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ORIGINAL ARTICLE

Validation of a Dispositional Hope Scale for Chilean children and adolescents

Validación de una Escala de Esperanza Disposicional para población infantil y juvenil chilena

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What do we know about the subject matter of this study?

Hope is defined as a dispositional attribute consisting of two dimensions: agency and pathway. This construct has been widely studied in children and adolescents due to its association with quality of life and life satisfaction.

What does this study contribute to what is already known?

It presents a validated scale to measure hope in children and adolescents in the Chilean population, which is essential to measure this construct, especially in adverse contexts or humanitarian interventions.

Abstract

According to Snyder's theory, hope is defined as a dispositional attribute consisting of two dimensions, agency and pathway thinking. This construct has been widely studied because of its association with quality and satisfaction with life. In the Chilean context, there is no valid measure adapted to the population of children and adolescents. **Objective:** To assess the psychometric properties of the Dispositional Hope Scale for Chilean children and adolescents (NNA, for its acronym in Spanish). **Subjects and Method**: The study was conducted on 331 NNA, aged 10 to 20 years, from different educational centers in the country. Reliability was tested with Cronbach's alpha coefficient. In addition, one-factor vs two-factor models were compared using the Maximum Likelihood (MLR), while validity was analyzed in relation to other variables, specifically depressive symptoms. **Results:** The scale showed a Cronbach's alpha coefficient of 0.89 and an adequate fit to the two-factor model, keeping the original structure proposed by Snyder et al. It is negatively related to depressive symptomatology. **Conclusions:** The NNA Hope Scale shows appropriate psychometric properties for its use on Chilean NNA population.

Keywords:
Hope;
Validation Study;
Children and Youth Population;
Depression;
Snyder Scale

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Introduction

In recent years, research on hope in children and adolescents has increased exponentially given its high association with general well-being[1,2]. Despite this, in Chile, research related to hope in childhood is scarce.

Snyder et al[3] define hope as a dispositional attribute, formed by two essential components: agency and pathway, plus a third element recognized as goals, considered as the cognitive endpoint of planned behavior[3,4]. Agency is understood as the perceived motivation that enables a person to initiate and remain oriented towards a defined goal[5]. The second component, pathway, is defined as a set of beliefs in personal abilities that allow the design of steps towards the desired goals[5].

In the adult population, it has been identified that hope is positively associated with psychological adjustment, physical health, life satisfaction, confidence, and commitment, among others[6,7]. Likewise, its mediating role on the quality of life of seriously ill people has been studied[8,9], being an essential component in rehabilitation and recovery[8,10], accompaniment in people with cancer and other diseases[11]. However, it has been shown to have a negative association with depressive symptomatology, negative affect, distress, and reduction of suffering, among others[6,12-14].

Hope has also been shown to be a key protective factor in youth, with evidence that adolescents with higher levels of hope are at a lower risk of experiencing internalizing problems[15,16]. In addition, hope has been associated with better academic performance and fewer behavioral problems[17]. In the child population, hope has been related to fewer difficulties and victimization in contexts of school violence[17] and as a moderator of perceived discrimination[18]. Therefore, studies on hope in children and adolescents characterize it as a psychological strength that helps them to cope with adverse life events[3,11,16,19,20].

Despite this, in Chile, research on hope in children and adolescents is practically nonexistent. No validated instruments have been reported that measure hope in the Chilean context, which complicates the study in the child and adolescent population. A first step to advance in this line is to have valid and reliable instruments that also capture this construct from the experience of the children and adolescents themselves. This study presents a scale widely used internationally to measure dispositional hope in children and adolescents. Multiple investigations have documented the use of the Snyder et al.[5] scale of hope for children, whose theoretical formulation is recognized globally.

In this context, this study evaluates the psychometric properties of the Dispositional Hope Scale (DHS) created by these authors, specifically the version designed for children and adolescents. Originally, this scale was created for use with children and adolescents between 8 and 16 years of age. However, subsequent studies have demonstrated its usefulness in adolescents up to 19 years of age[21]. The scale measures the two theoretical dimensions proposed by Snyder et al[5], agency and pathway. The purpose of this research proposal is to make possible the design of future research that explores the role of hope in the mental health of children and adolescents, which could favor this population with proposals for promotion and prevention in these matters.

Subjects and Method

Participants and Procedure

The participants in this psychometric study are part of a broader investigation that evaluates relationships between variables associated with parents, and the influence on the characteristics of their children. Therefore, as part of this study, it was proposed to analyze the psychometric properties, model fit, and validity of the DHS scores for use with Chilean children and adolescents. To initiate this validation process, we had the approval of the ethics committee of the *Universidad Católica del Norte*. For its adaptation to Spanish, a cross-translation process and analysis by expert professionals were carried out.

A non-probabilistic sampling method was used and consisted of 331 participants distributed between 231 females and 100 males, aged between 10 and 20 years (SD=2.59), and attending different educational centers in the country. The basic inclusion criteria were age between 9 and 20 years, signing of respective consents and assents, and that the consenting parent lives with the child or has a close relationship with her/him. Children and adolescents diagnosed with some type of special educational needs or chronic mental illness such as autism spectrum disorder, or Down syndrome, among others, were excluded. The questionnaires and subsequent data collection were carried out virtually.

Instruments

Dispositional Hope Scale for children[5]: The internal consistency of the original instrument (Cronbach's alpha) was .0.71 to .84. This scale was developed for children and contains 6 items, 3 representing the agency dimension and 3 the pathway dimension and has a six-option response scale from "Never happens to me/Never" to "Happens to me all the time/All the time". Scores are calculated by adding the responses of each item from 1 to 6, with the highest scores representing hope (no reverse items). Its design was tested in a sample of children with and without cancer. Regard-

ing the internal consistency reviewed in other studies, Cronbach's alpha ranged from 0.71 to a maximum of 0.95[3,15,22,23]. This scale has been validated in samples of children and adolescents from Portugal, China, Africa, the United States, and indigenous people of the region[15,20,23,24].

Children's Depression Inventory (CDI)[27]: It is composed of 27 items, with possible scores between 0 and 54 points and a cut-off point of 18 to suggest risk/suspicion of depression. Each item has three response alternatives, 0, 1, or 2, with higher scores indicating possible pathology. The Chilean standardization of the CDI presents a reliability of 0.72 through the Spearman-Brown method (odd-even) and a Cronbach's alpha coefficient of 0.72.

Data analysis

Data were analyzed with SPSS 21 in order to identify assumption violations and missing data, and Mplus v.7 for confirmatory factor analysis. The data analysis was carried out as follows: a review of the descriptive statistics of the scale was performed. Then, a reliability analysis of the scale was performed to measure the internal consistency of the instrument using Cronbach's alpha. To determine the factorial structure of the scale, two models were examined, based on the results obtained in previous research, a one-factor, and a two-factor solution.

For this analysis, the Maximum Likelihood Estimation (MLE) method was used since the scale has several alternatives greater than the minimum recommended to be considered categorical variables[28,29]. The Satorra-Bentler scaled chi-square value (SBχ^2) was used as a fit indicator, which allows the point of best fit or minimum discrepancy between the matrices compared to be considered, evaluating the general fit of the measurement model[30]. Likewise, the Comparative Fit Index (CFI) was used to evaluate how the data fit the theoretical model by analyzing discrepancies (CFI > 0.95)[30]. Also, the Tucker-Lewis Index (TLI) was used to compare the fit according to the degrees of freedom of the hypothetical model and the null hypothesis (TLI > 0.95)[30]. Finally, the Root Mean Squared Error of Approximation (RMSEA <0.06)[30] was analyzed as an indicator of the goodness-of-fit with values below < 0.5, and moderate fit with values between 0.5 and 0.6[30], considering their respective 90% confidence interval.

A final step consisted of providing evidence of validity referring to the relationship with other variables, known as concurrent validity. To achieve this analysis, Pearson's r correlation coefficient was used as a reference, expecting to calculate the correlations between the measures of both scales to analyze the negative association, hypothetically expected, between the scores of the DHS with those obtained in the CDI scale.

Results

Descriptive statistics

The mean total DHS score for children and adolescents was 23.2 (range 6-36; SD 7.2). The mean response for the scale items was 3.87 (range 1-6), indicating medium-high levels of hope (Table 1). The internal consistency of the scale was good (Cronbach's alpha = 0.89).

Factor structure of the Dispositional Hope Scale in Children and Adolescents

To evaluate the fit of the scale, two models were reviewed: the one-dimensional model (Model 1) and the original two-factor model (Model 2). Subsequently, they were checked to see if they differed significantly from each other. The goodness-of-fit statistics for Model 1 suggest a good fit, showing: SBχ^2(331) = 20.52; p value = 0.015; RMSEA = 0.062; CFI= 0.982; and TLI = 0.970. At the local level, all loadings were significant and greater than 0.74. On the other hand, the fit of Model 2 with a two-factor structure presents an improvement compared with the fit of Model 1, showing: SBχ^2(331) = 12.54; p value= 0.128; RMSEA = 0.062; CFI= 0.982; and TLI=0.970 (Table 2).

To estimate whether this improvement in the model is significant, the differences in the χ^2 and incremental fit indices between the models are reviewed, a strategy suggested in the literature[31,32]. A significant difference was considered at CFI < -0.01, as recommended. In this methodological framework, it is observed that the differences are significant between Models 1 and 2 (ΔCFI = -0.011; TRd = 6.444) so it was decided to retain Model 2 as the one that best represents the data. On the other hand, it is possible to assess the strengths of Model 2 through the RMSEA, which has an adequate fit (< 0.06). Likewise, the p-value of the χ^2 is not significant, and therefore, shows that the data matrix does not differ significantly from the hypothesized model, representing another indicator of good model fit[31,32]. Similarly, the CFI and TLI fit indices are higher than 0.95, which is within adequate values3[0], indicating that the data and degrees of freedom fit the theoretical model.

Evidence of validity based on the relationship with other variables

Regarding its relationship with other variables, the hypothesis was tested that the DHS, as a measure of dispositional hope in children and adolescents, would maintain negative and significant correlations with depressive symptomatology. The above is supported by the theoretical basis that highlights hope as a psychological strength and a protective factor against depressive symptomatology[12]. Therefore, the scores obtained

Table 1. Descriptive Statistics of the Hope Scale in Chilean Children and Adolescents

Item	Mean	Standard Deviation	Asymmetry	Kurtosis	*r* item-total corrected	Factorial loading
1. I think I am doing pretty well.	3.70	1.276	0.135	-0.763	0.643	0.674
2. I can think of many ways to get the things in life that are most important to me.	3.96	1.430	-0.068	-0.981	0.565	0.628
3. I am doing just as well as other kids my age.	3.79	1.496	-0.175	-1.007	0.579	0.626
4. When I have a problem, I can come up whit lots of ways to solve it.	3.68	1.543	0.124	-1.184	0.632	0.664
5. I think the things I have done in the past will help me in the future.	4.05	1.662	0.326	-1.125	0.571	0.633
6. Even when others want to quit, I know that I can find ways to solve the problem.	4.04	1.518	-0.260	-1.049	0.650	0.683

Note: N=331. All items measure hope. There are not inverted items in this scale. The values of the mean closest to six reflect greater hope, while those close to one show less hope according to the item.

Table 2. Comparison of the adjustment of competing models

Measurement models	χ^2	df.	Valor de p	CFI	TLI	RMSEA (IC_{90})
Model 1 (one factor)	20,52	9	0,015	0,982	0,970	0,062 (0,026-0,098)
Model 2 (two factors)	12,54	8	0,128	0,993	0,987	0,041 (0,000-0,083)

Note: N=331. MLR Estimator. The models presented suggest the presence of one or two dimensions according to revisions made to the theory. In both cases, the adjustment is good, improving the adjustment of the bidimensional model (2). χ^2: Chi squared; df: degrees of freedom. CFI: Comparative Fit Index TLI: Tuker Lewis Index RMSEA: Root Mean Square Error of Approximation.

in the DHS in children and adolescents were correlated with the CDI, using Pearson's r correlation coefficient. As expected, a significant inverse association was observed between depressive symptoms and the total score of the hope scale ($r = -0.622$, $p \leq 0.0001$), as with each dimension (agency: $r = -0.602$, $p \leq 0.0001$; pathway: $r = 0.567$, $p \leq 0.0001$), all of them of moderate magnitude.

Discussion

The objective of this study was to evaluate the psychometric properties of the Dispositional Hope Scale (DHS) for Children in a sample of Chilean children and adolescents. The findings of the study suggest that the Chilean version of the DHS has adequate psychometric properties for use in the child and adolescent population.

Regarding the factorial structure, one-factor and two-factor models proposed by Snyder et al.[5] were examined, in addition to other subsequent studies[15,22]. The results show an adequate fit for both the one-factor (Model 1) and the two-factor model (Model 2). However, Model 2 shows a better fit and retains the structure initially proposed by the authors of the scale[5].

According to previous studies, the results of the DHS in the Chilean context exceed the expected indices. The study by Marques et al[15] reports a two-factor structure that explained %70.98 of the total variance, with an internal consistency of 0.8115, similar to that found in this study. The study by Ling et al[23], using methodological procedures similar to those used in this study, shows adequate fit indicators, being improved by our study. Likewise, Hellman et al[22] reported an extensive review of the scale's reliability indexes, analyzing 225 studies. From this, a mean score of $\alpha = 0.81$ was obtained for the internal consistency of the scale[22], reporting, in addition, that studies in languages other than English evidenced lower Cronbach's alphas, except for this study.

Regarding the validity in relation to other variables,

the results were consistent in showing a negative association with depressive symptomatology. It is expected that hope would show an inverse relationship with depressive symptomatology since this construct is a protective factor for internalizing symptoms. From this point of analysis, our sample evaluated gave positive responses in the sense of hope and, therefore, presented a lower propensity to develop depressive symptoms.

Most of the research on hope in the child and adolescent population shows an inverse relationship with depression[33] and is considered a protective factor that even prevents suicide. From a clinical point of view, having an instrument of this type in the Chilean context opens the possibility of generating research in this area, as well as in the development of interventions that promote hope in children and adolescents, which can be especially focused on adolescents facing adverse conditions[15,16].

One of the limitations of this study is related to the lack of theoretical limits for estimating positive constructs, such as hope, as it is difficult to measure how much hope is adequate in the child and adolescent population[34]. Likewise, it is important to consider for future studies the analysis of scale invariance that reviews the possible differences that could arise by sex and developmental stage, given the complexities and widely known differences that arise when designing scales in the child and adolescent population.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

Financial Disclosure

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