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## Study of learning strategies and cognitive capacities in hearing and non-hearing pupils

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### Abstract

One very important matter in hearing-impaired pupils is to know whether they use different learning strategies to hearing pupils students. Similarly, knowing if they have the same cognitive capacities as their hearing peers is also interesting. Research was done to compare the cognitive capacities of hearing-impaired pupils to hearing pupils in years 4, 5 and 6 of primary education with the TEA1 test. In parallel, use of learning strategies by both pupil types was studied. The study sample was formed by 223 pupils aged between 9 and 12 years (distributed in the above three primary education years). The results barely showed any differences in cognitive capacities, but a significant difference was observed in study habits and using certain strategies between students with and without hearing impairments.

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*Keywords:* Hearing impairment, cognitive capacities, learning strategies, study habits

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### 1. Introduction

There is long-standing research tradition which demonstrates that the linguistic deficit that hearing-impaired students present do not negatively contribute to cognitive development (Khan et al, 2005; Meinze-Derr et al, 2010; Moeller, 2000; Pisoni and Geers de 2000, and Surowiecki et al., 2002).

Some authors through comparative studies believe that many of these children reach a level of specific operations with considerable delay (Gotzens, 1983).

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Colin (1980) points out that deaf children can present a different balance in their mental capacities, and this could indicate different intellectual functioning in compared groups.

By following these students’ cognitive development, many research works have indicated that development in hearing people and in subjects with hearing impairments differs, and have found some delays in the intellectual development of people with and without hearing disabilities (Furth, 1966, 1973; Furth & Youniss, 1971, 1979). Nowadays, some authors sustain that hearing loss itself is not associated with worse performance in non verbal cognitive capacities tests, and deaf children or children with hearing problems demonstrate similar cognitive performance to their hearing classmates (Krivitski et al., 2004, Mayberry, 2002, Yoshinaga-Itano et al., 1998, Zekveld et al., 2007 and Zwiebel, 1987). It has also been suggested that children with greater hearing loss adopt more efficient working memory strategies in special tasks, possibly to compensate for loss of heard information (Zekveld et al., 2007).

It has to be stated that almost all students employ certain learning strategies, like underlining important ideas, making sketches, summaries, repeating aloud, studying alone, not studying alone, asking about doubts, memorizing what they have learned without necessarily understanding it or, for instance, the list of the most repeated microstrategies in the specialized literature offered by Carlos Monereo (1990).

Regarding the strategies used by students with hearing disabilities, some studies have concluded that they are employed by both student groups, but their use differs between students with and without hearing impairments (Rodríguez, 1990). One of the challenges associated with evaluating the intellectual functioning of children with various levels of hearing loss is the determination that measures minimizing the impact of hearing impairments in language deficits terms. Deaf children use specific strategies to minimize these deficits (Phillips, Wiley, Barnard and Meinzen-Derr, 2014). Indeed in those cases where the class has been guided by a speech therapist, students’ reading comprehension improves. Thus some help, like a speech therapist, can be considered to favor the construction of learning strategies (Pérez, Serrano & Vico, 2011).

**2. Method**

*2.1. Participants*

The individuals selected for this study included 223 pupils aged between 9 and 12 years (mean age 10.45 years), of whom 145 were hearing pupils and 78 had a hearing disability. They all studied in primary education years 4, 5 and 6. Tests were applied by psychologies over a 2-week period. Pupils has been duly informed about undertaking them.

**3. Results**

According to the TEA intelligence quotient (IQ), no significant differences were found in the IQ of both student groups ( $X^2=.469$ ) since the pupils with a hearing impairment tended to obtain a quotient of 70 (3.5%), 80 (10%), 90 (9.5%) and 120 (22%), while hearing pupils obtained 70 (2.8%), 110 (21.6%), and a few obtained an IQ of 135 (2.3). Thus no significant differences between both pupil groups were found (Table 1).

Nor were any significant differences obtained ( $X^2= .884$ ) in TEA for the G Factor scores between pupils with and without hearing impairments

Table 1 IQ in TEA for pupils with and without hearing disabilities

IQ in TEA	70	80	90	100	110	120	130	135	Total
Pupils with no hearing disability	2.8%	8.5%	8.5%	27.2%	21.6%	22.1%	7%	2.3%	100.0%
Pupils with a hearing disability	3.5%	10%	9.5%	25.0%	21%	22.0%	9%	0%	100.0%

### 3.1. Differences between learning strategies in pupils with and without hearing disabilities

As we see below, there are significant differences in two learning strategies: Studying alone ( $X^2=.003^{***}$ ), where the pupils with a hearing disability never tended to do this; Place to study ( $X^2=.001$ ), where they tended to study anywhere (Table 2).

Table 2. Differences in learning strategies between pupils with and without hearing deficiencies

	X2
1. Task organization	.103
2. Not leaving tasks to later	.163
3. Studying the day before	.167
4. Studying alone	.003***
5. Not studying alone	.172
6. Studying time	.815
7. Place to study	.001***
8. Atmosphere	.671
9. Suitable place to study	.192
10. Underlining what is important	.080
11. Making sketches/drawings	.155
12. Seeking information	.173
13. Summaries	.100
14. Selecting information	.251
15. Read again when not understood	.267
16. First reading	.135
17. Memorising without understanding	.141
18. Memorising and understanding	.180
19. Providing ideas	.243
20. I like studying	.190

These results showed that both pupil groups used the same type of learning strategies and none stood out more than others. We stress the significant differences found for two types of strategy, *Studying alone* and *Place to Study*. These results contradict research works which have stated that apart from hearing subjects obtaining better results, the low scores obtained by students with hearing disabilities were due to lack of planning and strategies or problem solving (Das, 1984; Das & Heemsbergen, 1983; Das, Kar & Parrilla, 1996, 1998).

## 4. Conclusions

By way of general conclusion, it can be stated that both pupil groups obtained better scores for the G Factor than for TEA, which was due mainly to them including information better by means of visual elements. The pupils with hearing disabilities resorted to a visual representation of information because it was more effective for them to do so. Authors like Rodríguez (1990) have mentioned that temporal and linguistic codes are more efficient for short-term memory. Along the same line, research by Martín (1989) has shown that subjects with a hearing impairment depend to a great extent on visuospatial processing and perception, have difficulties with verbal, abstract and sequential processing, and improve in simultaneous visual processing (Rodríguez, 1990; Silvestre, 2003; Torres, 1987).

It is also necessary to stress that these results contradict those reported in other research works (Furth, 1966, 1973; Furth & Youniss, 1971, 1979), which found large differences between hearing subjects and people with hearing impairments, and delays in intellectual development for subjects with a hearing disability. These same conclusions were reached in other studies, which have demonstrated that hearing students obtained better results than those with a hearing disability due to poor planning, and for not adopting strategies or resorting to problem solving (Das, 1984; Das & Heemsbergen, 1983; Das, Kar & Parrilla, 1996, 1998). Our research concludes that there are no large differences in cognitive capacities between non-hearing and hearing pupils. The differences in the strategies adopted are only reflected in the study time and how to study as non-hearing students study individually.

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