

Original Article

# Adaptation to Chilean Spanish of Dynamic Loewenstein Occupational Therapy Cognitive Assessment (DLOTCA)

*Adaptación al español chileno de la Evaluación Cognitiva Dinámica de Terapia Ocupacional de Loewenstein (DLOTCA)*

*Adaptação Transcultural para o espanhol chileno da Avaliação Cognitiva Dinâmica de Terapia Ocupacional de Loewenstein (DLOTCA)*

Vivian Neumann-Collyer<sup>a</sup> , Boris Paolo Moena González<sup>a</sup> , Evelyn Alvarez Espinoza<sup>b</sup> , Gabriela Paz Cruz San Martin<sup>c</sup> , Maria Francisca Rauch-Gajardo<sup>d</sup> , Karla Hernández-Pérez<sup>e</sup> 

<sup>a</sup>Universidad Santo Tomás – UST, Viña del Mar, Valparaíso, Chile.

<sup>b</sup>Facultad de Medicina, Universidad de Chile – UCHILE, Chile.

<sup>c</sup>University of Glasgow – UofG, Glasgow, Scotland.

<sup>d</sup>Universidad Santo Tomás – UST, Osorno, Los Lagos, Chile.

<sup>e</sup> Universidad Viña del Mar, Valparaíso, Chile

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## Abstract

**Objective:** To adapt the tenth version in English of the Dynamic Loewenstein Occupational Therapy Cognitive Assessment to Chilean Spanish. **Method:** The DLOTCA application manual was adapted into Spanish. The process followed the general guidelines for the translation and adaptation of instruments of the World Health Organization (WHO), with direct translation, a panel discussion of experts, back translation, pre-tests, and cognitive interviews with users. **Results:** A direct translation into Spanish was obtained by two bilingual occupational therapists that were subjected to adjustments by a panel of experts composed of 6 occupational therapists, of the total of 28 sub-tests, the expert committee had no discrepancy in 20 of them, of which 8 remaining modifications were made. A back translation of the version obtained is carried out, where there were only discrepancies with one term, which was resolved by the research team. Finally, a pre-test was applied to 13 adults with brain damage, the adjustments in this stage were spelling and

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substitution of some terms for words more commonly used in the Chilean language, verifying the consistency in the understanding of the items independently of the results obtained. Three versions were produced before the final version, all stages were developed in a systematic way, achieving an understandable and consistent translation with the Chilean population.

**Conclusions:** A version in Chilean Spanish of the DLOTCA instrument has finally been made available to the scientific community.

**Keywords:** Diagnostic Test Approval, Translating, Occupational Therapy, Cognition.

### **Resumen**

**Objetivo:** Adaptar la décima versión en inglés de la *Dynamic Loewenstein Occupational Therapy Cognitive Assessment* al español chileno. **Método:** Se realizó adaptación al español del manual de aplicación de DLOTCA. El proceso siguió las pautas generales para la traducción y adaptación de instrumentos de la Organización Mundial de la Salud (OMS), con traducción directa, panel de discusión de expertos, retrotraducción, pruebas previas y entrevistas cognitivas con usuarios. **Resultados:** Se obtuvo una traducción directa al español por dos terapeutas ocupacionales bilingües que fue sometida a ajustes por un panel de expertos compuesto por 6 terapeutas ocupacionales, del total de 28 sub test el comité de expertos no tuvo discrepancia en 20 de ellos, de los 8 restantes se realizaron modificaciones. Se realiza una retrotraducción de la versión obtenida, donde solo hubo discrepancias con un término lo que fue resuelto por el equipo investigador. Finalmente se aplicó una prueba previa/pre test a 13 personas adultas con daño cerebral, los ajustes en esta etapa fueron ortográficos y de sustitución de algunos términos por palabras más comúnmente utilizados en la lengua chilena, verificando la consistencia en la comprensión de los ítems independientemente de los resultados obtenidos. Se produjeron tres versiones antes de la versión final, todas las etapas se desarrollaron de manera sistemática, logrando una traducción comprensible y consistente con la población chilena. **Conclusiones:** Finalmente se ha puesto a disposición de la comunidad científica una versión en español chileno del instrumento DLOTCA.

**Palabras-clave:** Aprobación de Pruebas de Diagnóstico, Traducción (Proceso), Terapia Ocupacional, Cognición.

### **Resumo**

**Objetivo:** Adaptar a décima versão em inglês do *Dynamic Loewenstein Occupational Therapy Cognitive Assessment* para o espanhol chileno. **Método:** O manual de aplicação DLOTCA foi adaptado para o espanhol. O processo seguiu as diretrizes gerais para tradução e adaptação de instrumentos da Organização Mundial da Saúde (OMS), com tradução direta, painel de discussão de especialistas, retrotradução, pré-testes e entrevistas cognitivas com os usuários. **Resultados:** A tradução direta para o espanhol foi obtida por dois terapeutas ocupacionais bilíngues que foi submetida a ajustes por um painel de especialistas composto por 6 terapeutas ocupacionais, do total de 28 subtestes, o comitê de especialistas não

apresentou discrepância em 20 deles, das quais 8 modificações restantes foram feitas. Foi realizada a retrotradução da versão obtida, com apenas discrepâncias com um termo, o que foi resolvido pela equipe de pesquisa. Por fim, uma prova prévia / pré-teste foi aplicado a 13 adultos com lesão cerebral, os ajustes nesta etapa foram de grafia e substituição de alguns termos por palavras mais utilizadas na língua chilena, verificando a consistência na compreensão dos itens, independentemente dos resultados obtidos. Três versões foram produzidas antes da versão final, toda as etapas foram desenvolvidas de forma sistemática, alcançando uma tradução compreensível e consistente para a população chilena. **Conclusão:** Uma versão em espanhol chileno do instrumento DLOTCA foi finalmente disponibilizada para a comunidade científica.

**Palavras-chave:** Aprovação de Teste para Diagnóstico, Tradução (Processo), Terapia Ocupacional, Cognição.

## Introduction

In Chile, 20% of the adult population has a disability situation, 40% of them have a dependency condition, that is, they have extreme difficulties/inability to carry out basic or instrumental activities of daily life, or receive help with high frequency (Servicio Nacional de la Discapacidad, 2015).

Among the main causes of disability in adults, we find the etiologies of acquired brain damage, mainly the Cerebrovascular Accident (CVA) and Brain-cranial Trauma (BCT), and to a lesser extent, cerebral agnosia, neurodegenerative processes, tumors, among others, are identified, presenting similar healthcare requirements (Polonio & Romero, 2010).

CVA is the main cause of death, with 9,004 deaths in 2013. It is estimated that there are 24,964 new cases annually so that today in Chile there are 69 cases every day. It is also the second cause of premature mortality in Chile and the first specific cause of loss of healthy years of life due to disability and premature death (Ministerio de Salud, 2017).

Brain-cranial trauma (BT) represents one of the major public health problems since it is considered the leading cause of death and disability in the population under 45 years old. (Acevedo, 2016; Ministerio de Salud, 2013).

These health situations have cognitive deterioration as one of their main sequelae, which will depend on the characteristics of the brain damage such as its anatomical location, its distribution, its magnitude, and the person's pre-morbid situation. At least 75% of people with brain injury have cognitive problems (Corregidor, 2016).

Motor skills, social interaction, and processing are necessary for people to have adequate occupational performance. Within them, there are cognitive skills (Grieve, 2009; American Occupational Therapy Association, 2014). The main cognitive functions are: attention, memory, visual perception, spatial skills, visual construction, praxis, and executive functions (Corregidor, 2016; Grieve, 2009).

Cognitive problems in people with acquired brain damage can include deficits in attention, memory, executive functions, and slowing down for information processing and learning (Corregidor, 2016).

It is important to preserve cognitive functions since they are directly related to activities of daily life, autonomy, and quality of life of the person. When deterioration occurs, they directly impact the ability to remain independent in the community and seriously compromise the quality of life (Álvarez-Hernández et al., 2012).

The occupational therapist is identified as one of the professionals who can intervene in cognitive rehabilitation through optimizing the cognitive functions of the person, facilitating the performance in occupational roles with a minimum of interference of the cognitive limitations from corrective or adaptive intervention approaches (Exnera et al., 2018).

The Occupational Therapy models used in the intervention process of adults after brain damage establish strategies to promote the highest level of occupational performance that favors the independence and autonomy of individuals. The Occupational Functioning Model establishes that the highest expected level in the therapeutic intervention process corresponds to the achievement of the sense of efficacy and self-esteem, which is a consequence of satisfaction in the performance of the vital roles of the person. To achieve this level of performance, the person must recover and/or compensate for difficulties in their skills and abilities, which in the case of people with brain damage are directly related to motor control and cognitive functions (Corregidor, 2016; Polonio, 2016).

Cognitive rehabilitation is a process of an interdisciplinary approach to intervening the cognitive deficits that arise after brain damage, which is effective to the extent that the patient can increase their cognitive abilities reflected in the activities of daily life (Ginarte, 2002).

To achieve a complete occupational assessment and the establishment of an adequate occupational diagnosis, the evaluative process must contain an exhaustive assessment of cognitive functions and their impact on the person's daily life. Corregidor (2016) and Lund et al. (2013) reference to the impact of the evidence-based practice in the work of Occupational Therapy, which has led to the use of validated and reliable evaluation instruments, which stands out as a highly relevant aspect. In the Chilean context, instruments of the discipline that have these characteristics do not exist.

For cognitive assessment, assessment instruments such as the Mini-Mental Test, the Pfeiffer Test, Montreal, the Clock Test, among others are currently used, which share the characteristic of being abbreviated assessments that provide a general profile of the cognitive condition of the patient and that can be applied and interpreted by different Professionals (Delgado & Salinas, 2009).

In the context of Occupational Therapy at an international level, the most widely used instruments are the Chessington Occupational Therapy Neurological Assessment Battery (COTNAB), the assessment of motor and processing skills (AMPS), and the dynamic Loewenstein occupational therapy cognitive assessment (DLOTCA). A review carried out in 2009 reveals that the latter is one of the tools most used by occupational therapists (Corregidor, 2016; Lund et al., 2013).

DLOTCA was developed at the Loewenstein Hospital in Israel since the existing neuropsychological tests up to now were too extensive and contained little relevant

evidence for Occupational Therapy. It is based on clinical experiences and neuropsychological theories of authors such as Piaget and Luria and designed to evaluate people with brain damage, identifying the limitations and abilities of the people in their cognitive functioning to delimit the starting points of the specific intervention of the discipline (Sanchez, 2011).

Katz et al. (2012), concludes that the reliability of this battery showed high correlations between all pairs of qualifiers. The reliability of internal consistency showed moderate to high Cronbach's alpha values (0.602-0.813) for all domains. This evaluation battery is effective in providing information on whether the participants need mediation and the level and type of assistance they need. This mediation refers to the fact that the examiner uses an approximation system to modify the task through prompts or other forms of mediation, to understand the type of information that is essential for that individual to complete the task. Therefore, DLOTCA provides a guide to planning interventions for people with cognitive disabilities (Katz et al., 2012).

In Chile, this last instrument is incorporated in the Occupational Therapy Units specialized in adult intervention. However, its validation to the national population has not been carried out, so it is important to translate and adapt this evaluation instrument to support professional reasoning and decision-making in Occupational Therapy interventions.

## **Methods**

This research was carried out by the Occupational Therapy Course of the *Universidad Santo Tomás*, Viña del Mar headquarters in 2019 and was approved by its Ethics Committee and following the principles and responsibilities established in the Singapore Declaration on Integrity in the Singapore Research (Comisión Nacional de Investigación Científica y Tecnológica, 2014).

The occupational therapists who confirmed the panel of experts signed a contract with the university regarding ethical aspects. The 13 people who received the pre-test agreed to participate by signing the informed consent form.

DLOTCA version 10 was translated as allowed by the researcher Noomi Katz, Ph.D., OTR; Director, Research Authority; Ono Academic College.

The translation and adaptation of the instrument were carried out in all its domains, under the guidelines of the WHO Procedural Guide for the translation and validation of instruments in the following phases: Direct translation; Expert Panel; Back-translation; pre-tests and cognitive interviews; final version (Organización Mundial de la Salud, 2011).

### **Direct translation**

We carried out the initial translation into Spanish of DLOTCA according to the guideline that indicates that this task should be entrusted to a translator, preferably a health professional, familiar with the terminology of the area covered by the instrument and with interview skills. The translators must know the English-speaking culture but his mother tongue must be the main language of the target culture, thus, by two

experienced occupational therapists whose mother tongue is Spanish, but with advanced knowledge of the English language.

### **Expert panel**

Six expert occupational therapists with command of the English language reviewed the initial translation, with and without knowledge of the DLOTCA instrument. Their selection was through an open call to occupational therapists who had command of the English language, with and without knowledge of the instrument, and who worked with adults with acquired brain damage. We selected those who met these requirements of which 4 of them knew the instrument. An evaluation of the intelligibility and fidelity of each item of the domains of the instrument was carried out through a Likert scale, in which 2 points were assigned to “agree”, 1 point “neither agree nor disagree” and 0 points to “disagree”.

In the area of intelligibility, we considered if the linguistic adaptations responded to the Chilean reality in the area of health, reading was easy and clear, without style problems, absence of grammatical errors, use of the usual terminology for OT, syntax without errors, and messages conveyed clearly (no need to reread to understand). Regarding fidelity, we evaluated if the translation expressed the same meanings of the original messages, if there were small misunderstandings or wrong interpretations of sentences or words, if all the sections were completely translated and if there were spelling errors.

After this, we created a focus group with the six experts plus the original translators and the authors of the research, through the Skype platform, to discuss the terms, words, phrases that should be reviewed. A complete translated version of the instrument was produced. This was a completely qualitative process so no statistical indicator was applied (Organización Mundial de la Salud, 2011).

### **Back-translation**

We requested the complete back-translation of the instrument to an external company specialized in translations by a translator whose mother tongue was English and without knowledge of the instrument. The emphasis in the reverse translation was on conceptual and cultural equivalence and not linguistic equivalence (Organización Mundial de la Salud, 2011).

### **Pre-tests and cognitive interviews**

The objectives of these tests refer mainly to the evaluation of the different components of the instrument, both in its instructions, in what is to be transmitted, the assumptions and logic of the questions, the identification of the main problems and if the vocabulary used is the appropriate one for the target audience of the study. Finally, it also aims to evaluate how adequate the response categories or attributes of the questions are (Smith-Castro & Delgado, 2011).

These preliminary tests consisted of the application of the instrument and the application of a Cognitive Interview after the evaluation of each DLOTCA item. For this, three occupational therapists from different cities in Chile (Viña del Mar, Osorno, and Puerto Montt) recruited for convenience, applied the instrument to a total of 13 adults between 21

and 57 years old, with diagnoses of brain damage, selected by non-probabilistic convenience sampling.

The application of the Cognitive Interview to each participant investigated difficulties with some terms, words, or concepts and determine the consistency of the responses. The authors prepared the Cognitive Interview Guideline and consisting of 5 questions for each of the 7 cognitive areas evaluated in DLOTCA.

### Final version

The data of all the procedures related to the translation and the adaptation process were summarized, analyzed, and weighted by methodological triangulation of researchers and the final version of a total of 3 versions of the DLOTCA was obtained (Okuda & Gómez-Restrepo, 2005).

### Documentation

All the procedures in the translation process were documented by the principal investigators with a record of the number and characteristics of the individuals involved in the process.

### Results

DLOTCA was translated and adapted from English to Chilean Spanish according to the guidelines of the Organización Mundial de la Salud (2011). Two occupational therapists did the initial translation.

In the back-translation, there were only discrepancies with the term “*devería*” since the original was “should”, and it was translated as “must”. However, in Spanish, it does not generate linguistic confusion.

The review by a panel of experts was carried out in two phases. One with a Likert scale evaluation of the intelligibility (Table 1) and fidelity (Table 2) of the translation of the domains of the instrument; and the second phase in two sessions of the focus group, differences were resolved in 8 of the 28 subtests in some specific terms that required cultural adaptation, specifically, spelling and grammar corrections, as well as some terms, were adapted to the Chilean Spanish language (Table 3).

**Table 1.** Represents the average of the arithmetic measure of Intelligibility by the domain of the DLOTCA instrument.

Category	Orientation	Disease awareness	Visual perception	Spatial perception	Praxis	Visual-motor construction	Formal operations
Average	1.91	1.94	1.71	1.77	1.74	1.74	1.72
Standard deviation	0.20412	0.08779	0.29390	0.33056	0.33066	0.31430	0.40351

**Table 2.** Represents the average Fidelity by the domain of the DLOTCA instrument.

Category	Orientation	Disease awareness	Visual perception	Spatial perception	Praxis	Visual-motor construction	Formal operations
Average	1.91	1.75	1.58	1.70	1.58	0.91	1.25
Standard deviation	0.12910	0.15811	0.34157	0.18819	0.34157	0.37639	0.22361

**Table 3.** Represents the changes made by the committee of experts, translators, and researchers.

Category	Orientation	Disease awareness	Visual perception	Spatial perception	Praxis	Visual-motor construction	Formal operations
Intelligibility					<i>Peineta</i> instead of <i>peine</i>		
					It was changed “ <i>adentro</i> ” to “ <i>dentro</i> ”		
			<i>constancia de objetos</i> to “ <i>permanencia de objetos</i> ”		The word “performance” is translated to <i>ejecución</i>	Word is corrected <i>retirar</i> is <i>dibujar</i>	
					The word <i>pliegues</i> is changed to <i>dobleces</i>		
Fidelity						<i>Cubos planos</i> to <i>cubos de madera natural</i>	Spelling errors are corrected.
	The word “ <i>alternativa</i> ” was changed to “ <i>opciones</i> ”	<i>Golpe en la cabeza</i> was changed to “ <i>lesión en la cabeza</i> ”	The term “ <i>selecciona</i> ” is changed to “ <i>apunta</i> ”				We changed <i>sub prueba</i> to <i>sub test</i> .
						Spelling errors are corrected	Correction of error in translation of the scoring scale Item 27
						<i>Manijas</i> by <i>manecillas</i>	

The back-translation was contrasted with the original manual. We identified some words that had been wrongly translated and others that had been ignored. The researchers proceeded to correct them to give them greater conceptual and cultural equivalence.

The results of the cognitive interviews applied to adult participants with diagnoses of brain damage were analyzed by the research team and by the therapists who applied the instrument, where some problems were identified with the initial translation. These problems were related to culturally determined words, these words and phrases were weighted according to the importance and adjusted by the authors and presented in Table 4.



**Table 4.** Modifications after the pilot test and cognitive interviews.

Domain	Item	Translated text	Difficulty	Modified text
Spatial perception	Spatial relationships in a photograph	“¿Qué hay al frente del hombre?”	Difficulty understanding the word “Frente”	“¿Qué hay Delante del hombre?”
Rational Operations	Geometric sequence A	“En esta línea, las formas están dibujadas en un orden especial continúe la secuencia de acuerdo al mismo orden”	Participants report not understanding the word “Continúe” from the instruction.	“En esta línea, las formas están dibujadas en un orden especial siga la secuencia de acuerdo al mismo orden”

On the other hand, when applying the evaluation, some difficulties related to the instrument's battery were detected, which were attributed to the Blocket format that is linked to cultural, temporal, and semantic aspects that did not significantly alter the results of the pilot test (Table 5). The research team decided not to implement modifications.

**Table 5.** Difficulties with the D-LOTCA battery.

Domain	Item	Translated instruction	Difficulty	Modification performed
Visual perception	Object permanence	The Interviewer shows 4 images of objects photographed from unusual angles: car, hammer, telephone, fork. The Interviewer asks the participant about each image “What do you see in the photograph?”	The figure of the hammer was not easily recognized as it was an unused model in the country.	It is not modified since once the photographs are shown from unusual angles together with the image of the hammer, pairing is achieved, therefore it does not affect the test.
Praxis	Use of objects	The participant is asked to fold a letter-size paper in two equal parts and place it in an envelope.	The size of the envelope was very small for the sheet of paper.	It is not modified; it is suggested that the interviewer deliver a paper of a size that with 2 folds to put it the envelope as indicated by mediation 3.
Praxis	Symbolic actions	“Show me how you use the phone, including picking up the handset, dialing a number, and putting the handset to your ear.”	There were difficulties in developing the action since people in the country preferably use mobile phones.	It is not modified because regardless of the type of telephone that the participant decides to symbolize, the praxis is developed.

## Discussion

The objective of carrying out an intercultural translation and adaptation process is to benefit the population and ensure the use of instruments that have demonstrated their validity, which thanks to new information technologies and globalization can be obtained despite being developed in a different language and a culturally remote

country, such as DLOTCA, developed by Israeli occupational therapists. The use of a previously developed and validated research instrument has the advantage of not only saving time and energy but also facilitating the construction of intercultural knowledge. Therefore, adapting the instrument to Spanish is of greater relevance than developing a new instrument, and avoids the indiscriminate elaboration of these, which imply a greater investment of time, money, and other resources. Therefore, the use of the same instrument can unify the conceptualization of the phenomenon studied through different studies, and then the findings can be compared (Yu et al., 2004; Ortiz-Gutiérrez & Cruz-Avelar, 2018).

As Muñoz et al. (2013) refers, adaptations for their use in linguistic and cultural contexts different from those in which they were built is an ancient practice and has increased in recent decades as a reflection of the greater contact between cultures and languages. This is evidenced in the case of the LOTCA instrument in its various versions as it is an instrument developed by occupational therapists and that fulfills the purposes defined by the discipline.

As indicated by Torre et al. (2020), the process of translation and subsequent analysis through cognitive interviews allows revealing cultural differences in the use of vocabulary. The identification of these differences is an important step since it allows the replacement of the terms that give rise to confusion or misinterpretation of the questions and allows each item to measure what is proposed. This is what is called cross-cultural adaptation, the main objective of this research.

Ortiz-Gutiérrez & Cruz-Avelar (2018) reinforces the relevance of having a research team that participates throughout the process. It was developed in this research, in which both direct translation and the panel of experts considered the participation of bilingual Spanish-English occupational therapists facilitating the adjustment of the pertinent terminology to the national reality.

The use of the guidelines for the translation and adaptation of WHO instruments stands out, which allowed the development of a systematized process and obtaining a translation adjusted to the cultural characteristics of the Chilean population. It coincides with similar research worldwide in which the different guidelines are used but with an agreement on the steps necessary to obtain a cultural adaptation (Torre et al., 2020).

Along these lines, we agree with the results of the Malay version of LOTCA-G. They refer that cultural adaptation is essential, allowing for shorter times in understanding the test instructions in a direct translation, considering that the nature of the original instrument contemplates multiple instructions (Mohd et al., 2015).

The various stages suggested by WHO to achieve the final version favored modifying terms in all stages, highlighting the results obtained in the cognitive interviews carried out together with the previous test of the participants with brain damage, where modifications were made based on the results to make the instructions easier to understand. On the other hand, after the application of the pilot test, elements of the original D-LOTCA battery stood out that were not modified because they did not impact the expected results in these items. However, we recommend paying attention to the images contained in the battery of the instrument since some are outdated objects and may require adjustments for an adequate cultural-linguistic correlation in case of other adaptations to the instrument.

The adjustments in our research after the results of the cognitive tests are considered minor and coincide with the results obtained in the same stage in the Danish adaptation of the LOTCA-II Instrument in which the problems identified were related to culturally determined words (Lund et al., 2013).

We need to consider that the target population of this assessment instrument is a population with some degree of deterioration of their cognitive functions. Therefore, the understanding of some of the instructions may be due to the basic cognitive changes and not only to the wording of the instructions.

## **Conclusion**

The use of the WHO translation guide allowed the performance of a systematic process of adaptation of the DLOTCA instrument. We identified the needs for improvements in each proposed stage to achieve a final version adjusted to the Chilean population.

In the back-translation, there were only discrepancies with one term, which was resolved by the research team. Of the total of 28 sub-tests, the expert committee had no discrepancy in 20 of them. In the remaining 8 sub-tests, spelling, grammatical and semantic modifications were made. The adjustments to the previous tests were of a semantic type in two sub-tests where the substitution was made by words more commonly used in the Chilean language. All the modifications made allowed us to achieve conceptual equivalence, which states that the instrument measures the same theoretical construct in Chilean culture.

Finally, considering the needs of occupational therapists to assess the cognitive skills of people with acquired brain damage and their impact on occupational performance, this work has contributed to obtaining an instrument adapted to the Chilean population.

The limitations of this study were two. The first one was the small sample size and the second one was the limited age range of the participants.

The results evidenced after the present adaptation of DLOTCA correspond to the first stage of the research. As a projection, we will carry out a piloting later, where the reliability of the instrument will be mediated by a bivariate statistical analysis through Cronbach's alpha coefficient.

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Vivian Neumann-Collyer: Principal investigator, the conception of the article, organization of sources and/or analysis, writing of the text, review. Karla Hernández-Pérez: Co-investigator and application of the pilot test in Viña del Mar, the conception of the article, organization of sources, analysis, writing of the text, review. Boris Paolo Moena González: Methodological advice, writing, and review of the article. Evelyn Alvarez Espinoza: Direct translation of DLOTCA and participation in panel experts, review of the article. Gabriela Paz Cruz San Martin: Direct translation of DLOTCA, review of the article. Maria Francisca Rauch-Gajardo: Co-investigator and application of a pilot test in Osorno, review of the article. All authors approved the final version of the text.

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#### **Corresponding author**

Vivian Neumann-Collyer  
e-mail: [vivianneumann@santotomas.cl](mailto:vivianneumann@santotomas.cl)

#### **Section editor**

Prof. Dra. Daniela Tavares Gontijo