

# Speech-language-hearing therapists' perceptions of the characteristics of structured assessment tests proposed by current Chilean regulations

Antonieta Herrera-Lillo<sup>1</sup> Carla Gislaine Leal-Kaymalyz<sup>2</sup> 

<sup>1</sup> Universidad Viña del Mar, Escuela de Ciencias de la Salud, Viña del Mar, Región de Valparaíso, Chile.

<sup>2</sup> Universidad Viña del Mar, Centro Regional de Inclusión e Innovación Social, Viña del Mar, Región de Valparaíso, Chile.

## ABSTRACT

**Purpose:** to analyze the speech-language-hearing therapists' perception of structured tests proposed by the current Chilean regulations to assess and diagnose language in children.

**Methods:** a questionnaire to assess their perception of three tests (the Test of Auditory Comprehension of Language, the revised Phonological Simplification Processes Assessment Test and the Screening Test of Spanish Grammar). Differences were contrasted with the Friedman test, and the post hoc was compared with the Wilcoxon rank sum test. Also, the Spearman's rho coefficient was used to study the correlation between scores, setting the confidence level at 5%.

**Results:** the revised Phonological Simplification Processes Assessment Test obtained the highest mean Likert score in most items assessed, except for the question on excessive application time. A total of 91% of participants reported the need for a digital version of the three structured tests. Lastly, the highest and most significant score correlation occurred between the Test of Auditory Comprehension of Language and the Screening Test of Spanish Grammar.

**Conclusion:** the participants' perceptions of the revised Phonological Simplification Processes Assessment Test are more positive than those of other tests. The participants also believe that the tests should have a digital version.

**Keywords:** Speech, Language and Hearing Sciences; Child Language; Diagnosis; Surveys and Questionnaires; Data Analysis; Information Technology

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### Corresponding author:

Carla Gislaine Leal-Kaymalyz  
Centro Regional de Inclusión e Innovación Social, Universidad Viña del Mar, Región de Valparaíso, Chile  
Diego Portales 90, Viña del Mar, Chile  
Código postal: 2580022  
E-mail: cleal@uvm.cl

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## INTRODUCTION

García Ubillo et al.<sup>1</sup> define the speech-language-hearing (SLH) sciences as a “field that constructs knowledge from the convergence of various fields of knowledge: linguistics, psychology, medicine, and biology; thus, it constructs its interdisciplinary nature. Its practice is centered on human communication and its various changes throughout life” (p. 65). This field examines human communication interactions, considering different dimensions that provide an integrative perception of reality. Hence, fields such as sociology, politics, and ethics are addressed to understand their role in human and societal communication<sup>2,3</sup>.

Regarding professional practice, many SLH therapists work or have begun working with education and inclusive education<sup>2,4</sup> in special schools, schools with integration programs, or kindergartens. A high percentage of such professionals have also approached the field of health in hospitals, clinics, and healthcare centers<sup>5-7</sup>. According to the 2018 Chilean SLH registry (FOPACH, in Spanish) concerning their scope of practice, 73.3% of the 5,476 surveyed professionals worked with communication, followed by 20.7% with oral-motor function. In third place, 19.0% worked with swallowing, followed by clinical teaching with 17.5%. Lastly, with the lowest percentages, are those who worked with hearing and voice, respectively with 12.5% and 12.1%<sup>8</sup>.

In 2010, the American Speech-Language-Hearing Association (ASHA) defined the SLH practices in education, pointing out the roles, responsibilities, and practices that must be carried out in all educational levels from preschool to high school, approaching the various speech, language, hearing, voice, and swallowing disorders that affect children in these stages<sup>9</sup>. They also indicate that professionals can help design curricula and teach to read and write and participate in multidisciplinary teams in the institutions to provide a more comprehensive and inclusive response to students they treat<sup>4,10,11</sup>.

This definition of such professional scope in education has been reflected in regulations established in decrees no. 1300 (of 2002)<sup>12</sup>, 170 (of 2009)<sup>13</sup>, and others that define how intervention must be carried out regarding children with special education needs (SEN) in either School Integration Programs or Special Language Schools. It also led to decree no. 83 (of 2015)<sup>14</sup>, that establishes diversified teaching through the Universal Learning Framework<sup>15</sup>, which in turn determines that the intervention of all professionals

who work in educational institutions (including SLH therapists) must aim at the benefit of all students in the classroom<sup>16</sup>. Hence, SLH therapists must care for all class participants, rather than only children with language or communication disorders.

Another landmark is that SLH therapists were allowed to work in regular education through the Law of Preferential School Fund. According to Law 19,464, article 2, it opened the way for educational institutions to hire educational assistants. Thus, SLH therapists became participants in the plan to improve education, providing options not only in caring for disorders associated with language (as in School Integration Programs and Special Language Schools) but other communication disorders as well. This variant also makes it possible to develop programs to help improve communication skills in the school community, including teachers and students. In Chile, SLH practice has specialized in education since the 1990s, which is explained by its connection with neurodevelopmental language and speech disorders. This broadened the SLH scope of practice to encompass the diagnosis and intervention of various pathologies<sup>17</sup>. Specifically, children and youth communication is the field with the greatest SLH participation – which is how they are probably best known by the general population and where they have the most job opportunities<sup>18</sup>.

The Chilean Ministry of Education (MINEDUC), through the MINEDUC Study Center, furnishes open-access data regarding nationwide enrollments in all levels of education<sup>19</sup>. The analysis of these databases shows that the Chilean educational system enrolled 183,373, 185,498, and 181,776 boys and girls with SEN in preschool and basic education in 2018, 2019, and 2020, respectively. Moreover, enrollments classified as SEN in 2020 correspond to 5% of the total. Concerning enrollment distribution per level of education in the year with the most updated information, 145,109 (79.8%) were enrolled in child education and 36,667 (20.2%) in high school. Also, in the same year, 91.3% were enrolled in funded private schools, while only 8% were in municipal schools. The remaining ones included other types of institutions, such as paid private schools, delegated administration boards, and local educational services. As for enrollments associated with SLH practice in 2020, 96.2% corresponded to specific language disorder (SLD), 2.0% to intellectual disability, and the remaining 1.8% to other SEN<sup>20</sup>.

There are currently in Chile a series of policies that rule special education, which is grounded in various

laws. These include the general law of education no. 20,370 (of 2009); law no. 20,422 (of 2010), which establishes norms on equal opportunities and the social inclusion of people with disabilities; and law no. 20,201, on institutional funds and other legal agencies. These laws ensure access to formal education for thousands of people who need it<sup>21,22</sup>. Moreover, regarding plans and programs for students diagnosed with temporary language difficulties, decree no. 1,300 began implementing special schools exclusively dedicated to specific language disorders (SLD), which are still working, and decree no. 170 (of 2009), which “benefitted these students with special education funds”<sup>13</sup>.

Concerning SLD assessment and diagnosis, abnormal language development<sup>23,24</sup> can be analyzed and identified by professionals who work with early childhood, such as child educators or pediatricians<sup>25</sup> – the latter assess them with the Healthy Child Control Tests, of the public health system. Nevertheless, the only diagnoses validated by MINEDUC, under the Chile Grows with You program, are those issued by SLH therapists who suspect of autism, dysphasia, or SLD. Their diagnostic assessments use standardized tests that have been adapted to the Chilean population by the *Universidad de Chile*, as established by decrees no. 170 and 1300.

These standardized tests encompass the Test of Auditory Comprehension of Language (TECAL, in Spanish), the Screening Test of Spanish Grammar (STSG), and the Phonological Simplification Processes Assessment Test (TEPROSIF-R, in Spanish). The first one (TECAL) assesses the morphosyntactic and semantic comprehension performance – i.e., the auditory comprehension of language – and has 101 items: 41 on vocabulary, 48 on morphology, and 12 on syntax. In the application, the child listens to auditory stimuli and responds by identifying the right image out of three possibilities presented on a sheet. The second test (TEPROSIF-R) assesses the phonological simplification processes produced by children. In general, it measures the time between the reception of the stimulus and the production of the word being assessed. The third test (STSG) quickly detects in the first instance syntactic errors in Spanish – i.e., it measures basic grammar use or grammatical performance as a relevant indicator of linguistic development<sup>26-28</sup>.

Based on the literature, information and communication technology (ICT) has helped people in their everyday lives and their professional education and

practice, generating important innovations for the whole society<sup>29</sup>. However, this reality, which has been forcefully presented in recent years, is not free of pros and cons regarding its use. On the one hand, it is argued that ICT can address SEN, as children facilitate their own learning<sup>30</sup>. Moreover, ICT changes and advancements must be present in education, considering that children are more motivated and learn faster through new methodologies and especially, technologies<sup>31</sup>. On the other hand, professionals who use ICT with small children must always keep in mind that interaction and play are essential aspects, respecting the maturation and development stages. For instance, 2- and 3-year-old children do not distinguish two-dimensional (2D) from three-dimensional (3D) screens and/or digital resources, which makes it more difficult for them to understand that what they see on the devices is not real<sup>32</sup>. More specifically, ICT use has made it possible to address various problems in the various fields of SLH therapy, requiring that such professionals acquire digital competence<sup>33</sup>. However, ICT use in SLH practice depends on the patient’s diagnosis, intervention, and age<sup>34,35</sup>.

The standardized tests analyzed in this study are presented graphically, with black-and-white images that portray various grammatical, semantic, and phonological elements. Thus, some questions arise from the analysis of the stimuli presented in these tests, as well as the date when they were developed or adapted to the Chilean population<sup>36,37</sup>. For example, is it appropriate to include ICT in the SLH assessment and intervention processes? Is the linguistic assessment performance of children affected because the visual stimuli are in black and white? Does it take too long to apply these instruments? Does the test presentation format interfere with the children’s attention and/or motivation?

Given the above, this study aimed to analyze SLH therapists’ perception of the structured tests proposed by the current Chilean regulations to assess and diagnose language in children, based on the following research question: “Do SLH therapists perceive any differences between the current standardized tests?”.

## METHODS

This study complies with the requirements of the ethics committee of the *Universidad Viña del Mar, Chile* (code 40-22R) and highlights that no intervention was used that might affect the participants’ health. Nonetheless, they were asked to sign an informed consent form, through which they were informed that

they were voluntarily answering a questionnaire and were free to withdraw from it at any time. The secrecy of their identity was also ensured, as it will not be made public in any context.

This is a quantitative, descriptive, cross-sectional, nonexperimental study. Its target population is SLH professionals certified between 1996 and 2019, who worked in 2020 in the various institutions of the Valparaíso Region, in Chile. The study approached a non-probabilistic convenience sample, as its design is not inferential<sup>38</sup>. The inclusion criteria were as follows: (1) SLH professionals who were certified at the time they answered the questionnaire and (2) had been working in the profession for at least 1 year in the fields of education and health. Hence, professionals who had not been working as SLH therapists or had not used the analyzed standardized tests in their diagnostic processes were excluded from the study.

Measurements were taken with the ICT Perception Questionnaire, which has been validated<sup>39</sup> following validity and reliability protocols<sup>40</sup>. It assesses SLH professionals' quantitative perception of the characteristics, use, and knowledge of instruments proposed in the current Chilean regulations and of ICT use in assessment and diagnostic processes. The questionnaire has 47 items with a Likert-type scale, in which 1 indicates that the respondent "totally disagrees" with the statement and 5 indicates they "totally agree" with it. However, this article presents only the analysis of module 1, which has 27 items and generates nine variables associated with TECAL, TEPROSIF-R, and STSG characteristics.

The following variables were analyzed regarding the perception of the instruments' qualities: (1) quality of the images, (2) size of the images, (3) presentation format to children, (4) trust in the results, (5) consistency of assessment content, (6) evaluator's presentation format, (7) opinion on the possibility of a digital format, (8) update on images, and (9) application time.

As for data collection, the professionals were invited via e-mail in June 2020 to participate in the study, and the ICT questionnaire was applied from July 31, 2020, to September 28, 2020. Data were collected digitally through the Google Forms free platform<sup>38</sup> because of social distancing due to the coronavirus pandemic health emergency. They were ordered and coded in Excel and then exported to the R-Project free statistical program.

Data were analyzed through frequencies and bar charts, characterizing participants in terms of

demographic variables such as sex and age, the year they graduated from university, and their professional practice. To reach its objective, this research also analyzed the frequency and percentage of positive answers associated with scores 4 and 5, neutral answers considering only scores 3, and negative answers with scores 1 and 2 on the Likert scale. The scores of the nine variables resulting from the 27 items were analyzed with descriptive statistics such as means, variances, and standard deviations to compare their perception of TECAL, TEPROSIF-R, and STSG, which are the instruments approved by the current Chilean regulations.

The Friedman statistical test<sup>41</sup> was used to referentially evaluate whether the professionals' perceptions of the three instruments are equal [H0: median scores are equal], with a 5% confidence level. The post hoc comparison of the perception between pairs of instruments was made with the Wilcoxon rank sum test for two matched samples [H0: mean scores are equal between pairs], considering the Holm correction<sup>42</sup> to adjust the p-values, and setting the confidence level at 5%.

Lastly, to verify whether the professionals' opinions were related, the Spearman's coefficient was used to correlate positive, neutral, and negative answers between the instruments. Setting the confidence level at 5%, hypothesis H0: there is no correlation was tested in contrast with H1: there is a correlation.

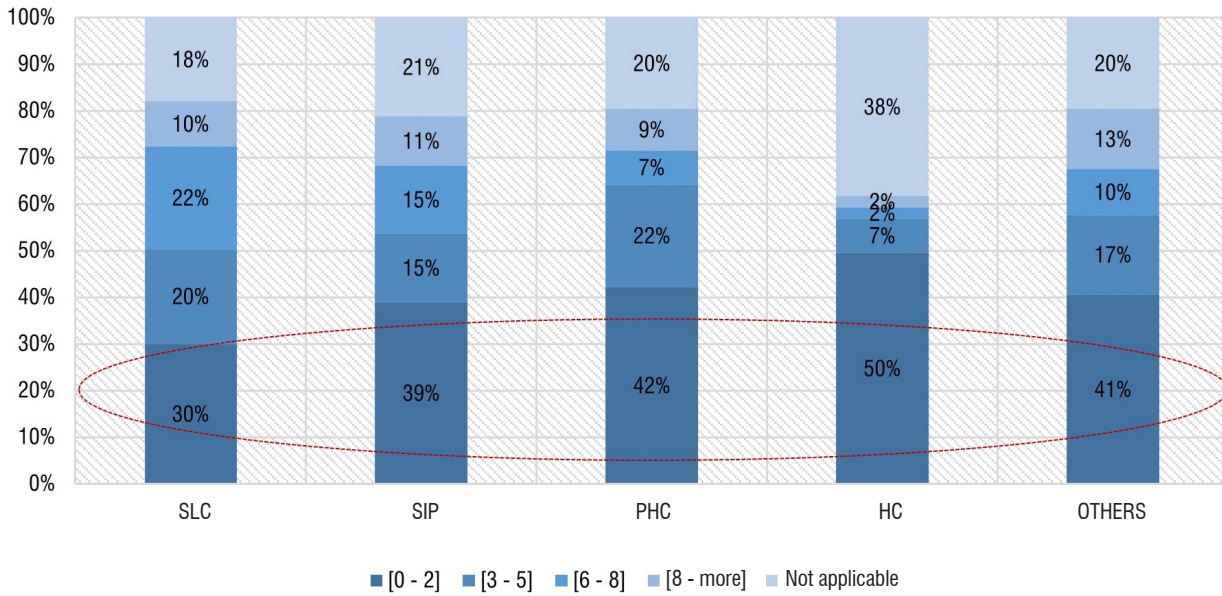
## RESULTS

### Sample description

Altogether, 123 SLH therapists participated in the pilot study, of which 91.9% are females [ $n = 113$ ] and only 8.1% are males [ $n = 10$ ]. The participants' mean age was 33 years, ranging from 23 to 47 years, although most of them were between 30 and 39 years old. The age group from 20 to 29 years graduated between 2013 and 2019, while those 30 to 39 years old graduated between 2004 and 2018, and those 40 to 49 years old graduated between 1996 and 2008.

Most participants reported they had already worked in the various contexts presented in the questionnaire. Figure 1 shows that most participants worked at the most 2 years in the different contexts of professional practice – 30% worked in special education, language, and communication; 39%, in school integration projects; 42%, in private healthcare centers; 50%, in health centers; and 41%, in other settings.





Captions: Special Education, Language, and Communication (SLC), School Integration Programs (SIP), Private Healthcare Center (PHC), Health Center (HC). Developed by the authors

**Figure 1.** Percentage of participants who have worked in different settings per number of working years.

### Comparison of the perception of the instruments' characteristics

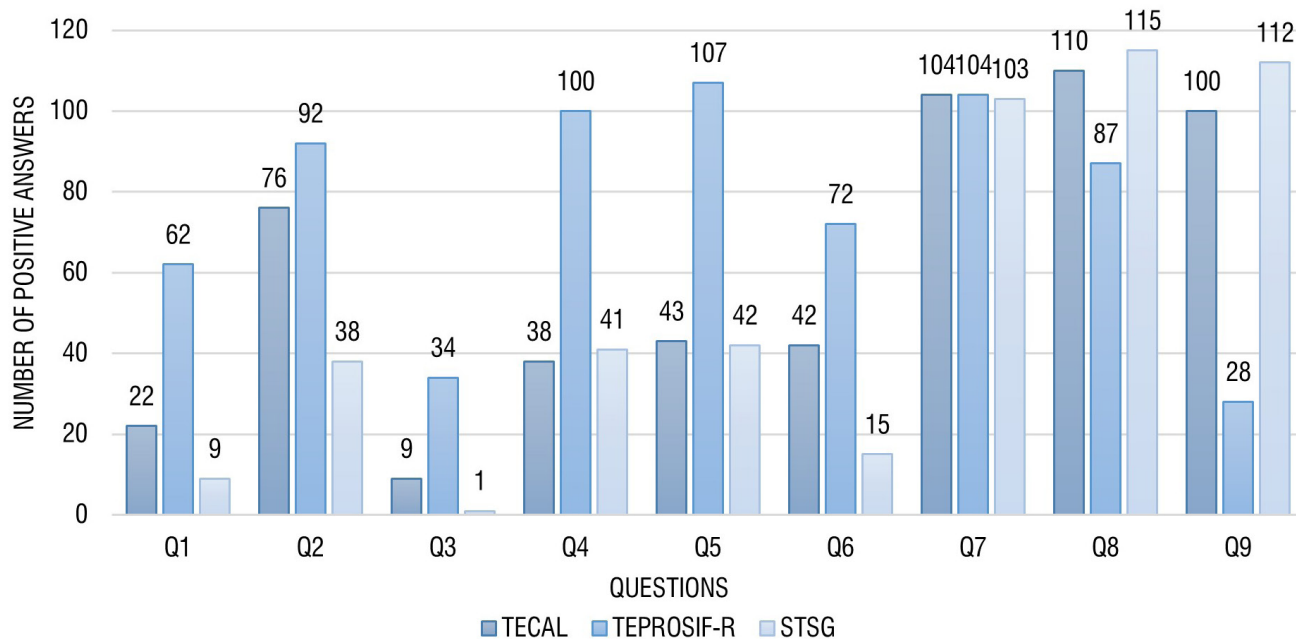
The professionals' perceptions were compared regarding nine questions related to the characteristics

of the instruments currently approved by Chilean regulations. The items are described in Table 1.

**Table 1.** Number of participants who assessed the instruments' characteristics, classified according to positive, neutral, and negative answers

Item	TECAL			TEPROSIF-R			STSG		
	NG	NT	PT	NG	NT	PT	NG	NT	PT
Q1. Is the quality of the test images good?	65	36	22	24	37	62	89	25	9
Q2. Is the size of the test images adequate?	17	30	76	11	20	92	51	34	38
Q3. Is the test presentation format attractive to children?	92	22	9	49	40	34	105	17	1
Q4. Do you rely on the test results?	44	41	38	4	19	100	48	34	41
Q5. Is the test consistent regarding the content it assesses?	32	48	43	4	12	107	35	46	42
Q6. Does the test presentation format seem adequate to you?	49	32	42	16	35	72	64	44	15
Q7. Does the test need a digital version (to be applied on a Tablet or computer)?	6	13	104	6	13	104	8	12	103
Q8. Should the content of the test images be updated?	6	7	110	12	24	87	1	7	115
Q9. Does the test take too long to apply?	7	16	100	69	26	28	3	8	112

Captions: positive answers (PT), neutral answers (NT), negative answers (NG), Test of Auditory Comprehension of Language (TECAL), Phonological Simplification Processes Assessment Test (TEPROSIF-R), Screening Test of Spanish Grammar (STSG)



Caption: Questions Q1 to Q9 correspond to those presented in Table 1  
Developed by the authors.

**Figure 2.** Total positive answers per question regarding the qualities of each speech-language-hearing assessment instrument (TECAL, TEPROSIF-R, and STSG).

The opinion of most participants is that images in TEPROSIF-R have better quality and that their size is adequate (items 1 and 2). On the other hand, most participants believe the presentation format is not adequate for children in any of the three instruments (item 3). As for result reliability, the consistency of content they assess, and presentation format (items 4, 5, and 6), participants again rated TEPROSIF-R positively. Most of them also agree that the three instruments should have digital and updated versions of the images (items 7 and 8). Lastly, participants highlight that TECAL and STSG take too long to apply (item 9) (Figure 2).

Table 2 presents the descriptive statistics of the Likert scores for each instrument and the significance of the simultaneous and paired comparisons

of the instruments. TEPROSIF-R had a better overall perception regarding the size of the images, results reliability, and consistency of the contents it assesses (items 2, 4, and 5), with a significant value ( $p$ -value < 0.05). The other instruments, however, did not have significant results ( $p$ -value > 0.05).

Regarding the possibility of a digital version of the instruments (item 7), there was no significant difference between the scores, as participants rated positively this possibility regarding all instruments. Participants also rated updating the images of the three instruments (item 8) with a mean high score. However, TECAL and STSG obtained significantly higher scores than TEPROSIF-R ( $p$ -value < 0.05). Lastly, the participants report that TECAL and STSG take longer to apply than TEPROSIF-R.

**Table 2.** Comparison of means and standard deviations of each item and simultaneous and paired comparison hypothesis tests

Items	TECAL	TEPROSIF-R	STSG	Decision	
	(1)	(2)	(3)	All	Pairs
	Mean (SD)				
Q1. Is the quality of the test images good?	2.5 (1.08)	3.4 (1.09)	2.0 (0.95)	There is a difference	There is a difference
Q2. Is the size of the test images adequate?	3.8 (1.11)	4.0 (0.97)	2.8 (1.24)	There is a difference	There is no difference* (1) and (2)
Q3. Is the test presentation format attractive to children?	1.9 (1.02)	2.8 (1.13)	1.5 (0.76)	There is a difference	There is a difference
Q4. Do you rely on the test results?	2.9 (1.10)	4.2 (0.85)	2.8 (1.19)	There is a difference	There is no difference* (1) and (3)
Q5. Is the test consistent regarding the content it assesses?	3.1 (1.00)	4.3 (0.80)	3.0 (1.09)	There is a difference	There is no difference* (1) and (3)
Q6. Does the test presentation format seem adequate to you?	2.9 (1.14)	3.7 (1.08)	2.4 (1.00)	There is a difference	There is a difference
Q7. Does the test need a digital version (to be applied on a tablet or computer)?	4.3 (0.99)	4.4 (0.99)	4.3 (1.00)	There is no difference*	Not applicable
Q8. Should the content of the test images be updated?	4.6 (0.87)	4.1 (1.12)	4.7 (0.62)	There is a difference	There is no difference* (1) and (3)
Q9. Does the test take too long to apply?	4.3 (0.96)	2.5 (1.25)	4.5 (0.76)	There is a difference	There is no difference* (1) and (3)

\* p-value > 0.05

Captions: standard deviation (SD), Test of Auditory Comprehension of Language (TECAL), Phonological Simplification Processes Assessment Test (TEPROSIF-R), Screening Test of Spanish Grammar (STSG)

## Correlation of opinions

The correlation between Likert scores regarding TECAL and STSG was 90% (p-value < 0.05, significant), whereas the correlation between TEPROSIF-R and the other two tests was 28% (p-value > 0.05, not significant). In other words, the participants' opinions on TECAL and STSG are more associated with one another than with TEPROSIF-R.

## DISCUSSION

Current research processes must be grounded on scientific evidence available in the fields of SLH studies – particularly, the professionals' opinion about the reliability and feasibility of the assessment instruments imposed by the current regulations. In other words, it is important to present the opinion of those who recurrently use the assessment instruments available. In the first place, this means manifesting the need for updating the instruments, and in the second place, creating new elements that consider technological advancements and the developmental stage of those to whom the assessment is intended.

Given the above, it is doubtlessly important to count on tests adapted to Chilean children in SLH processes, which make SLD assessment and diagnosis easier. However, in times when ICT advances at incredible speed, using such tools would support SLH professionals in many ways. The SLH professionals' opinions on the characteristics of the tests in the current regulations and their adaptation to ICT tools have revealed the need for updating some elements of the content, structure, and format of these tests.

### Items 1/2/8: Images (size of the images, quality of the images, updating the images)

Professionals in this study agree that the sheets (images) in TEPROSIF-R have better quality and size than those in the other two tests. However, when asked their opinion on updating the images of each instrument, most of them answered positively. Particularly regarding TEPROSIF-R, it called the attention that 70% of participants agree or totally agree that the images should be updated, as some modifications have been made in the instrument's sheets of drawings<sup>28</sup>.

### Item 3/6: Presentation format

On the other hand, most participants perceive that the three instruments' presentation format is not much attractive or not attractive at all to Chilean children aged 3 to 6 years. Nonetheless, this perception is even worse regarding STSG and TECAL, as most of them (85% and 75%) believe that they are not much attractive or not attractive at all to children. In contrast, the opinion on TEPROSIF-R was more homogeneous, as only 40% of participants referred to it as little attractive.

In a psychometric study by Albarracín et al.<sup>43</sup> regarding the validation process of TEPROSIF-R for use in Peruvian children, a panel of experts evaluated whether the instrument "is appropriate to the intended public". Precisely this criterion concerning the instrument had the lowest agreement among judges (86%), in contrast with the other criteria (100%). This result raises an interesting reflection about the TEPROSIF-R presentation format to children. Furthermore, 59% of participants in this opinion study considered the TEPROSIF-R presentation format adequate but indicated that it is not quite attractive to children (72%).

### Item 4/5: Results/Content

Concerning test result reliability, these Chilean SLH therapists' perception revealed a tendency of trusting in the TEPROSIF-R results, which was pointed out by 81.3% of them. In contrast, only 31% and 33% of participants rely on TECAL and STSG results, respectively. Pávez et al.<sup>28</sup> conducted the validation for the Chilean population by correlating the results of the old test (TEPROSIF) with the new one (TEPROSIF-R), obtaining a 92% correlation. Nevertheless, this only explains that increasing the old instrument's measures also increases those in the adapted instrument, without evaluating the agreement between these measures. The study by Albarracín et al.<sup>43</sup> for Peruvian children found that 100% of experts agreed that TEPROSIF-R is easy to apply, its organization is logical, and its variables, indicators, and items are coherent. This may partly explain the positive perception of trust in TEPROSIF-R results and content consistency, to the detriment of the other two tests.

### Item 7/9: digital version/application time

Based on the participants' opinions, most SLH professionals (more than 84%) tend to highlight the need for a digital version of the three instruments. This perception agrees with the advancements of ICT tools

in different professions. Moreover, Laverde<sup>44</sup> points out that "rehabilitation professionals, including SLH therapists, must also encourage people with communication disabilities and/or communication disorders to access and use ICT. This urgent task requires from SLH therapists the appropriate and timely knowledge, design, and use of technological tools" (p. 28). Moreover, participants perceive that two out of the three tests (TECAL and STSG) have slower applications, while only 23% of participants said that TEPROSIF-R does not take long to apply.

All children, regardless of their linguistic and communication skills, have the right to be correctly and dynamically assessed. Hence, the SLH professionals must continuously teach with technological and information advancements that guide us into a comprehensive and favorable assessment process. Thanks to the results, it was identified that to change or create an assessment system that uses ICT, it is essential to have interdisciplinary help from engineers who know about programming, which is the only way to develop interesting interactive software for users, optimizing the application time.

## CONCLUSION

The findings in this study indicate that interviewed SLH therapists believe that the three tests have significantly different characteristics, use, and reliability. Nevertheless, when specifically comparing the different aspects of the tests, the positive perception improves significantly regarding TEPROSIF-R. In other words, the perception of the characteristics, use, and reliability of TEPROSIF-R is significantly better than that of TECAL and STSG and less similar to them. Moreover, SLH therapists agree that the three structured tests must consider having a digital version.

## REFERENCES

1. García Ubillo V, Herrera Lillo A, Sandoval Ramírez M. Léxico especializado para la iniciación fonoaudiológica. Valparaíso: Universidad de Playa Ancha; 2020. <http://repositoriobibliotecas.uv.cl/handle/uvsc1/1747>.
2. Quintero Uribe JF. El quehacer en educación inclusiva de un grupo de fonoaudiólogos colombianos: Educación inclusiva. *Rev Areté*. 2019;19(1):60-74. <https://dialnet.unirioja.es/servlet/articulo?codigo=7345458>.
3. Sandoval M, Bratz J. Social representation of speech therapists' ethos in the metropolitan and Valparaíso regions of Chile. *Rev. CEFAC*. 2017;19(1):41-52. <https://doi.org/10.1590/1982-021620171914316>.



4. Quintero JF, Osorio-Montoya ML. Discapacidad, diversidad e inclusión: concepciones de fonoaudiólogos que trabajan en educación inclusiva. *Rev Fac Nac Salud Pública*. 2018;36(3):52-9. <https://doi.org/10.17533/udea.rfnsp.v36n3a06>.
5. Aguirre-Bravo AN, Sampallo-Pedroza RM. Fonoaudiología en los cuidados paliativos. *Rev Fac Med*. 2015;63(2):289-300. <https://doi.org/10.15446/revfacmed.v63n2.48539>.
6. Vega YE, Torres AM, del Campo MN. Análisis del rol del fonoaudiólogo(a) en el sector salud en Chile. *Cienc Trab*. 2017;19(59):76-80. <https://doi.org/10.4067/S0718-24492017000200076>.
7. Rincón Pinilla MP, Quecho Rodríguez DM, Garavito Hernández PV, Rodríguez Riaño J. Fonoaudiología en salas de urgencias: perspectiva desde una revisión documental. *Rev Areté*. 2021;21(1):125-32. <https://doi.org/10.33881/1657-2513.art.21112>.
8. Jiménez D, Poblete C, Astudillo D, Molina J, González S. Informe de Censo Fonoaudiólogos para Chile. 2018.
9. American speech-language-hearing association [homepage on the internet]. American Speech-Language-Hearing Association; 2010 [accessed 2022 jan 17]. <https://www.asha.org/policy/pi2010-00317/>.
10. Álvarez Areiza LM. Rol del fonoaudiólogo en Instituciones educativas en ciclos preescolar y básica primaria. *Revista ARETÉ*. 2012;12(1):33-42. <https://arete.iberu.edu.co/article/view/366>.
11. Torres RA, Vega RY, Del Campo RM. Autorreflexión sobre el desempeño profesional del fonoaudiólogo(a) en el sector educativo: una aproximación a la construcción del rol. *Rev Chil Fonoaudiol*. 2015;14:103-17. <https://doi.org/10.5354/rcdf.v14i0.37738>.
12. Aprueba planes y programas de estudios para alumnos con trastorno específico del lenguaje. Santiago de Chile: Ministerio de Educación. 2002. <https://www.bcn.cl/leychile/navegar?i=206596&f=2003-01-11>.
13. Fija normas para determinar los alumnos con necesidades educativas especiales que serán beneficiarios de las subvenciones para educación especial. Santiago de Chile: Ministerio de Educación. 2009. <https://www.bcn.cl/leychile/navegar?idNorma=1012570>.
14. Aprueba criterios y orientaciones de adecuación curricular para estudiantes con necesidades educativas especiales de educación parvularia y educación básica. Santiago de Chile: Ministerio de Educación. 2015. <https://www.bcn.cl/leychile/navegar?idNorma=1074511>.
15. Cortés Díaz M, Ferreira Villa C, Arias Gago AR. Fundamentos del Diseño Universal para el aprendizaje desde la perspectiva internacional. *Rev Bras Educ Espec*. 2021;27:e0065. <https://doi.org/10.1590/1980-54702021v27e0065>.
16. Sánchez-Gómez V, López M. Comprendiendo el Diseño Universal desde el Paradigma de Apoyos: DUA como un sistema de apoyos para el aprendizaje. *Rev Latinoam Educ Inclusiva*. 2020;14(1):143-60. <https://doi.org/10.4067/S0718-73782020000100143>.
17. Rosero JC, Fajardo L, Murcia G, Urrego AC. Construcción de un paradigma de acción fonoaudiológica en la educación. *Revista ARETÉ*. 2009;(9):85-94. <https://arete.iberu.edu.co/article/view/398>.
18. Figueroa Vargas A, Iturra Urrutia R, Matus Cárcamo C, Muñoz Cortés F. Caracterización de las concepciones del ejercicio fonoaudiológico en Chile en los últimos 40 años [Tesis de pregrado]. Santiago de Chile (Chile): Universidad de Chile; 2015. <https://repositorio.uchile.cl/handle/2250/138217>.
19. Datos Abiertos [homepage on the internet]. Centro de Estudio Mineduc. 2021 [accessed 2021 nov 3]. <https://datosabiertos.mineduc.cl/>.
20. Arriagada Hernández C, Jara Tomckowiack L, Calzadilla Pérez O, Arriagada Hernández CR, Jara Tomckowiack L, Calzadilla Pérez OO. The co-teaching from inclusive approaches for the teams of the School Integration Program. *Estudios pedagógicos*. 2021;47(1):175-95. <https://doi.org/10.4067/S0718-07052021000100175>.
21. Establece la ley general de educación 20.370. Santiago de Chile: Ministerio de Educación. 2009. <https://www.bcn.cl/leychile/navegar?idNorma=1006043>.
22. Establece normas sobre igualdad de oportunidades e inclusión social de personas con discapacidad. Santiago de Chile: Ministerio de Educación. 2010. <https://www.bcn.cl/leychile/navegar?idLey=20422>.
23. Coloma CJ, Mendoza E, Carballo G. Desempeño gramatical y narrativo en niños con Trastorno Específico del Lenguaje. *Círculo Lingüíst Apl Comun*. 2017; 69:67-90. <https://doi.org/10.5209/CLAC.55314>.
24. Acosta Rodríguez VM, Moreno Santana AM, Axpe Caballero MÁ. La Detección e intervención en habilidades narrativas en niños con Trastorno Específico del Lenguaje en contextos educativos 1. *Educ XX1*. 2017;20(2):387-404. <https://www.redalyc.org/articulo.oa?id=70651145017>.
25. Moran Alvarado MDR, Vera Miranda LY, Morán Franco MR. Los trastornos del lenguaje y las necesidades educativas especiales: consideraciones para la atención en la escuela. *Rev Univ Soc*. 2017;9(3):191-7. [http://scielo.sld.cu/scielo.php?script=sci\\_arttext&pid=S2218-36202017000300030](http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202017000300030).
26. Pávez MM. Test para la Comprensión Auditiva del Lenguaje de E. Carrow aplicación en Chile. Santiago de Chile: Escuela de Fonoaudiología de la Universidad de Chile; 2004.
27. Pávez MM. Test exploratorio de gramática española. 3.ª ed. Santiago de Chile: Ediciones Universidad Católica de Chile; 2010.
28. Pávez MM, Maggiolo M, Coloma CJ. Test para evaluar procesos de simplificación fonológicas TEPROSIF-R. 3.ª ed. Santiago de Chile: Ediciones Universidad Católica de Chile; 2008.
29. Sapién Aguilar AL, Piñón Howlet LC, Gutiérrez Diez M del C, Bordas Beltrán JL. La Educación superior durante la contingencia sanitaria COVID-19: Uso de las TIC como herramientas de aprendizaje. Caso de estudio: alumnos de la Facultad de Contaduría y Administración. *Rev Lat Comun Soc*. 2020;(78):309-28. <https://doi.org/10.4185/RLCS-2020-1479>.
30. Hernández Vásquez ME, Sosa Hernández ME. Uso de Tecnologías de Información y Comunicación (TIC) en inclusión escolar de estudiantes con Trastornos del Espectro Autista (TEA). *Context Estud Humanidades Cienc Soc*. 2018 [accessed 2022 nov 30]; (41). <http://revistas.umce.cl/index.php/contextos/article/view/1397>.
31. Alvarado Coello AC, Proaño Rosales E del C. Influencia del uso de las tecnologías de enseñanza-aprendizaje en el comportamiento de niños y niñas de inicial 2 de la Escuela de Educación Básica «Dr. Juan Tacna Merengo» en año lectivo 2017-2018 [Licenciatura]. Guayaquil (Ecuador): Universidad Laica Vicente Rocafuerte de Guayaquil; 2018. <http://repositorio.ulvr.edu.ec/handle/44000/2136>.
32. Campana K, Mills JE, Haines C, Prendergast T, Martens M. To tech or not to tech? The debate about technology, young children, and the library. *Child Libr*. 2019;17(2):20-6. <https://doi.org/10.5860/cal.17.2.20>.

33. Rodríguez Hernández Y, Jiménez Rodríguez GE. Competencia digital en Fonoaudiología: retos de formación profesional desde los avances tecnológicos. *Rev Logop Foniatría Audiol.* 2019;39(4):192-200. <https://doi.org/10.1016/j.rfa.2019.04.003>.
34. Pérez G, Martínez A, Peñaloza Z, Ríos N, Ortega Y, Zambrano L et al. Tecnología de la comunicación y sistemas de comunicación en el lenguaje. Revisión sistemática desde la fonoaudiología. *Rev Científica Signos Fónicos.* 2017;3(1):22-46. <https://ojs.unipamplona.edu.co/ojs/viceinves/index.php/cdh/article/view/755>.
35. González-Velasco C, Feito-Ruiz I, González-Fernández M, Álvarez-Arenal JL, Sarmiento-Alonso N. Does the teaching-learning model based on the flipped classroom improve academic results of students at different educational levels? *Rev Complut Educ.* 2021 [accessed 2021 dec 22]; 32(1):27-39. <https://doi.org/10.5209/rced.67851>.
36. Grande M, Cañón R, Cantón I. Tecnologías de la información y la comunicación: Evolución del concepto y características. *IJERI.* 2016;(6):218-30. <https://www.upo.es/revistas/index.php/IJERI/article/view/1703>.
37. Martínez R, Cisterna F. Las tecnologías de información y comunicación en el desarrollo de la enseñanza del área trastornos del lenguaje, habla y deglución en el adulto, de la carrera de Fonoaudiología. *Rev Educ Cienc Salud.* 2015;12(1):29-34. <http://www2.udec.cl/ofem/recs/>.
38. Arroyo M, Finkel L. Encuestas por internet y nuevos procedimientos muestrales. *Panorama Social.* 2019 [accessed 2021 nov 18]; 30:41-53. <https://produccioncientifica.ucm.es/documentos/5e2ad89a29995274ab8791a8>.
39. Leal-Kaymaliz C, Herrera-Lillo A. Validity and reliability of the questionnaire that measures the perception of speech-language-hearing therapists regarding the use of information and communication technologies (ICTs) in speech-language-hearing evaluation and intervention processes. *Rev. CEFAC.* 2021;23(5):e5421. <https://doi.org/10.1590/1982-0216/20212335421>.
40. Villasís-Keever MÁ, Márquez-González H, Zurita-Cruz JN, Miranda-Navales G, Escamilla-Núñez A, Villasís-Keever MÁ et al. El protocolo de investigación VII. Validez y confiabilidad de las mediciones. *Rev Alerg Mex.* 2018;65(4):414-21. <https://doi.org/10.29262/ram.v65i4.560>.
41. Núñez Colín CA. Análisis de varianza no paramétrica: Un punto de vista a favor para utilizarla. *Acta Agríc Pecu.* 2018;4(3):69-79. <https://doi.org/10.30973/aap/2018.4.3/1>.
42. Martínez Cambolor P. Ajuste del valor-p por contrastes múltiples. *Rev Chil Salud Pública.* 2012;16(3):225-32. <https://revistasaludpublica.uchile.cl/index.php/RCSP/article/view/23127>.
43. Albarracín É, Carranza P, Meléndez E. Adaptación psicométrica del test para evaluar procesos de simplificación fonológica (Teprosif-R). *Pers Rev Fac Psicol.* 2013;(16):73-91. <https://doi.org/10.26439/persona2013.n016.3>.
44. Laverde Robayo DM. Reflexiones sobre la utilidad de la realidad virtual en la práctica fonoaudiológica. *Rev Colomb Rehabil.* 2014;13(1):26-33. <https://doi.org/10.30788/RevColReh.v13.n1.2014.27>.

#### Author contributions:

AH-L: conceptualization, data curation, investigation, writing original draft, writing review and editing.

CL-K: formal analysis, methodology, writing original draft, writing review and editing.