CI). All but one of these correlations were nonsignificant. A positive but small significant correlation emerged between family cohesion and maternal attitudes in the domain of academic achievements ($r = 0.31, p = 0.01$). Mothers who reported a higher level of cohesion in their family tended to hold relatively high expectations with regard to the effect of CI on their implanted child’s academic achievements.

Pearson correlations were calculated between stress and each of the six attitude scales. None of these correlations were found to be significant.

One of the main goals of this study was to examine the effect of time passed since the CI on mothers’ attitudes toward and expectations from the CI. In order to study these effects, a multivariate ANOVA was conducted, with time passed since the implantation as the independent variable and the six attitude scores as the dependent variables. Means, standard deviations, and $F$ scores are presented in Table 4.

The analysis yielded a significant overall effect of the independent variable ($F_{12, 108} = 2.08$, Hotelling = 0.462, $p = 0.024$, partial $\eta^2 = 0.188$). ANOVAs showed significant effects with regard to the domains of communication and academic achievement. The results of Scheffé post hoc comparisons revealed that in the communication domain, attitudes were more positive before the CI and least positive after more than 3 years. In attitudes toward the academic achievement domain, mothers of children who were implanted less than 3 years before the study showed significantly higher expectations than did mothers whose children were implanted for longer but did not significantly differ from mothers of candidates. It should be noted that a nonsignificant tendency also emerged for lowest expectations in the most veteran group (>3 years since implantation) in the domains of self-image, social adjustment, and rehabilitation demands.

Additional validation for the information presented in Table 4 was found when time from implantation was considered as a continuous variable. In this case, all the correlations between the time variable and the attitude scales, except the home atmosphere domain, were negative and above 0.21. Two coefficients were significant: time with communication ($r = -0.30$, $p = 0.02$) and time with academic achievement ($r = -0.33$, $p = 0.008$), indicating decreased attitudes and expectations in these domains as time from the implantation passed.

**Discussion**

This study investigated the relationships between family stress and attitudes toward CI at three points of time: before the implantation, up to 3 years after the implantation, and more than 3 years later. In addition, the relationships between family stress and family climate (adaptability and cohesion) were examined. It was assumed that when the family undergoes the process of implantation, its coping depends, to a certain extent, on the family’s climate and resources, that is, its cohesion and adaptability. As mentioned in the introduction section, CI may render two alternative effects on family stress as well as on attitudes. One

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**Table 3 Parental stress and family cohesion and adaptability by time passed**

<table>
<thead>
<tr>
<th></th>
<th>Candidates pre-CI ($n = 10$)</th>
<th>&lt;3 Years post-CI ($n = 31$)</th>
<th>&gt;3 Years post-CI ($n = 23$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Stress</td>
<td>2.34</td>
<td>0.39</td>
<td>2.35</td>
</tr>
<tr>
<td>Cohesion</td>
<td>4.08</td>
<td>0.56</td>
<td>4.18</td>
</tr>
<tr>
<td>Adaptability</td>
<td>3.08</td>
<td>0.40</td>
<td>2.99</td>
</tr>
</tbody>
</table>
possible alternative is that as the time from the implantation passes, the child’s functioning improves, the level of family stress decreases, and expectations from CI remain high. A large body of research has shown positive consequences of CI as a function of time from implantation (e.g., Campisi et al., 2004; Haensel et al., 2005). The second alternative is that family stress does not decrease as time passes, perhaps because the child’s functioning does not meet the high expectations that were present at the beginning of the process and attitudes become less positive. The results of this study give more support to the second of these two alternatives.

Cohesion and Adaptability

The fact that the three groups of mothers did not report different levels of family cohesion or family adaptability suggests that these groups were similar with respect to family climate. The current finding that families with a higher level of cohesion tended to report lower levels of stress is in line with that of Morrison and Zetlin (1990), who found that family cohesion predicted the family’s coping with the presence of a child with special needs. Henggeler, Watson, Whelan, and Malone (1990) similarly reported that family cohesion was the most consistent predictor of adjustment and well-being among parents of deaf children and was especially related to mothers’ level of stress. It seems that the degree of support that family members offered each other affected the level of stress they experienced. However, caution should be taken in interpreting the present finding because the association between cohesion and stress in this study was not robust.

Adaptability, on the other hand, did not relate linearly with stress. This finding means that mothers from families with a lower level of adaptability did not report higher levels of stress compared to those from families with a higher level of adaptability. Therefore, it may be suggested that for some families the ability to keep their routine, that is, not to “adapt” to the presence of a child with special needs, is functional. In line with the proposal of Olson et al. (1983) that families with a very low degree of adaptability or a very high degree of adaptability tend to experience more stress than families with a moderate level, this study examined both linear and nonlinear relations between adaptability and stress. None were significant, thus challenging the model of Olson et al. and the findings of other studies (e.g., Lavee & Olson, 1991; Thomas & Olson, 1993). Further research is needed to determine if the present results are due to the specific characteristics of the present sample, that is, mothers of deaf before and after CI.

Stress

In general, the mothers who participated in this study did not report high levels of stress, with scores ranging from 2.21 to 2.35 on a scale of 1–5. This coincides with studies reporting that mothers of deaf children did not experience high levels of stress (e.g., Pipp-Siegel et al., 2002). Thus, this study’s results support the possible conclusion that deafness is not necessarily associated with high levels of family stress. However,
the current study’s measure of stress was a general one and not specifically related to CI. It is possible that a more focused measurement of stress or anxiety related to the implantation itself could yield somewhat different results. Another explanation for the relatively low levels of stress may be that all the participants were continuously involved with rehabilitation centers and thus enjoyed careful support and guidance. It might be speculated, therefore, that these families’ intensive contact with the rehabilitation centers helped keep their stress levels low. In line with Pipp-Siegel et al. (2002), it might be concluded that intervention plausibly mitigates maternal stress.

The results of this study failed to demonstrate a decrease in stress levels following CI because the three groups of mothers did not differ in reported levels of stress. These unexpected findings may be related to the fact that even if the child’s performance and functioning improved after the CI, the child continued to face hearing difficulties and thus continued to be a source of stress. This finding and explanation are similar to the ones of Pipp-Siegel et al. (2002), claiming that children with relatively more hearing may be a source of stress even more than deaf children because mothers anticipate them to hear all the information but in fact they are still missing a lot. Another possible explanation to the lack of differences among the three groups of mothers is a floor effect. Inasmuch as the level of stress among the candidates’ mothers was low to begin with, there was not much room for improvement.

Attitudes and Expectations

The attitudes and expectations of the participating mothers were very high, with scores above 4.72 on a scale of 1–6 for five out of the six domains. If expectations from and attitudes toward the CI are so high, perhaps unrealistically high, then the effects of CI, good as they are, will likely fail to meet them. These results suggest that professionals in the field of rehabilitation of deaf children should aim to help parents establish a realistic view of the CI. This conclusion is supported by the differences in attitudes found between the three groups of mothers. These differences showed a tendency (only partially significant though) for lower attitudes and expectations among the group of mothers whose children were implanted more than 3 years earlier compared to the other groups. This tendency emerged for all six domains but was especially pronounced in communication and academic achievements. This indicates that, as time from implantation passed, mothers expressed some disappointment from CI, especially in the domains of communication and academic achievements. Perhaps a few years after the CI, mothers had to face reality: The implanted child did not meet the mothers’ expectations in these two areas. This line of interpretation of the data is supported by the current findings on attitudes and expectations regarding rehabilitation demands. Although the effect of time in this domain did not reach an acceptable level of significance, a tendency emerged for the attitudes toward and expectations from rehabilitation to decrease as time from the implantation increased, as can be seen in Table 4. The lack of statistical significance is probably due to the small number of participants, especially in the candidates group because the decrease in attitudes and expectations was more than one third of the relevant standard deviations. It should also be noted that a meaningful effect size of time passed since the implantation and rehabilitation demands was found (partial $\eta^2 = .108$). Therefore, it may be concluded that, over time, mothers tended to express lower expectations, realizing that there is still a need for intensive rehabilitation efforts. This finding coincides with a large body of research (e.g., Christiansen & Leigh, 2002) that pointed to the necessity of intensive, long-term rehabilitation efforts after the CI in order to make the whole procedure effective.

The results of this study correspond with our clinical experience and the experience of other professionals working with families of implanted children. As seen in the clinic, parents often invest tremendous effort in the CI process and tend to develop high hopes and expectations. This focus on the CI may “free” parents temporarily from facing the fact that their child is deaf. The promises attached to CI facilitate parents’ denial of the severity of the child’s condition. During the initial stages of the CI procedure and rehabilitation, parents cope with their children’s hearing difficulties by “doing”. Only some years after the CI are they forced to
recognize and cope with the fact that the child continues to have hearing problems. In the clinic, parents with a stronger belief that their child will be like a hearing child and very high expectations will experience more pronounced disappointment during the eventual realization of the child’s condition.

These clinical observations need to be validated by future research that attends to the limitation of this study. This study examined three groups cross-sectionally; longitudinal research should follow the same group of parents from candidacy for an extended period of time. In addition, the current study utilized only mothers’ reports; future research should also include objective evaluations of the child’s performance in various relevant areas, to enrich understanding of the development of parents’ reactions to the CI. We believe that there is a good empirical basis to assume that, generally, the effects of CI on the implanted children’s communication are very positive and that they lead to better adjustment in other areas as well. However, valid measurements of these effects among individual children would add important insights into the effects of the child’s functioning on family stress and on parents’ attitudes and expectations. Future research with larger number of participants, including other family members (e.g., fathers and siblings) might further validate the results of this study and put them in a broader perspective.

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