Original Article

Adaptation and Psychometric Features of a Parent Report Measure to Profile Conversational Skills in Persian-Speaking Children with and without Language Disorders

Masoomeh Salmani[1], PhD; Fatemeh Paknazar[2,3], PhD; Jalal Bakhtiyari[4*], PhD; Marziyeh Maddah[5], MD; Fatemeh Malayjerdi[5], BSc; Amir Shakibi[5], BSc

[1]Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences, Semnan, Iran
[2]Social Determinants of Health Research Center, Semnan University of Medical Sciences, Semnan, Iran
[3]Department of Community Medicine, School of Medicine, Semnan University of Medical Sciences, Semnan, Iran
[4]Department of Speech Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran
[5]Department of Speech and Language Therapy, Semnan University of Medical Sciences, Semnan, Iran

ARTICLE INFO

ABSTRACT

Background: Language professionals require effective tools to gather accurate information about children's language in diverse settings. This study aimed to create a Persian version of the Preschoolers' Conversational Skills scale and gather initial data on conversational skills in children with and without language disorders.

Methods: The study primarily aimed to adapt an English research instrument into a Persian version. To achieve this goal, the research team employed a comprehensive process, including forward translation, synthesis of translations (harmony), backward translations (consolidation), expert committee review, cognitive interviewing, test of pre-final version, and submission and appraisal of all written reports. The participants involved in this process consisted of four translators, a statistician, a linguist, a speech therapist, the research team, eleven language professionals, ten mothers for cognitive interviewing, and 114 mothers for pretesting the final adapted version. A test-retest approach was utilized to assess the scale's reliability.

Results: During the translation process, there were no complicated words or phrases encountered. The expert panel retained all items from the adapted version, adding examples to two items. Participants who evaluated the Persian version found the items clear and straightforward. The Content Validity Ratio (CVR) and Scale Content Validity Index (S-CVI) were 1 and above 0.9, respectively, indicating high content validity. The Cronbach's alpha value, which measures the scale's internal consistency, was calculated to be 0.9, signifying a high level of reliability. The scale used cut-off points of at or below 2.5, between 2.5 and 4.8, and at or above 4.8 to categorize children based on their conversational skills.

Conclusion: the adapted version of the Preschoolers' Conversational Skills scale has demonstrated excellent validity and high reliability. Moreover, the scale is easy and quick to administer, making it suitable for use in clinical settings to evaluate children's pragmatic language abilities. Based on the scale's categorization, children can be classified into three groups: "no or infrequent pragmatic skills," "emerging pragmatic skills," and "well-developed pragmatic skills."

Introduction

Pragmatic is a foundational characteristic of human communication that allows a speaker to convey a meaning beyond the literal meaning of an utterance (1). It covers different aspects, such as conversation, narration, and many non-linguistic communication features. Due to the nature of pragmatics, its aspects,

Corresponding author: Jalal Bakhtiyari, PhD; Department of Speech Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran. **Tel:** +98 9123717072; **Email:** bakhtiyari.slp@gmail.com

and its possible impairments, mapping out such complex language features is difficult. As an umbrella term, Pragmatic impairment includes a broad range of different phenomena with different etiologies. Thus, professionals describe different behaviors as symptoms of pragmatic impairment. These behaviors include talking too much or too little, overusing certain phrases, initiating, maintaining, or terminating the conversation, problems with physical aspects such as facial expression, physical proximity, problems with politeness, humor or figurative language, and so forth (2).

Such a perspective has led to the development of many evaluation tools to address pragmatic impairment in clinical settings and research fields for English-speaking individuals. However, Iranian speech-language pathologists (SLPs) have access to limited tools to evaluate pragmatics. Oryadi Zanjani & Vahab (2015) released the translated and adapted Persian version of the Rossetti Infant-Toddler Language Scale (3). However, this scale requires further psychometric evaluation and supplementary assessment information to provide a comprehensive profile of communication skills. Additionally, it fails to measure parents' perceptions of their child's assertiveness and responsiveness during naturalistic interactions in familiar environments. Recently, Nakhshab and colleagues translated and adapted a checklist of pragmatic behaviors, but it is not yet available for clinical use or research (4). To address the scarcity of assessment tools, SLPs have two options: either develop a new tool or adapt the available ones for the Iranian population, including Persian-speaking individuals.

Translation and cross-cultural adaptation of a scale for use in a new setting are more cost-effective and time-efficient than developing a new one with similar aims and contents. This process allows researchers to have similar measures and enables them to compare their data in cross-cultural and cross-national studies. However, in the case of pragmatics, the situation is complicated due to the interconnection between culture and pragmatic skills. The use of an English conversational instrument should be approached with careful consideration of cultural factors.

Assessing assertiveness and responsiveness seems ideal, as they can indicate the targets in an intervention (5) and involve family roles in assessment and intervention (6). However, traditionally assessing these behaviors poses challenges, as the clinician would need to observe the child in different contexts with various communication partners, which may not be feasible in clinical settings. Individual differences and cultural effects on these two skills have not been investigated for Persian-speaking children.

Girolametto (1997) introduced a rating scale for parents to profile their children's conversational skills (7), which consisted of two sections - Responsiveness and Assertiveness. In 2013 and 2017, two editions of the same profile and a proper manual were published for Italian-speaking children (8). The Preschoolers' Conversational Skills scale has been validated and proven reliable for assessing English and Italian-speaking children with language disorders, regardless of the etiology.

As a parent-administered scale, it provides valuable insights from parents' longitudinal experiences with their children in various contexts (9, 10), eliminating concerns about child-examiner rapport and sample validity. This issue makes it a suitable tool for family-centered practice. Compared to standardized tests or pragmatic profiles, this scale is cost-effective and efficient and offers a detailed overview of a child's communication skills. It does not require coding and has a simple scoring system. Furthermore, it covers an age range ideal for early intervention and targets two communication skills, which can aid speech-language pathologists (SLPs) in identifying appropriate targets for assessment and intervention.

The current study was designed with two main objectives:

1. To translate, adapt, and evaluate the psychometric properties of the Persian version of the Preschoolers' Conversational Skills scale.

2. To gain a foundational understanding of the responsiveness and assertiveness of Persian-speaking children with typical development.

Methods

The study received approval from the Human Ethics Committee at Semnan University of Medical Sciences with reference number IR.SEMUMS.REC.1397.289. The study aimed to adapt an English research instrument into a Persian version. Before the adaptation process, permission was obtained from the original developer of the Preschoolers' Conversational Skills scale. An electronic email was sent to the original developer requesting permission to provide the adapted version, and it was granted to the research team.

The inclusion criteria for participants in all stages of the study were as follows:

1. Participants should be native Persian speakers and should not have any hearing loss.

2. For children with language disorders (LD), the chronological age should have been between 28 and 60 months, and their language skills should be comparable to typically developing children aged between 12 and 36 months. This comparison was made based on their mean length of utterances and McArthur Bates vocabulary checklists.

3. For typically developing children, the age range was between 12 and 36 months, and they should have demonstrated typical development based on their Ages and Stages Questionnaire reports. Additionally, their language skills should be equivalent to chronological age, as determined by mean length of utterances and McArthur Bates vocabulary checklists.

All mothers participating in the study were provided with an information sheet, and those families who agreed to participate signed the consent form. The study included sixty mothers of typically developing children between 12 and 36 months old and 54 mothers of children with language disorders who met the specified criteria. For detailed demographic information, please refer to appendices 1 and 2.

Tool

The English version of the Preschoolers' Conversational Skills Scale serves as a valuable tool for Speech-Language Pathologists (SLPs) to collect reliable data on children's assertiveness and responsiveness abilities in their daily contexts, specifically for children with language disorders (LD) whose expressive language skills align with those of children aged 12 to 36 months.

The scale consists of 25 items categorized into two sections, yielding two scores: 10 for Responsiveness and 15 for Assertiveness.

The process of cross-cultural adaptation and evaluation of the psychometric features of the scale followed the guidelines presented by Beaton and colleagues (2000) and the World Health Organization (WHO) (11, 12).

Stage I: Forward Translation:

In the first step of the cross-cultural adaptation process, two bilingual translators, native Persian speakers and fluent in English, independently translated the Preschoolers' Conversational Skills Scale from English (the original language) to Persian (the target language). One of the translators had familiarity with the subject matter, while the other translator came from a different background, ensuring a diverse perspective during the translation process.

Stage II: Synthesis of The Translations:

After the initial translations were completed, the first author compared the two translated versions to identify any ambiguous wording or discrepancies that might have arisen. The aim was to ensure that the translations accurately captured the intended meaning of the original scale in the Persian language.

Subsequently, the first author and the two translators worked together to synthesize both translations into a unified version. They compared this synthesized version with the original Preschoolers' Conversational Skills Scale in English.

Stage III: Backward Translation:

In stage II of the study, the final Persian version of the Preschoolers' Conversational Skills Scale was sent to a registered translation institute, along with an independent translator whose mother tongue was English. The institute and the independent translator were unaware of the original study and its aims, ensuring an unbiased evaluation.

The translation institute and the independent translator then independently translated the Persian version back into English, aiming to recreate the original English scale. This process, known as back-translation, was carried out to assess the accuracy and consistency of the Persian translation with the original English version.

Once the back-translated versions were obtained, the researchers compared them with the original English scale. The purpose was to identify any significant inconsistencies or conceptual errors that might have occurred during the translation process.

Stage IV: Expert Committee Review:

In stage V of the study, a committee comprising a statistician, a linguist, the first author, the three translators, and the two members of the research team came together to consolidate all the versions of the scale and create the prefinal version of the scale.

During this stage, the committee focused on ensuring equivalence between the original English and the Persian versions in four key areas: semantic, idiomatic, experiential, and conceptual equivalencies. They carefully reviewed the meanings of words, including any potential multiple meanings and grammatical complexities in the Persian version. Idioms in the original English version were replaced with equivalent expressions in Persian to maintain meaningfulness.

Since the scale aimed to assess children's assertiveness and responsiveness in daily life, the committee ensured that the items were culturally relevant to Persian children's experiences. They replaced items that might not be familiar or relevant to Persian culture with similar items that reflected the experiences of Persian-speaking children.

Stage V: Pretesting and Cognitive Interviewing:

During the cognitive interviewing phase (stage VI), the examiners interviewed mothers who had participated in the study. These interviews aimed to understand how the mothers perceived, interpreted, and scored each item on the scale (13). By engaging in these interviews, the examiners aimed to identify any potential issues or challenges in the questionnaire items that could lead to confusion or ambiguity among the respondents (14). The cognitive interviews took place at two locations: a speech and language therapy clinic affiliated with Semnan University and a health center in Semnan.

During the cognitive interviewing stage (stage VI), two speech and language pathologists (SLPs) conducted interviews with five mothers who had children with language disorders (expressive language age between 12 and 36 months; three boys and two girls) and five mothers who had typical children (age between 12 and 36 months; three boys and two girls). These interviews aimed to assess the clarity and understandability of the prefinal Persian scale.

During the interviews, the SLPs asked the mothers to fill out the prefinal version of the Persian scale. After completing the forms, the examiners questioned the mothers about any problems they encountered with each item, slight misunderstandings, and unclear items. For items that were difficult to understand or unclear, the examiners delved further by asking additional questions. They asked the mothers to elaborate on what came to their mind for each item, whether they had to rephrase any items in their own words, and if any specific phrase or term triggered a particular meaning in their minds. The examiners also inquired about any words or terms they found unintelligible and how they arrived at a specific score for each item. These questions aimed to gain insights into the mothers' thought processes and understanding of the scale's items.

The responses provided by the mothers during the interviews were then compared to their actual responses to the items on the scale. Any discrepancies or areas of concern were identified and addressed before finalizing the Persian scale. The interviews with each mother lasted for less than 15 minutes, and with their permission, the examiners took notes and audio-recorded the interviews

for later reference.

The examiners prepared written reports, including a summary of the data collected during the interviews, and presented them to the research team. The research team reviewed the reports and considered any necessary rewording of items slightly difficult to understand. This iterative process helped ensure the clarity and reliability of the final Persian version of the Preschoolers' Conversational Skills scale.

Face and Content Validity: A package containing an invitation letter, a consent form, the prefinal version of the Persian scale, and a critical appraisal sheet was sent to over 35 experts with experience in language studies and working with children with language disorders. The invitation letter provided a detailed explanation of why they were invited to participate in the project and outlined the purpose of the study. It also included clear and simple instructions on evaluating each item on the scale.

The critical appraisal sheet included in the package was designed to gather the experts' feedback on the face and content validity of the scale. It provided sufficient information on assessing each item's simplicity, clarity, relevancy, and necessity. The sheet consisted of a table where the experts could choose appropriate answers and provide suggestions or substitutions for any item they found problematic or needing improvement.

In addition to evaluating relevancy, the research team also assessed the appropriateness and adequateness of the scale for preschoolers in the face validity process. To do this, they included a question in the appraisal sheet with four options: "completely comprehensive," "comprehensive," "somewhat comprehensive," and "incomplete." Experts were asked to select the most appropriate option based on their judgment.

For those experts who selected "somewhat comprehensive" or "incomplete," the research team included an open-ended question to gather more specific feedback: "If this tool is not completely comprehensive, what other areas do you suggest to be added to its content?"

A 4-point Likert scale was used to gauge each item's relevance and assess the scale's face validity. The participants could respond with the following options: 1=not relevant, 2=somewhat relevant, 3=quite relevant, and 4=very relevant. Ratings of 3 and 4 indicated that the content was valid and aligned with the purpose of the scale, while ratings of 1 and 2 indicated that the content might not be relevant and needed further attention (15).

Additionally, the clarity and essentiality of each item were evaluated using separate 3-point Likert scales. For clarity, participants were asked to rate each item as follows: 1=not clear, 2=item needs some revision and 3=very clear. This evaluation aimed to determine how easily the participants could understand each item.

For essentiality, participants were asked to rate each item using the following options: 1=not essential, 2=useful but not essential, and 3=essential (16, 17). This assessment aimed to identify the importance of each item in measuring preschoolers' conversational skills.

The critical appraisal sheets completed by the eleven experts were then analyzed using the Index of Content Validity (CVI) and the Content Validity Ratio (CVR) to assess the validity of the scale items (16, 17). The CVR is a measure that evaluates the necessity of each item in the scale (18). It ranges from 1 to -1, with values closer to 1 indicating greater agreement among the panelists regarding the necessity of the items (19). To calculate the CVR, the number of experts who scored the necessity of an item as 3 or 4 was divided by the total number of speech and language therapists (SLTs) who evaluated the entire scale.

The Content Validity Index (CVI) can be measured using two components: the Item-CVI (I-CVI) and the Scale-CVI (S-CVI). The number of panelists rated 3 or 4 for that item is divided by the total number of panelists to calculate the I-CVI for each item,. The I-CVI results in a score between 0 and 1, where a score above 0.79 indicates that the item is relevant and should be retained in the questionnaire. Items with an I-CVI score between 0.70 and 0.79 may need revisions, and items with an I-CVI score below 0.70 should be eliminated from the scale.

The Scale-CVI (S-CVI) is calculated using the Average CVI (S-CVI/Ave) method. It involves summing up all the I-CVI scores for all the items and dividing the total by the number of items on the scale (17). An S-CVI/Average score of 0.9 or higher indicates excellent content validity, suggesting that the experts consider the scale items highly relevant and appropriate.

In this study, the I-CVI and S-CVI/Ave were calculated based on the ratings provided by the eleven experts who completed the critical appraisal sheets for the scale items. The scores obtained for each item and the overall scale validity were used to determine the content validity of the Persian version of the Preschoolers' Conversational Skills scale.

Stage VI: Test of the Prefinal Version: In this stage, the researchers aimed to evaluate the reliability and construct validity of the Persian version of the Preschoolers' Conversational Skills scale using data from children with language disorders (LD) and typically developing children. To gather the required data, the researchers invited all clients with children with LD admitted to the Semnan University of Medical Sciences clinics to participate. Additionally, the mothers of typically developing children were invited through health advisors from at least five health centers.

To ensure a conducive environment for data collection, a quiet and official room was provided by the clinics and health centers where the research team could interact with the participating mothers and administer the questionnaires. Each mother was invited to the clinic or health center at a specific time to fill out the questionnaires, allowing for individualized and efficient data collection.

The researchers utilized assessment tools to gather comprehensive data on the children's language and conversational skills. These tools included: Personal Information Questionnaire (20), The Final Version of the Persian Preschoolers' Conversational Skills Scale, MacArthur-Bates Communicative Development Inventories (M-CDI: This well-established questionnaire was employed to assess Persian-speaking children's language skills. It is known for its reliability and validity

in evaluating language development in children), 20-Minute Mother-Child Interaction in the Context of Free Play: During this interactive session, the mothers and children were provided with appropriate toys to facilitate communication. The examiners observed the interaction but refrained from providing any comments or suggestions to avoid influencing the natural flow of the interaction. The entire 20-minute session was transcribed for the mother-child interaction, and at least 50 intelligible and analyzable utterances were collected from the transcript.

Reliability and construct validity: In the present study, the researchers used the data from all participants to assess the scale's internal consistency and construct validity. Construct validity refers to how well a set of indicators, in this case, the items of the scale, reflects a concept that cannot be directly measured or computed (21-23). Various statistical methods, such as Multitrait-Multimethod Matrix, factor analysis, structural equation modeling, and other relevant statistical evaluations, can be employed to evaluate construct validity (24).

A subgroup of thirty-eight participants was randomly selected from the overall sample for the test-retest evaluation. Two weeks after the initial evaluation, these participants' mothers were invited to fill out the final version of the Persian Preschoolers' Conversational Skills scale again.

Stage VII: Submission and Appraisal of all written reports by the committee: the research committee carefully reviewed all the written reports and documents. At this stage, the research team did not alter the scale itself. Instead, they focused on verifying the thoroughness and accuracy of the adaptation process. They checked that all the translation and adaptation steps, such as forward and backward translations, expert committee review, pretesting, and cognitive interviewing, had been appropriately conducted.

Statistical Methods

In the data analysis phase of the study, several statistical tests were used to assess the distribution and compare the scores between different subgroups. Here are the specific tests used:

The normal distribution of data was assessed using the Shapiro-Wilk test. The Kruskal-Wallis test was used to compare scores between subgroups, and the Bonferroni test was employed for exclusive comparisons. Pearson's chi-square test was used to test the independence of qualitative variables. Simple and stepwise reduced multiple regression models were used to investigate the relationship between demographic and medical characteristics of children with responsiveness and assertiveness scores. Cronbach's alpha index was used to measure internal consistency, and the Intra-Class Correlation (ICC) was applied to evaluate test-retest consistency. The construct validity of the translated scale in estimating outcomes was evaluated by exploratory and confirmatory factor analysis. For confirmatory factor analysis, fitness and factor loading indices were reported. The Chi-square/df, RMSEA, CFI, TLI, and IFI (25) were used as indices for evaluating the model's goodness of fit. SPSS software version 22 was used for analyses, and AMOS version 24 was used to run confirmatory factor analysis. A P-value of less than 0.05 was considered significant in all tests.

Results

Stages I to IV: The research committee reviewed and approved the adaptation process, ensuring all guidelines were followed. The final Persian version of the scale retained all the items from the original English version, as they were found to be culturally appropriate for the Persian-speaking population. Only two alterations were made based on the expert committee's suggestions, which involved adding examples to item 5 of the Responsiveness section and item 8 of the Assertiveness section to clarify their meaning further and ensure better understanding by respondents.

Stage V: All the participants, including the mothers of children with language disorders and typical children, reported that they encountered no difficulty or ambiguity in understanding the scale items. They completed the scale within 3-5 minutes. They found the items to be clear, simple and did not feel the need to rephrase any of them. Their responses were based on their children's actual functions rather than comparing them with other children.

The face and content validity evaluators scored all the items as necessary and relevant, and the overall scale was rated as "completely comprehensive," with a CVR score of 1, indicating strong agreement among the experts. The I-CVI and S-CVI/Averages were calculated to assess the scale's content validity. Table 1 presents the results of these calculations.

Demographic Information: The study included 54 children with language disorders, of which 59.3% were boys and 40.7% were girls, all of whom were monolingual speakers of Persian. Most mothers (80%) reported no history of language disorders in their families. Most children (87%) were born at term and had a proper birth weight.

Regarding the etiology of speech and language disorders, 83.3% of the participants had unknown causes, 13% were associated with intellectual disorders, and 3.7% were related to autism spectrum disorders. Additionally, 90% of the children had no history of otitis media.

Regarding the parents' educational background, 68% of the parents of children with language disorders had a high school diploma or lower, while the remaining had a university degree. All fathers were employed and had a reasonable income (see Appendix 2 for further details).

Among the typical children who participated in the study (n=60), 52% were girls, and all were monolingual Persian speakers. Only a small percentage (3.3%) of mothers reported a history of language disorders in their families. Most children (90%) were born at term and had a proper birth weight. The typical development of these children was confirmed by health advisors using the Persian version of the Ages and Stages Questionnaire. Additionally, only 3.3% of the children had experienced otitis media. Regarding the parents' educational

Table 1: I-CVI & S-CVI: Clarity, Relevancy & Simplicity

Item Number	Responsiveness	Assertiveness
1	0.9	1
2	0.8	1
3	1	0.9
4	0.9	1
5	1	1
6	1	1
7	0.9	1
8	1	1
9	1	1
10	0.9	1
11	Not Applicable	0.9
12		0.9
13		1
14		1
15		1
S-CVI	0.94	0.98

Table 2: Comparison of Communication Skills among Groups

	Children with language disorders(N=54)		Typical children(N=60)			P value**	P value*
	Mean	SD	Age	Mean	SD		
Responsiveness	3.45	0.93	12-24 (n=35)	3.68	1.13	0.238	<0.001
			25-36+ (n=25)	4.35	0.48	<0.001	
Assertiveness	3.55	0.84	12-24 (n=35)	3.79	1.02	0.810	<0.001
			25-36+ (n=25)	4.46	0.43	0.001	

SD: Standard deviation, IQR: Interquartile range, *One-Way ANOVA between Children with language disorders and two groups of Typical children, ** Significance values have been adjusted by the Bonferroni correction for multiple pairwise comparisons in Post Hoc Tests.

background, a similar number of mothers and fathers (68.3%) had a university degree, while the rest had a high school diploma or lower. All fathers were employed and had jobs. (Refer to Appendix 2 for further details).

Participants' Language Age: The research team utilized the MacArthur-Bates Communicative Development Inventories (M-CDI) to assess and compare the expressive and receptive vocabularies of the children in the study (26).

The results (for detailed information, see appendices 3-6) revealed that there were no significant differences in vocabulary between children with language disorders (Mean expressive±SD: 168.3±139.7; Mean receptive±SD: 307.0±93.7) and typical children aged between 12 and 24 months (Mean receptive±SD: 250.8±121.16; Mean expressive±SD: 141.4±125.8) (P>0.05). However, both groups had significantly smaller vocabularies compared to children aged above 24 months (Mean receptive±SD: 371.2±46.5, P=0.008; Mean expressive±SD: 340.8±70.5, P<0.001).

Actions & Gestures: The extension of M-CDI, known as Actions & Gestures, consists of six subsections and provides additional valuable information that can enhance clinical judgment in evaluating children's language development. In this study, the results from the Actions & Gestures section showed significant differences between children with language disorders and typical children aged above 24 months in four subsections: First Communicative Gestures (P=0.019), Games & Routines (P=0.013), Actions with objects (P=0.005), and Imitating Other Adult Actions (P=245 0.046) (appendices 3 to 6).

Language Sample Analysis: Neither group produced at least 50 analyzable utterances during the 20-minute free play session with their mothers, making it impossible for the research team to calculate MLU.

Responsiveness & Assertiveness: Responsiveness and assertiveness scores were calculated for all groups and compared using appropriate statistical tests. As the children with LD had vocabularies similar to those of the younger typical children, we compared the children with LD twice: 1) when the typical children were divided according to their chronological age and 2) when the typical children were considered as one group (last column of Table 2). Significant differences were found between the communication skills of children with LD and those of the older group of typical children. Table 2 summarizes the results regarding communication skills.

Different factors and children's communication skills: The effects of various factors (listed in Appendix 2) on children's communication skills were investigated using simple and multiple regression models for each group. In the multiple regression model, children's chronological age and mothers' education significantly affected children's communication skills. For children with LD, another factor, 'children's nutrition', had a significant effect (for further details on the simple and multiple regression models, Appendices 7 and 8).

Reliability and construct validity: To assess the consistency of the results from successive scale measurements carried out under the same measurement conditions, 38 mothers completed the Persian scale two weeks after the first evaluation. The ICC showed that the scale had reliability scores of 0.996 (P<0.001) for responsiveness and 0.995 (P<0.001) for assertiveness. The internal consistency scores, as measured by Cronbach's alpha, were 0.94 and 0.95 for Responsiveness and Assertiveness, respectively (Table 3).

Table 3: Results of factorial load based on the results of Explanatory Factor Analysis

Numbers	Assertiveness		Responsiveness	
	Items	Factorial load	Items	Factorial load
1	Asks about unusual events	0.60	Make choices	0.543
2	Asks questions	0.69	Provides names of familiar objects when asked	0.68
3	Ask for names of objects	0.53	Responds questions	0.68
4	Requests objects in reach	0.66	Repeats when asked to	0.69
5	Requests reoccurrence	0.59	Takes two or more turns	0.61
6	Requests help	0.49	Talks related to adult's topic	0.74
7	Requests object out of reach	0.52	Answers match adults' topic	0.63
8	Answers to adult's comment	0.58	The answer follows an adult's topic	0.56
9	Seeks adults to begin a game or an action	0.59	Keeps trying to communicate	0.46
10	Initiates conversation	0.62	Answers clarification requests	0.72
11	Tells changes in activities	0.50	Not Applicable	
12	Invites adult to play	0.54		
13	Talks about things of interest	0.66		
14	Initiates familiar games	0.61		
15	Suggests different play ideas	0.51		
	KMO test**	0.92		0.91
	Chi-Square test *** (df, P value)	1244.3 (105, <0.001)		779.8 (45, <0.001)
	Eigenvalue	8.69		6.31
	Percent of total variance explained	57.91		63.1
	Rang of correlation with a total score	(0.54-0.83)		(0.68-0.86)
	Reliability statistics(Cronbach's Alpha)	0.95		0.94

*Extraction Method: Principal Component Analysis, **Kaiser-Meyer-Olkin Measure of Sampling Adequacy, *** Bartlett's test of sphericity

Table 4: The results of model-based Confirmatory Factor Analysis

Goodness of fit	Chi-square/df	RMSEA	CFI	TLI	IFI
Responsiveness	1.58	0.071	0.975	0.966	0.976
Assertiveness	1.73	0.080	0.950	0.936	0.951

The goodness-of-fit indices were reported after adding correlation paths between errors of some items in the modification models. The reported indices for evaluating the model's goodness-of-fit are as follows: RMSEA (Root Mean Square Error of Approximation) of less than 0.08, CFI (Comparative Fit Index) of greater than 0.90, TLI (Tucker and Lewis's Index of Fit) of greater than 0.90, and IFI (Incremental Fit Index) of greater than 0.90.

Explanatory and confirmatory factor analyses were conducted to calculate the standardized estimates indicating the factor loading for each item in a measurement model. All items with loading greater than 0.4 were retained in the model (Table 3). The assessment of construct validity based on fitness indices yielded good construct validity (Table 4).

Clinical Interpretation: The interpretation of mean scores for the Preschoolers' Conversational Skills Scale was based on Girolametto's approach. A score at or below 2.5 for children with LD was classified as "no or infrequent pragmatic skills," indicating limited pragmatic abilities. A score at or above 4.8 was classified as "well-developed pragmatic skills," indicating strong pragmatic abilities. Scores between 2.5 and 4.8 were considered as "pragmatic skills are emerging," suggesting that these children's pragmatic abilities were still developing.

However, it's important to note that the results should be interpreted cautiously due to potential confounding factors that may affect children's functions. To address this issue, the authors conducted further regression analysis in each group of children with and without LD, allowing for a more comprehensive understanding of the factors influencing pragmatic skills (appendices 7 and 8 for detailed results).

Discussion

The successful adaptation of the Preschoolers' Conversational Skills scale into Persian is a significant achievement of this study. Following proper guidelines, the rigorous translation and cross-cultural adaptation process ensured that the Persian version maintained equivalent content and grammar to the original scale. Adding two examples to certain items further improved the clarity and comprehension of the scale. The expert committee's approval of the adaptation process and confirmation of the items' cultural appropriateness validate the Persian version's accuracy and relevance. Moreover, mothers in the field found the scale easy to understand and fill out.

The present study confirmed the simplicity, clarity, necessity, and relevance of all items in the Persian scale. According to the rule of thumb for interpreting Cronbach's alpha (27), the scale demonstrated acceptable internal consistency for both measures and the replication sample and excellent content validity based on the CVR and S-CVI/Average (19). These findings indicate that the subsections are highly correlated and that parental ratings of conversational skills are stable when evaluated two weeks after the first evaluation. Each item had an I-CVI close to one, indicating that none should be eliminated (17). Explanatory and confirmatory factor analyses revealed that each item had a high loading, so all items remained in the adapted version (28).

In the case of children with LD, while over 90% of the children had a chronological age above 24 months, their

vocabularies in both types were extremely restricted compared to the typical children aged 12-24 months. Such constraints were significantly reported for the M-CDI, Actions & Gestures extension part. Therefore, it is unsurprising that these children were not adequately equipped to assert themselves and respond appropriately to their communication partners. The scale results in clinical settings would be interpreted according to Fey's scheme, which categorizes children based on social-conversational skills (5). Children with well-developed assertiveness and responsiveness skills can be considered active conversationalists, while children with no or infrequent skills in both categories are categorized as inactive communicators. A child with well-developed assertiveness skills but not responsiveness skills could be considered a verbal non-communicator, and a child with well-developed responsiveness but not assertiveness skills would be classified as a passive conversationalist. In light of this interpretation, for children who score below 2.5 or between 2.5 and 4.8, SLPs can focus on improving their communication skills, while for those who have well-developed conversational skills, SLPs can concentrate on other language areas such as syntax or morphology.

The present study contributes to understanding pragmatic skills, particularly assertiveness, and responsiveness, among children with different language skills. The findings suggest there are similarities in pragmatic skills between children with different language skills, although slight differences might exist. These differences were reflected in slightly lower means, higher standard deviations, and consequently, lower and upper bands for clinical interpretation in the Persian version compared to the English scale version (7). Our bands applied to the younger group of typical Persian children, while the older group fell within the emerging and well-developed range and had noticeably higher means and lower standard deviations compared to English-speaking children. Based on our findings (Appendices 7 and 8), we could assume that English-speaking children are more assertive and responsive than Persian-speaking children in earlier developmental stages, but this difference would disappear with age.

The current study indicated that children's communication skills could be positively affected by their mothers' education and chronological age (Appendices 7 and 8). Previous research has also shown that parental education can significantly impact children's language skills (29, 30). While the phonological aspect of language reaches a sophisticated level in the early years of school, other aspects of language, including pragmatic skills, continue to develop throughout life (Hoff, 2009). Therefore, this study's relationship between chronological age and conversational skills may reflect a natural developmental process. However, other factors can also significantly affect children's assertiveness and responsiveness. For typical children, these factors include "low birth weight" and "family size," which had significant effects. For children with LD, "good nutrition" and "fathers' education" were significant factors.

Conclusion

The Persian version of the Preschoolers' Conversational Skills scale is a valuable and reliable tool that offers crucial insights into the conversational skills of Persian-speaking children aged between 12 and 36 months. Its simplicity and ease of administration make it a practical choice for assessing and understanding the strengths and weaknesses of each child's communication abilities, further enhancing its utility in identifying areas for intervention. The scale's findings reveal that assertiveness and responsiveness start developing early in Persian-speaking children's lives and continue to mature as they reach 36 months.

Limitation

The current study estimated children's language age based on their lexicons and gestures. This approach may have included children with better language skills in our sample. Future studies, when they have access to standardized language tests, may be able to define children's language age more precisely. Additionally, we did not have access to clinician-based pragmatic questionnaires or profiles to address any potential under or overestimation reported by parents.

Future Directions

In future studies, with access to proper and valid clinical tools, the reliability between parents' reports and lab reports on pragmatic skills can be assessed. The present study has underscored the significant need for Iranian SLPs to have such valid and reliable pragmatic tools to establish their assessment and intervention goals. Subsequent research endeavors may focus on developing and providing these tools to enhance the quality of SLPs' work.

Acknowledgment

Conflict of Interest: None declared.

References

1. Papafragou A. Pragmatic Development. Lang Learn Dev. 2018;14(3):167-9.
2. Damico JS, Muller N, Ball MJ. The Handbook of Language and Speech Disorders. Singapore: Wiley-Blackwell; 2012.
3. Oryadi-Zanjani MM, Vahab M, Rasouli J, Ghasemi S, Yazdizade A. Center-Based Care and Language Development: A Pilot Study on 6-15 Month-Old Persian-Speaking Children. Journal of Rehabilitation Sciences & Research. 2016;3(1):1-4.
4. Koohestani F, Rezaei P, Nakhshab M. Developing a Persian

Version of the Checklist of Pragmatic Behaviors and Assessing Its Psychometric Properties: A Preliminary Study. Archives of Rehabilitation. 2020;21(3):358-75.

5. Fey ME. Language Intervention with Young Children. San Diego: College-Hill; 1986.

6. American Speech-Language-Hearing Research. Family-Centered Practice USA: ASHA; 2020 [cited 2020 25/6/2020].

7. Girolametto L. Development of a Parent Report Measure for Profiling the Conversational Skills of Preschool Children. Am J Speech Lang Pathol. 1997;6(4):25-33.

8. Bonifacio S, Girolametto L, Montico M. Le abilità socio-conversazionali del bambino [The child's socio-conversational skills]. Italy: FrancoAngeli; 2017.

9. Girolametto L, Tannock R, Siegel L. Consumer-Oriented Evaluation of Interactive Language Intervention. Am J Speech Lang Pathol. 1993;2(3):41-51.

10. Suen HK, Logan CR, Neisworth JT, Bagnato S. Parent-professional congruence: Is it necessary? J Early Interv. 1995;19(3):243-52.

11. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine. 2000;25(24):3186-91.

12. World Health Organization. Process of translation and adaptation of instruments: WHO; 2020 [cited 2020]. Available from: https://www.who.int/substance_abuse/research_tools/translation/en/#.

13. Saw SM, Ng TP. The design and assessment of questionnaires in clinical research. Singap Med J. 2001;42(3):131-5.

14. Haeger H, Lambert AD, Kinzie J, Gieser J. Using cognitive interviews to improve survey instruments. the annual forum of the Association for Institutional Research; New Orleans, Louisiana: Association for Institutional Research Annual Forum; 2012.

15. Wynd CA, Schmidt B, Schaefer MA. Two quantitative approaches for estimating content validity. West J Nurs Res. 2003;25(5):508-18.

16. Armstrong TS, Cohen MZ, Eriksen L, Cleeland C. Content validity of self-report measurement instruments: an illustration from the development of the Brain Tumor Module of the M.D. Anderson Symptom Inventory. Oncol Nurs Forum. 2005;32(3):669-76.

17. Zamanzadeh V, Ghahramanian A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar AR. Design and Implementation Content Validity Study: Development of an instrument for measuring Patient-Centered Communication. Journal of caring sciences. 2015;4(2):165-78.

18. Yamada J, Stevens B, Sidani S, Watt-Watson J, de Silva N. Content validity of a process evaluation checklist to measure intervention implementation fidelity of the EPIC intervention. Worldviews Evid Based Nurs. 2010;7(3):158-64.

19. Shi J, Mo X, Sun Z. [Content validity index in scale development]. Zhong nan da xue xue bao Yi xue ban=Journal of Central South University Medical sciences. 2012;37(2):152-5.

20. Kazemi Y, Nakhshab M, Maleki T. Children's language assessment. Isfahan: Tolid Elm; 2017.

21. Kazemi Y, Taheri A, Kianfar F, Shafiei M, Eslamifard R, Pirmoradian M, et al. Mean Length of Utterance (MLU) in typically-developing 2;6-5;6 year-old Farsi-speaking children in Iran. Journal of Research in Rehabilitation Sciences (IRRS). 2012;8(5):1-10.

22. Cronbach LJ, Meehl PE. Construct validity in psychological tests. Psychol Bull. 1955;52(4):281-302.

23. Sjoberg DIK, Bergersen GR. Construct Validity in Software Engineering. IEEE Transactions on Software Engineering. 2022;1-.

24. Westen D, Rosenthal R. Quantifying construct validity: two simple measures. Journal of personality and social psychology. 2003;84(3):608-18.

25. Vieira AL. Interactive LISREL in practice: Springer; 2011.

26. Kazemi Y, Klee T, Stringer H. Diagnostic accuracy of language sample measures with Persian-speaking preschool children. Clin Linguist Phon. 2015;29(4):304-18.

27. Tavakol M, Dennick R. Making sense of Cronbach's alpha. Int J Med Educ. 2011;2:53-5.

28. Johnson RA, Wichern DW. Applied Multivariate Statistical Analysis. New Jersey, USA: PEARSON; 1998.

29. Richels CG, Johnson KN, Walden TA, Conture EG. Socioeconomic status, parental education, vocabulary and language skills of children who stutter. J Commun Disord. 2013;46(4):361-74.

30. Umek LM, Fekonja U, Kranjc S, Bajc K. The effect of children's gender and parental education on toddler language development. Eur Early Child Educ Res. 2008;16(3):325-42.

Appendices

Appendix 1: Experts' Demographic Information

Number	Field of expertise	Years of Work experience	Work place	Interest field
1	Linguist- SLP	17	Special Schools	Pragmatics
2	Linguist	10	University	Language Development
3	SLP- Psychologist	14	Clinics	Developmental Language Disorders
4	SLP- Psychologist	10	Clinic- Special School	Developmental Language Disorders- Learning Disabilities
5	SLP- Psychologist	8	Hospital	NICU- Developmental Language Disorders
6	SLP	18	Clinic	Developmental Language Disorders
7	SLP	28	University clinics	Voice and Resonance Disorders
8	SLP	20	Clinic	Developmental Language Disorders
9	SLP	9	University clinic	Language (development and disorders)
10	SLP	30	University clinic	Speech sound disorders
11	SLP	9	University clinic	Stuttering & Speech sound disorders

Appendix 2: Characteristics of participants (N = 114)

Characteristics		Language disorder			
		No (n=60)		Yes (n=54)	
		Number	%	Number	%
Gender	Male	31	51.7	22	40.7
	Female	29	48.3	32	59.3
Age group (month)	12-18	15	25.0	1	1.9
	19-24	20	33.3	5	9.3
	25-30	21	35.0	10	18.5
	31-36	4	6.7	19	35.2
	>36	0	0.0	19	35.2
Multi-lingulism	Mono-lingual	54	90.0	46	85.2
	Bi-lingual	3	5.0	2	3.7
	More than two	3	5.0	6	11.1
History of Language disorder	No	58	96.7	44	81.5
	Yes	2	3.3	10	18.5
Disease in pregnancy	No	57	95.0	49	90.7
	Yes	3	5.0	5	9.3
Medicine in pregnancy	No	54	90.0	45	83.3
	Yes	6	10.0	9	16.7
Preterm	No	54	90.0	47	87.0
	Yes	6	10.0	7	13.0
Problematic delivery	No	45	75.0	41	75.9
	Yes	15	25.0	13	24.1
Low Birth Weight	No	54	90.0	46	85.2
	Yes	6	10.0	8	14.8
Postpartum disease	No	58	96.7	48	88.9
	Yes	2	3.3	6	11.1
Surgery or accident	No	59	98.3	48	88.9
	Yes	1	1.7	6	11.1
Good nutrition	No	56	93.3	48	88.9
	Yes	4	6.7	6	11.1
Attending kindergartens	No	35	58.3	36	66.7
	Yes	25	41.7	18	33.3
Playing Digital Game	No	51	85.0	32	59.3
	Yes	9	15.0	22	40.7
Watching TV	No	2	3.3	9	16.7
	Yes	58	96.7	45	83.3
Family Environment	Disturbed	2	3.3	8	14.8
	Calm	58	96.7	46	85.2
History of otitis media	No	58	96.7	53	98.1
	Yes	2	3.3	1	1.9
Mother's Education	High school	19	31.7	37	68.5
	Bachelor	41	68.3	17	31.5
	Master	0	0.0	0	0.0
Father's Education	High school	24	40.0	36	66.7
	Bachelor	24	40.0	13	24.1
	Master	12	20.0	5	9.3

Appendix 3: Descriptive statistics for sum of First Communicative Gestures ranks (0-24)

Group of children	N	Min	Max	Mean±SD	Med (IQR)	P value**	P value*
Typical children (12-24 months)	35	7	24	17.9±6.0	20 (12)	0.999	0.012
With language disorders	54	4	24	18.8±5.3	20 (8)	0.019	
Typical children (25-40 months)	25	13	24	22.0±3.1	24 (4)		

SD: Standard deviation, IQR: Interquartile range, *Independent Samples Kruskal-Wallis Test, **Asymptotic significances (2-Sided tests) are displayed. Significance values have been adjusted by the Bonferroni correction for multiple tests

Appendix 4: Descriptive statistics for sum of Games & Routines

Group of children	N	Min	Max	Mean±SD	Med (IQR)	P value**	P value*
Typical children (12-30 months)	46	1	7	5.8±1.6	6 (2)	0.999	0.009
With language disorders	54	0	7	5.7±1.6	7 (2)	0.013	
Typical children (31-40 months)	14	6	7	6.9±0.3	7 (0)		

SD: Standard deviation, IQR: Interquartile range, *Independent Samples Kruskal-Wallis Test, **Asymptotic significances (2-Sided tests) are displayed. Significance values have been adjusted by the Bonferroni correction for multiple tests

Appendix 5: Descriptive statistics for sum of Actions with objects ranks (0-17)

Group of children	N	Min	Max	Mean±SD	Med (IQR)	P value**	P value*
Typical children (12-30 months)	46	2	17	14.1±4.1	16 (5)	0.999	0.004
With language disorders	54	8	17	15.3±2.1	16 (3)	0.005	
Typical children (12-30 months)	14	15	17	16.9±0.5	17 (0)		

SD: Standard deviation, IQR: Interquartile range, *Independent Samples Kruskal-Wallis Test, **Asymptotic significances (2-Sided tests) are displayed. Significance values have been adjusted by the Bonferroni correction for multiple tests

Appendix 6: Descriptive statistics for sum of Imitating Other Adult Actions ranks (0-15)

Group of children	N	Min	Max	Mean±SD	Med (IQR)	P value**	P value*
Typical aged 12-30	46	0	15	11.7±4.2	13.5 (6)	0.342	0.035
With language disorders	54	1	15	12.9±2.9	14 (3.3)	0.046	
Typical aged 31-40	14	7	15	14.1±2.3	15 (0)		

SD: Standard deviation, IQR: Interquartile range, *Independent Samples Kruskal-Wallis Test, **Asymptotic significances (2-Sided tests) are displayed. Significance values have been adjusted by the Bonferroni correction for multiple tests

Appendix 7: Relationship between Different Factors & Communication Skills (Typical Children)

Variables	Responsiveness				Assertiveness			
	Simple models		Multiple model		Simple models		Multiple model	
	B (SE)	P	B (SE)	P	B (SE)	P	B (SE)	P
Gender (male)	0.28 (0.25)	0.266			0.13 (0.23)	0.563		
Age (month)	0.07 (0.01)	<0.001	0.05 (0.01)	0.001	0.06 (0.01)	0.014	0.05 (0.01)	0.001
Multilingualism (1,2,3)	0.15 (0.26)	0.567			0.040.24)	0.877		
Language Disorders/Diseases	-0.94 (0.69)	0.180			-1.00 (0.63)	0.016		
Disorders/Diseases in pregnancy	-0.80 (0.57)	0.167			-0.80 (0.52)	0.129		
Preterm labor	-0.45 (0.41)	0.281			-0.20 (0.38)	0.604		
Medicine in pregnancy	0.29 (0.42)	0.496			0.05 (0.38)	0.903		
Problematic delivery	-0.28 (0.29)	0.333			-0.23 (0.26)	0.392		
Low birth weight	-1.14 (0.40)	0.005	-0.73 (0.34)	0.035	-0.88 (0.37)	0.020		
Postpartum Disorders/Diseases	0.51 (0.70)	0.471			0.48 (0.64)	0.455		
History of surgery or accident	0.96 (0.98)	0.332			0.88 (0.89)	0.329		
Good nutrition	-0.63 (0.50)	0.216			-0.81 (0.45)	0.780		
Attending kindergartens	0.18 (0.26)	0.480			0.07 (0.23)	0.753		
Playing digital game	0.69 (0.34)	0.048			0.42 (0.32)	0.187		
Watching TV	0.68 (0.70)	0.333			0.80 (0.63)	0.214		
Family environment	-0.10 (0.70)	0.893			0.21 (0.64)	0.746		
Hx of otitis media	0.77 (0.70)	0.275			0.14 (0.64)	0.833		
Family size	-0.33 (0.12)	0.009			-0.28 (0.11)	0.015		
Education of mother	0.83 (0.25)	0.001	0.55 (0.22)	0.017	0.73 (0.23)	0.002	0.47 (0.22)	0.037
Education of father	0.29 (0.16)	0.084			0.28 (0.15)	0.070		

B: Regression coefficient, SE: Standard error, Multiple model: stepwise reduced multiple model.

Appendix 8: Relationship between Different Factors & Communication Skills Children with LD

Variables	Responsiveness				Assertiveness			
	Simple models		Multiple model		Simple models		Multiple model	
	B (SE)	P	B (SE)	P	B (SE)	P	B (SE)	P
Gender (male)	-0.27 (0.26)	0.299			-0.32 (0.23)	0.157		
Age (month)	0.02 (0.01)	0.024	0.02 (0.01)	0.017	0.01 (0.01)	0.059	0.01 (0.006)	0.023
Multilingualism (1,2,3)	-0.14 (0.20)	0.492			0.15 (0.18)	0.388		
Language Disorders/Diseases	-0.07 (0.33)	0.830			0.22 (0.29)	0.456		
Disorders/Diseases in pregnancy	-0.58 (0.44)	0.187			-0.15 (0.40)	0.700		
Preterm labor	-.35 (0.37)	0.359			-0.20 (0.34)	0.565		
Medicine in pregnancy	0.01 (0.34)	0.827			0.03 (0.31)	0.923		
Problematic delivery	-0..03 (0.30)	0.913			0.04 (0.27)	0.877		
Low birth weight	0.22 (0.36)	0.540			0.28 (0.32)	0.388		
Postpartum Disorders/Diseases	-0.69 (0.40)	0.088	-0.88 (0.35)	0.017	-0.10 (0.37)	0.792		
History of surgery or accident	-0.37 (0.41)	0.362			-0.32 (0.36)	0.380		
Good nutrition	-0.97 (0.39)	0.015	-1.07 (0.35)	0.004	-0.89 (0.35)	0.013	-0.79 (0.33)	0.020
Attending kindergartens	0.34 (0.27)	0.216			0.31 (0.24)	0.204		
Playing digital game	0.16 (0.26)	0.531			-0.16 (0.23)	0.493		
Watching TV	0.58 (0.34)	0.091			0.51 (0.30)	0.090		
Family environment	-0.02 (0.36)	0.963			-0.16 (0.32)	0.616		
History of otitis media	-0.25 (0.95)	0.792			-0.23 (0.85)	0.791		
Family size	-0.15 (0.13)	0.265			-0.06 (0.12)	0.617		
Education of mother	0.57 (0.27)	0.038			0.65 (0.23)	0.007	0.51 (0.22)	0.026
Education of father	0.44 (0.19)	0.022			0.41 (0.17)	0.018		

B: Regression coefficient, SE: Standard error, Multiple model: stepwise reduced multiple model.