

SEARCHING FOR A BETTER WAY TO ASSESS READING COMPREHENSION IN DEAF STUDENTS¹

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ABSTRACT

It has been stated that standardized reading comprehension tests are not appropriate to determine deaf students' real capability to construct meaning from written text. This kind of tests would underestimate the reading abilities of deaf students presenting them even as non-readers. In order to overcome these limitations it has been proposed to use retell tasks to assess reading comprehension. This study aimed to compare deaf students' performance on a standardized reading comprehension test and a retell task of equivalent difficulty level with hearing students' performance on the same tests. The goal was to evaluate the hypothesis that standardized tests underestimate deaf students' comprehension abilities, when compared with their own performance in a retell task. A sample of 45 deaf students and 30 hearing students were evaluated with a reading comprehension test standardized for Chilean hearing population (CLP) and a retell task using texts of comparable difficulty level. Texts were constructed to match the structure and readability of those in CLP. One way ANOVA analysis sustained the hypothesis. Further developments of retell tasks for deaf students' reading abilities assessment are discussed.

INTRODUCTION

Many publications state that the overall reading ability of deaf students remains far below that of hearing students (Albertini & Mayer, 2011; Bochner & Walter, 2005; Luckner & Handley, 2008; Schirmer & McGough, 2005; Wauters, van Bon, Tellings, & van Leeuwe, 2006). Schimmel, Edwards, and Prickett (1999) report that 18 years old deaf students have an average reading performance equivalent to that observed in the fourth grade in American school. At the same time, it has been claimed that the reading assessment tests standardized for the hearing population, tend to underestimate the reading comprehension skills of deaf individuals (Miranda, 1997; Svartholm, 1998).

The characteristics of such kind of tests would be at the basis of this phenomenon. In particular, highly schooled format of the items (written questions, multiple choice type, use of abstract language) implies that, in order to answer correctly the student not only must have understood the text but should also have specific competencies that are not reached by the majority of deaf students (Zazove, Meador, Reed, & Gorenflo, 2013).

On the contrary, in retell tasks (cf. Reed, 2011) the student uses the same communication tools used to perform daily tasks. For this reason, it has been proposed

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that these tasks should provide a more accurate estimation of the actual reading comprehension skills of deaf individuals.

This study aimed to test the hypothesis that when comparing the performance of deaf students on standardized reading tests and retell tasks, the first underestimates their performance in reference to hearing students.

METHOD

This study considered the application of two instruments to assess reading comprehension. The first one is a test standardized for Chilean school population and the second is a retell task that was created especially for this study. Both instruments were applied to two independent samples of participants, one composed of hearing students in primary school, and the other composed of deaf students in secondary and higher education. The distance between the percentages of performance achieved by each participant in both tests was calculated and then a comparison between groups was performed in terms of average distances observed in each group. The details of the process of data collection and analysis are described below.

Participants

Two groups of participants were included in this study. The first of them consisted of 30 hearing students, five for each level of primary education in Chile, between the 3rd and 8th grade. All students were from the same school. All students in each grade were invited to participate in the study. Those who voluntarily agreed to participate and whose parents signed a letter of informed consent were evaluated with a test of reading comprehension standardized for Chilean population (CLP test, Alliende, Condemarín, & Milicic, 2007). From those who had a performance equivalent to the 50th percentile or higher, five students per level were invited to be evaluated with a retell task, specially created for this study. Participation in this second evaluation was also voluntary for students. Among the hearing students, 30% were female and 70% male. Participants in this group were between 8 and 14 years old.

The second group was composed by 45 deaf students (profound or severe hearing loss) whose ages ranged from 13 to 22 years old. They were between the 7th grade and 2nd year of higher education. Table 1 shows the number of deaf participants at each educational level.

Table 1. *Frequency distribution of deaf participants by educational level*

	Frequency
7th primary	5
8th primary	6
I° secondary	8
II° secondary	10
III° secondary	6
IV° secondary	7
Higher Education	3
Total	45

This group's participation was also voluntary. In the case of under-aged students, their parents signed an informed consent form, and students signed an informed assent form. Participants who were 18 years old or older signed the informed consent form by themselves.

Materials

CLP test (Alliende et al., 2007).

This test, standardized for Chilean population, is divided into eight levels of difficulty, each one of them corresponds to the expected level of achievement in reading comprehension for each of the levels of Chilean primary education. For each level a specific test is used. Tests corresponding to levels 1 and 2 do not include complete texts but only separate words and phrases. Therefore, these levels were not used in this study. The tests for the other six levels include texts with increasing length and difficulty, ordered by difficulty level. Each test includes two or three texts. Participants have to read each one of them, and then answer multiple-choice questions about the ideas presented in the texts. The tests include both narrative and expository texts; the number of texts in each category varies between tests of different levels.

Participants register their answers to the questions on a booklet. These answers are then evaluated according to the guidelines provided by the authors of the test. While there are standards to categorize the performance of test respondents in relation to the Chilean population, in this study the percentage of achievement was used as a measure of participants' performance. By doing so, the results in this test can be compared to the results of the retell task, which does not have any standardization study. To determine the percentage of achievement, the number of correct answers was counted and the percentage that this number represents over the total of items in the test was calculated.

Retell task.

For this study a retell task with texts of equal difficulty than those included in the CLP test was constructed. For each level from 3 to 8, texts with similar complexity and structure to those used in the corresponding CLP test were created. Flesch-Szigriszt Readability Index (IFSZ) was used to ensure equivalence of difficulty. This was measured by the INFLESZ software (<http://legibilidad.com/home/descargas.html>). Each participant must read each of the texts corresponding to the same level of difficulty of the CLP test he is being evaluated with. When the student finishes reading each text, the evaluator asks him to report what he read. For the hearing participants, such report is done orally. In the case of deaf participants the evaluator indicates that she can choose to do it in Chilean Sign Language or orally, in Spanish, depending on his preference. The evaluator encourages the participant to tell the maximum of ideas that she has understood from the text.

In the case of hearing participants, the retells are recorded on audio and then transcribed. In the case of deaf participants, the retells are recorded on video, and then translated and transcribed into Spanish. The translation was made by hearing people with a high level of knowledge of sign language, who were also proficient users of that language. These translations were also reviewed by deaf adults fluent in sign language and competent in written Spanish. All transcripts were coded in terms of the number of ideas contained in the text that were included in each participant's retell. The percentage of achievement for each text, based on the number of ideas retold by the students from the total number of ideas included in the text, was calculated, and then the average of achievement percentage in the texts read by the student was obtained.

Procedure

To determine the degree of difficulty of the tests that would be applied to each participant, a different procedure was used with each of the groups included in this study. Hearing participants were evaluated with the test corresponding to the grade they were in at the time of assessment. For deaf students, a procedure to estimate the level of difficulty corresponding to each of them was developed. A meeting with the teachers who work directly with these students in their schools was conducted. At that

meeting, some texts of all the difficulty levels of CLP test were presented to the teachers. Then, each group of teachers was asked to indicate which text matched the reading comprehension level of each student who had agreed to participate in the study. This text should be easy enough for the participant to be able to construct meaning from it, and hard enough to mean a challenge for her. Deaf students in higher education were assigned to the highest level (level 8) following Banner and Wang (2010). The students' assignment to the different levels made by the groups of teachers was used to select both the level of difficulty in the CLP test and retell task.

In all cases, the application of the two instruments was separated by a very short time, making it highly unlikely that the reading comprehension skill has changed significantly in that time.

Analysis

For each participant the achievement percentage in each instrument was calculated. The distance between the performance of each participant in both instruments was then calculated. For this, the percentage of achievement in retell task was subtracted from the percentage of achievement obtained in the CLP test. Subsequently, the average distances between performances for both groups included in this study (deaf students and hearing students) was calculated. Finally, through a one-way ANOVA, the hypothesis that there is a significant difference between the mean of the differences for each of these groups was evaluated.

The following rationale was used to interpret the results of ANOVA. The performance that any person has in both tests is an estimate of the same attribute of the person: the level of development of their reading comprehension skill. Given the conditions of application of the tests, it can be assumed that this attribute has not suffered variation between applications. Therefore, the difference between the percentage of achievement obtained by the same participant in the two tests reflects the way those tests perform the estimation of the attribute. To the extent that these are reliable tests, this difference between the tests should tend to be stable within a given population. Conversely, if two groups show significantly different average differences, it is reasonable to think that the way the tests estimate the attribute is different in the two populations to which such groups belong. This is because the estimation is a function of the interaction between the characteristics of the tests and the characteristics of the subjects who answer them.

To interpret any difference between the groups regarding the distance between achievement levels in both tests, we will use as a reference the retell task, since the interpretation of their results is straightforward: the percentage of achievement corresponds to the proportion of ideas contained in the text that were reported by the participant, using oral Spanish or Chilean Sign Language, depending on his individual preferences. If the difference between the percentages of achievement is significantly higher in one of the groups, this means that a participant from that group that have reported a given number of ideas will tend to get a higher score on the CLP test than a participant of another group that has reported the same number of ideas. Having reported the same amount of ideas included in the text, the second group participant will see her level of performance underestimated when evaluated with CLP.

RESULTS

The mean distance between the percentage of achievement in the two tests was 29.29 percentage points ($SD = 17.10$) for the group of hearing students and 16.62 percentage points ($SD = 14.27$) for the group of deaf students. Table 2 shows the averages obtained according to levels of difficulty of the tests applied.

Table 2. Average distances between percentages of achievement on tests of reading comprehension, according to levels of difficulty of the tests

Difficulty level	Hearing students					Deaf students				
	<i>M</i>	<i>N</i>	<i>SD.</i>	Min	Max	<i>M</i>	<i>N</i>	<i>SD.</i>	Min	Max
3	18.72	5	19.48	-13.30	38.02	20.77	11	13.70	1.65	47.52
4	31.41	5	11.60	20.27	43.53	15.84	11	10.11	-4.30	33.69
5	29.09	5	20.40	6.09	56.39	13.81	2	16.67	2.02	25.60
6	32.33	5	22.97	2.57	60.82	-1.59	7	12.12	-26.73	10.58
7	41.08	5	14.20	23.84	63.25	16.62	7	8.62	6.17	29.33
8	23.13	5	9.08	13.63	36.36	30.32	7	10.10	18.05	43.26
Total	29.29	30	17.10	-13.30	63.25	16.62	45	14.27	-26.73	47.52

For the comparison of total groups' average, one way ANOVA gave a value $F = 12.11$ ($DF = 1,73$; $p = 0.001$). Table 3 shows the values obtained in comparisons according to tests' difficulty levels.

Table 3. Mean comparisons (one way ANOVA) between hearing and deaf students, by tests' difficulty level.

Difficulty level	<i>F</i>	<i>p</i>	<i>DF</i>
3	0.060	0.810	1, 14
4	7.485	0.016	1, 14
5	0.858	0.397	1, 5
6	11.219	0.007	1, 10
7	13.924	0.004	1, 10
8	1.597	0.235	1, 10
Total	12.11	0.001	1, 73

DISCUSSION

General results confirm the hypothesis that the CLP test underestimates the performance of deaf students in their reading comprehension skills, compared with hearing students. This is a clear evidence for the idea that, in general, standardized reading tests underestimate the abilities of deaf students and, in contrast, other tests such as retell tasks provide more accurate estimations of their actual ability to construct meaning from written texts.

However, when analyzing the results according to tests' difficulty levels, the results are less categorical. This could be due to the small sample sizes per level. It could also be explained by the different distribution of text types (narrative/expository texts) at each difficulty level. Future studies should evaluate these alternatives expanding the sample sizes for each level of difficulty and making a comparison between texts of the same type.

In relation to samples used, not just its size is a limitation of this study. It is important to consider that, in the sample of hearing students, there were only readers that the CLP test located in the 50% higher performance in reading comprehension for the Chilean population. It is necessary to assess whether the underestimation that the CLP test makes of the reading comprehension of deaf students, refers to hearing students at all levels of reading comprehension or only to those who have attained high achievement levels. It is even possible that the relationship between populations is not linear and hearing students with very low levels of reading comprehension see their

ability underestimated when assessed with CLP test, for similar reasons as those affecting deaf students.

Future studies should emphasize a more detailed analysis of the productions of students at retell tasks. Due to the structure of these tasks, it is possible to determine not only how many, but which specific ideas were reported by students. This type of analysis allows not only a better understanding of the differences and similarities between the reading comprehension processes of deaf and hearing students, but offers more precise intervention tools for educators.

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