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The Cultural Adaptation and Validation of an Urdu Version of the Revised Social Communication Checklist (SCC-R) for Pakistani Children with Autism Spectrum Disorder

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Abstract
This study focuses on the cultural adaptation and validation of an Urdu version of the Revised Social Communication Checklist (SCC-R) for assessing social communication skills in Pakistani children with autism spectrum disorder (ASD). Due to the lack of validated assessment tools in Urdu, this study aimed to ensure the SCC-R's cultural relevance and psychometric reliability for use in the Pakistani context. Following Brislin's model for translation and adaptation, the tool underwent forward and backward translations, with an expert panel refining it to fit cultural and linguistic nuances. A sample of 42 mothers (18 with ASD children and 24 with typically developing children) participated, completing the SCC-R in controlled settings. Content validity was assessed using a panel of experts, resulting in a high Content Validity Index (CVI), demonstrating the instrument's relevance. Psychometric analyses, including reliability tests and item-total correlations, showed moderate reliability across most subscales, with some recommendations for refining the "Imitation" subscale. Significant differences between ASD and typically developing groups on all subscales validated the SCC-R's effectiveness in distinguishing social communication skills. This study underscores the importance of culturally tailored tools, paving the way for more accurate assessments and interventions for ASD in non-Western contexts.

***Keywords**:* Autism Spectrum Disorder (ASD), Social Communication Checklist (SCC-R), Cultural Adaptation, Validation, Psychometric Evaluation

Introduction
Autism spectrum disorder (ASD) affects children in various ways, influencing both their physical and psychological states. Children with ASD may face challenges in social interactions, communication, and sensory processing, which can profoundly impact their daily lives (American Psychiatric Association, 2013). Parenting and treatment of children with ASD involves physical, psychological, and social care, all of which require an understanding of their social communication skills (Lord et al., 2000; National Research Council, 2001). However, assessment of social communication skills of children can be challenging due to the complex dynamic nature of human interaction which includes verbal and nonverbal cues, perspective-taking, and understanding social norms (American Psychiatric Association, 2013; Lord et al., 2000).
In recent years, there has been an increased focus on culturally adapting assessment tools for ASD to ensure they accurately capture the unique sociocultural contexts of diverse populations (Girma et al., 2021; Hu & Tsai, 2020). Assessing social communication in children with ASD can be

particularly challenging in multicultural settings, where differences in cultural norms, language, and social behavior may influence both the manifestation of symptoms and the interpretation of assessment results (de Leeuw et al., 2021; Mandell & Novak, 2005). Adaptation and validation processes help make these tools more relevant and precise, fostering better diagnosis and intervention strategies suited to specific populations (Papadopoulos et al., 2019; Vanegas et al., 2022). This is particularly important for languages like Urdu, where limited standardized measures exist to assess ASD-related social communication skills among children (Javed et al., 2021).

Several instruments have been developed specifically for assessing the social communication skills of children such as the Social Communication Checklist (SCC-R) and Children's Communication Checklist (CCC) (Bishop, 2003; Ingersoll & Dvortcsak, 2010). The SCC-R has been translated and adapted in several languages to assess social communication skills of children with ASD (Akhani et al., 2021; Bejarano-Martín et al., 2022; İnan et al., 2020; Pierucci et al., 2023; Sengupta et al., 2020). However, despite a threefold increase in the incidence of ASD in the last 30 years, there is currently no validated tool available in Urdu tailored for the Pakistani population (Asghar et al., 2023). Therefore, the aim of this study was to assess the validity and reliability of an Urdu version of revised Social Communication Checklist (SCC-R) in a sample of Pakistani children with ASD.

Method

The present study was undertaken as part of an investigation on autistic children where the SCC-R was used to study the social communication skills of children in a Pakistani population. The adaptation process of SCC-R was carried out based on the methods described in the literature according to the following phases; translation, cross-cultural adaptation and psychometric evaluation (Beaton et al., 2000; Ferrer et al., 1996; Guillemin et al., 1993).

Participants

The study was conducted in Rawalpindi and Islamabad following approval from the Advanced Studies & Research Board (Reference no. F.14-12/2020/ERB/NIPQAU). All participants were proficient in reading and understanding Urdu. Before data collection, the study's purpose, objectives, and procedures were clearly explained, and written consent was obtained. The study included 42 participants, comprising 18 mothers of children diagnosed with ASD and 24 mothers of typically developing children (TDC), with inclusion and exclusion criteria used to define each group clearly.

Convenient sampling was employed to gather data from both groups. Data collection for the ASD group occurred at a government hospital's outpatient department, where 18 children meeting DSM-5 criteria for ASD were identified based on developmental history and clinical assessment by an experienced pediatrician. Eligible parents were briefed on the study and asked to provide written consent. They then completed the Social Communication Checklist in a private conference room within the hospital to maintain privacy and minimize distractions. Participants in this group were mothers of children aged 3 to 6 years who met ASD criteria, without any severe visual, hearing, or motor impairments or additional neurological syndromes. The mean age of children in this group was 52.00 months (SD = 11.09), with a majority (94.44%) being male and only one female (5.56%). For the TDC group, data collection took place at Smart School, a private preschool. The researcher obtained approval from the school administration and conducted data collection during a Parent-Teacher Association (PTA) meeting. Parents of typically developing children aged 3 to 6 years, who were attending school and had no neurodevelopmental disorders, were invited to participate. Written informed consent was obtained, and parents of 24 typically developing children completed the checklist. This group had a mean age of 52.33 months (SD = 10.41) and a more balanced gender distribution, with 62.50% male (n = 15) and 37.50% female (n

= 9). Throughout the data collection process, ethical considerations, including confidentiality, voluntary participation, and respect for privacy, were upheld in both settings. This careful approach ensured that the study maintained ethical integrity and that the data collected would provide a robust basis for evaluating the Social Communication Checklist across different child development profiles. The demographic characteristics of the participants are presented in Table 1, providing an overview of the children's age and gender distribution across both groups.

Table 1:Demographic Characteristics of Participants (N=42)

Variable	N (%)
Children	
Total No. of children participating	42
Children with ASD	18
Typically Developing Children	24
Age of child (ASD Group), mean (SD)	52.00 (11.09)
Age of child (TDC Group), mean (SD)	52.33 (10.41)
Gender of child (ASD Group)	
Male	17 (94.44%)
Female	1 (5.56%)
Gender of child (TDC Group)	
Male	15 (62.50%)
Female	9 (37.50%)

Measure

Social Communication Checklist Second Edition (SCC-R)

The Social Communication Checklist, Second Edition (SCC-R), is a tool designed to evaluate social communication skills in children, particularly those with ASD or other developmental delays. It allows parents to assess their child's abilities across multiple domains including social engagement, expressive and receptive language, imitation, and play. The checklist is structured in a developmental sequence, making it useful for tracking progress and identifying areas where the child may need support. Each skill is evaluated based on frequency—whether the child demonstrates the behavior "usually" (at least 75% of the time), "sometimes," or "rarely or not yet." This approach provides a comprehensive overview of the child's social communication competencies.

The SCC-R covers critical areas of communication and social interaction. For example, social engagement skills include behaviors like maintaining eye contact, initiating play, and responding to others' attempts to gain attention. Expressive language is assessed through skills such as babbling, naming objects, combining words, and engaging in conversations. Receptive language includes understanding and following directions, identifying body parts, and responding to questions. The checklist also emphasizes imitation skills, from simple actions like clapping hands to more complex imitative interactions during play. Additionally, the SCC-R evaluates play behaviors, examining how children use toys, engage in pretend play, and take on imaginative roles. Through this multi-dimensional assessment, the SCC-R provides valuable insights into a child's social communication abilities, helping guide targeted interventions and track developmental progress.

Translation and adaptation

The translation process of the Social Communication Checklist followed Brislin's (1976) model, a widely recognized method for ensuring the cultural and linguistic validity of research

instruments. This model emphasizes a rigorous process of both forward and backward translation to ensure the accuracy and appropriateness of the content across cultures. To start, formal permission from the authors of this scale was taken for translating it into Urdu language. Initially, two PhD scholars, one psychologist and one language expert independently translated the original scale into the target language. This step ensured that both the psychological concepts and linguistic nuances were captured. These four translations were then presented to an expert review committee, consisting of two assistant professors in psychology and two psychology PhD students. The committee employed a collaborative approach to evaluate the translated items, ensuring that they were not only linguistically accurate but also culturally relevant to the target population.

Following the forward translation, four independent backward translations were carried out. This phase involved one PhD scholar, two clinical psychologists, and a graduate student of psychology. The backward translations were compared to the original scale to identify any discrepancies or loss of meaning. The expert committee, using the same collaborative approach, reviewed the backward translations, resolving any inconsistencies and refining the items to ensure they retained their intended meaning. Through this meticulous, multi-step process, the final version of the scale was carefully selected and approved by the experts, ensuring both linguistic accuracy and cultural relevance.

Psychometric Evaluation

To assess the content validity of the Social Communication Checklist, a Content Validity Index (CVI) form was created and distributed to a panel of 10 experts. This form included all items from the checklist, each with a 4-point Likert scale for rating relevance, from "not relevant" to "highly relevant." Experts were asked to evaluate each item's appropriateness for assessing social communication deficits in children with ASD. Prior to data collection, each expert received a detailed briefing on the study's objectives and purpose, helping them understand the context and align their evaluations with the scale's intended goals.

The expert panel included three pediatricians, two clinical psychologists, one special education teacher, two psychiatrists, and two medical officers, selected based on inclusion and exclusion criteria. To qualify, each expert needed at least five years of experience working with children with social communication deficits, as well as familiarity with psychometric scales. This ensured relevant and informed feedback on the checklist items. Professionals whose work was primarily clinical, without research involvement, were excluded to maintain a research-focused panel.

Data collection occurred over three weeks, accommodating the experts' varied schedules and locations. CVI forms were distributed and collected either in person or electronically, allowing flexibility while ensuring the integrity of data collection. Once all forms were gathered, the responses were compiled to determine the checklist's content validity, drawing on the diverse expertise of the panel members to enhance the rigor and relevance of the validation process. Table 2 displays the composition of the expert panel showing their professional background.

Table 2: Composition of Expert Panel for Content Validation

Expert Panel Composition	Number of Experts
Pediatrician	3
Clinical Psychologist	2
Special Education Teacher	1
Psychiatrist	2
Medical Officer	2
Total	10

Statistical Analysis

To evaluate the psychometric properties of the Social Communication Checklist Revised (SCC-R), several statistical analyses were performed, including comparisons between two groups: mothers of children with ASD and mothers of Typically Developing Children (TDC). Initially, descriptive statistics, such as mean (M), standard deviation (SD), and reliability coefficients (α), were calculated for each SCC-R subscale, using data exclusively from the ASD sample. The subscales analyzed were Social Engagement, Using Communication-Form, Using Communication-Function, Understanding Communication, Imitation, and Play. Next, item-total correlations and corrected item-total correlations were examined for each subscale. This step assessed the extent to which individual items contributed to the reliability and internal consistency of their respective subscales, providing insight into each item's role within the broader measure.

Finally, an independent samples t-test was conducted to compare the scores of the ASD and TDC groups across the different subscales. This analysis aimed to identify any significant differences in social communication abilities between children with ASD and typically developing children, based on their mothers' responses. Together, these analyses provided a comprehensive view of the SCC-R's reliability, item performance, and group differentiation, helping to establish the checklist's utility in assessing social communication in children with ASD.

Results

Translation Adjustments and Cultural Adaptations

In the Social Communication Checklist – Revised (SCC-R), the term "communication" was consistently translated as "Raabta" in all backward translations. However, during back translation, "Raabta" was rendered as "contact," which did not fully capture the intended meaning of "communication." To address this, the expert committee decided to translate "communication" as "Baat-cheet," a term that more accurately reflects the interactive and conversational aspects of communication in the cultural context. For item 3, which referenced common childhood games like Peek-a-boo, Pat-a-cake, and chase, the English terms were retained in brackets alongside their Urdu translations. This approach was taken to ensure clarity, as these games may not have universally recognized Urdu equivalents. Including both the English and Urdu terms allowed for greater comprehension by parents familiar with either language. In item 22, the word "actions" presented a unique challenge, as it returned with four different translations from the backward translation process. After deliberation, the committee selected the term "sargramiyaan" (activities) for the translation and chose to leave "actions" in brackets to preserve the intended meaning in both languages. Items 25 and 26, which referred to grammatical concepts like "pronoun" and "tense," were handled with care. The committee decided to keep these terms in brackets, alongside their Urdu translations, to ensure that parents who are familiar with the English terminology would not lose context, while still providing Urdu translations for those less familiar.

In item 55, the example provided was a reference to the famous children's song "Wheels on the Bus." Given its widespread recognition, the committee chose to write the song's title in Roman Urdu without translating it, as it is a familiar term among Urdu-speaking parents and retains its original meaning. Item 62 contained the idiom "cause and effect," which was challenging to translate fully into Urdu. Therefore, while the idiom was translated for cultural relevance, the English phrase was also included in brackets to preserve the nuanced meaning of the idiom for those familiar with the original term. Overall, the translation of the remaining items was found to be both culturally and contextually appropriate, ensuring that the adapted scale would be comprehensible and relevant to the target population without losing the integrity of the original content. Table 3 provides a detailed summary of the key translation adjustments and cultural adaptations made to ensure the Social Communication Checklist – Second Edition (SCC-R) is both linguistically accurate and culturally relevant for the target population.

Table 3: Summary of Translation Adjustments and Cultural Adaptations in the SCC-R

Item	Original Term/ Example	Translation	Adaptation/ Explanation
Communication (General Term)	Communication	Baat-cheet	Originally translated as "Raabta," but back-translated as "contact." Adjusted to "Baat-cheet" to better reflect the conversational and interactive nature of communication.
Item 3	Childhood games (e.g., Peek-a-boo, Pat-a-cake, chase)	Urdu translations with original English terms in brackets	English terms retained in brackets alongside Urdu translations to ensure clarity for both English and Urdu speakers.
Item 22	Actions	Sargramiyaan (Actions)	Returned with four different translations. The committee selected "sargramiyaan" (activities) and kept "actions" in brackets for clarity.
Item 25 & 26	Pronoun, Tense	Urdu translations with original terms in brackets	To maintain clarity for both familiar and less familiar parents, "pronoun" and "tense" were kept in brackets along with Urdu translations.
Item 55	Wheels on the Bus (children's song)	Roman Urdu (Wheels on the Bus)	The title of the song was written in Roman Urdu without translation, as it is widely recognized and familiar to parents.
Item 62	Cause and Effect (Idiom)	Urdu translation with original English idiom in brackets	The idiom was translated into Urdu, but the English version was kept in brackets to preserve the original meaning for those familiar with it.

Content Validity

The Content Validity Index (CVI) of the Social Communication Checklist was assessed with a panel of 10 experts, who evaluated six subscales: Social Engagement, Using Communication-Form (Expressive Language), Using Communication-Function (Expressive Language), Understanding Communication (Receptive Language), Imitation, and Play. Each subscale was reviewed for relevance, with items rated on a scale of 1 (not relevant) to 4 (highly relevant). For each subscale, the number of items rated 3 or higher was totaled to compute the average item-level CVI (I-CVI). The overall scale-level CVI (S-CVI) was also calculated to assess content validity.

The results demonstrated high content validity across all subscales. For example, the Social Engagement, Using Communication-Form, and Using Communication-Function subscales each had 15 items, with 146 ratings of 3 or higher and only 4 ratings below 3, yielding an I-CVI of 0.97. Similarly, the Imitation subscale achieved a perfect I-CVI of 1.00. The remaining subscales, Understanding Communication and Play, also demonstrated strong validity with I-CVIs of 0.97. The S-CVI/Ave across all subscales was 0.97, surpassing the recommended threshold of 0.78 for content validity (Polit & Beck, 2006; Yusoff, 2019). As shown in Table 4, the Content Validity Index (CVI) results are presented for each subscale of the Social Communication Checklist.

These findings support the strong content validity of the Social Communication Checklist, confirming that the items appropriately capture the intended constructs. The CVI results suggest that the instrument is suitable for use in future research and applications, ensuring reliable measurement of social communication skills

Table 4: Content Validity Index (CVI) Results for the Social Communication Checklist

Subscale	Number of Items	Relevant (ratings ≥ 3)	Not Relevant (ratings ≤ 2)	Interpretation	SS-CVI/Ave	S-CVI/Ave
Social Engagement	15	146	4	Appropriate	0.97	
Using Communication -Form (Expressive Language)	15	146	4	Appropriate	0.97	
Using Communication -Function (Expressive Language)	15	146	4	Appropriate	0.97	0.97
Understanding Communication (Receptive Language)	8	79	1	Appropriate	0.97	
Imitation	6	60	0	Appropriate	1.00	
Play	11	107	3	Appropriate	0.97	

Descriptive Statistics and Reliability.

The results of the study were analyzed using descriptive statistics, reliability tests, item-total correlations, and t-tests to compare the performance of children with ASD and Typically Developing Children (TDC) on the Social Communication Checklist Revised (SCC-R) (Cohen, 1988; Tavakol & Dennick, 2011). The descriptive statistics and alpha reliability coefficients for the SCC-R and its subscales are summarized in Table 5. The overall SCC-R had a mean score of 47.72 (SD = 12.32) with an alpha coefficient of 0.54, indicating moderate internal consistency (Nunnally & Bernstein, 1994). Among the subscales, the "Play" subscale had the highest reliability ($\alpha = 0.63$), followed by "Using Communication-Function" ($\alpha = 0.65$) and "Understanding Communication" ($\alpha = 0.57$). However, the "Imitation" subscale had the lowest reliability ($\alpha = 0.26$), suggesting the need for further refinement of the items in this subscale. These reliability coefficients highlight the varying levels of internal consistency across the subscales, with most falling in the moderate range (Tavakol & Dennick, 2011).

Table 5: Descriptive statistics and Alpha reliability coefficients (N = 18)

Variables	*K*	*A*	*M*	*SD*	Potential Range
Social Communication Checklist Revised (SCC-R)	70	.54	47.72	12.32	0-140
Social Engagement	15	.59	11.89	3.32	0-30
Using Communication-Form	15	.56	10.56	3.24	0-30
Using Communication-Function	15	.65	9.72	3.64	0-30
Understanding Communication	08	.57	5.56	2.09	0-16
Imitation	06	.26	4.50	1.43	0-12
Play	11	.63	7.39	2.89	0-22

Item-Total Correlation for Social Engagement Subscale. Table 6 presents the item-total and corrected item-total correlations for the "Social Engagement" subscale. Four items showed significant correlations with the total scale score ($p<.05$, $p<.01$), indicating that these items were well-aligned with the overall construct being measured. The highest corrected item-total correlation was found for Item 8 ($r = 0.62$), while the lowest significant correlation was for Item 6 ($r = 0.31$). These findings suggest that while most items were suitable for the subscale, further examination of lower-performing items may be warranted to improve their contribution to the subscale's overall reliability.

Table 6: Item-total correlation and corrected item-total correlation of Social Engagement subscale SCC-R (N=18)

Item No.	*M*	*SD*	Item-total correlation	Corrected Item-total correlation
2	.44	.51	.60**	.47
6	.78	.88	.61**	.31
8	.72	.96	.65**	.62
10	.33	.49	.48*	.38

**p<.05, **p<.01*

Item-Total Correlation for Using Communication-Form Subscale. Table 7 shows the item-total correlations for the "Using Communication-Form" subscale, which assesses expressive language. All items showed significant correlations with the total score, with corrected item-total correlations ranging from 0.35 to 0.45. The strongest item in this subscale was Item 30 ($r = 0.45$), and the weakest was Item 20 ($r = 0.35$). These results indicate a moderate relationship between individual items and the total score, supporting the overall validity of this subscale.

Table 7: Item-total correlation and corrected item-total correlation of Using Communication – Form (Expressive Language) subscale SCC-R (N=18)

Item No.	*M*	*SD*	Item-total correlation	Corrected Item-total correlation
16	.22	.55	.56*	.42
20	.67	.77	.54*	.35
28	.94	.87	.61**	.40
30	1.00	.91	.68**	.45

**p<.05, **p<.01*

Item-Total Correlation for Using Communication-Function Subscale. Table 8 presents the item-total correlations for the "Using Communication-Function" subscale. Items in this subscale also showed strong correlations, with the corrected item-total correlations ranging from 0.41 to 0.66. The highest performing item was Item 40 (r = 0.66), and the lowest was Item 45 (r = 0.41). These results indicate that the subscale is generally well-constructed, with most items contributing strongly to the overall score.

Table 8: Item-total correlation and corrected item-total correlation of Using Communication – Function (Expressive Language) subscale SCC-R (N=18)

Item No.	*M*	*SD*	Item-total correlation	Corrected Item-total correlation
36	.78	.88	.75**	.61
38	.83	.79	.68**	.51
39	.67	.69	.64**	.51
40	.44	.71	.77**	.66
42	.72	.67	.61**	.43
45	.56	.62	.51*	.41

**p<.05, **p<.01*

Item-Total Correlation for Understanding Communication Subscale. Table 9 summarizes the correlations for the "Understanding Communication" subscale. This subscale also exhibited solid item-total correlations, with the highest correlation found for Item 52 (r = 0.52) and the lowest for Item 50 (r = 0.30). The results suggest that most items are appropriate for this subscale, although Item 50 may benefit from further review to improve its correlation with the total score.

Table 9: Item-total correlation and corrected item-total correlation of Understanding Communication (Receptive Language) subscale SCC-R (N=18)

Item No.	*M*	*SD*	Item-total correlation	Corrected Item-total correlation
46	.67	.69	.67**	.42
47	.89	.47	.55*	.43
50	.39	.50	.65*	.30
52	1.1	.64	.76**	.52
53	.22	.55	.71**	.61

**p<.05, **p<.01*

Item-Total Correlation for Imitation Subscale. Table 10 presents the item-total correlations for the "Imitation" subscale of the SCC-R, which assesses children's ability to mimic observed behaviors. The corrected item-total correlations ranged from 0.15 to 0.30, with only two items reaching statistical significance (p<.05, p<.01). Item 57 showed the weakest corrected item-total correlation (r = 0.15), while Item 54 had the strongest correlation (r = 0.30). The relatively low correlations in this subscale suggest that imitation behaviors may be more difficult to capture accurately with the current items, indicating a need for further item development to improve the reliability of this subscale.

Table 10: Item-total correlation and corrected item-total correlation of Imitation subscale SCC-R (N=18)

Item No.	*M*	*SD*	Item-total correlation	Corrected Item-total correlation
54	.94	.64	.67**	.30
57	.33	.69	.70**	.15

**p<.05, **p<.01*

Item-Total Correlation for Play Subscale. Table 11 provides the item-total correlations for the "Play" subscale, which evaluates children's engagement in play-related activities. The corrected item-total correlations ranged from 0.26 to 0.66, with several items showing significant correlations with the total subscale score ($p<.05$, $p<.01$). The strongest performing item was Item 69 ($r = 0.66$), and the weakest was Item 67 ($r = 0.26$). Overall, the "Play" subscale demonstrated moderate internal consistency, suggesting that while most items are effective in assessing play behaviors, a few items could benefit from refinement to better align with the overall construct of play.

Table 11: Item-total correlation and corrected item-total correlation of Play subscale SCC-R (N=18)

Item No.	*M*	*SD*	Item-total correlation	Corrected Item-total correlation
61	.44	.62	.62**	.47
62	.56	.71	.72**	.57
66	.22	.43	.59**	.48
67	.78	.73	.49*	.26
69	.67	.84	.81**	.66

*$p<.05$, **$p<.01$*

Correlations Among Study Variables. Table 12 displays the bivariate correlations among the SCC-R subscales. Strong correlations were found between the "Social Engagement" and "Using Communication-Form" subscales ($r = 0.83$, $p<.01$), indicating that these areas of social communication are highly interrelated (Field, 2013; Pallant, 2020). The "Play" subscale also showed significant positive correlations with several other subscales, particularly "Using Communication-Form" ($r = 0.82$, $p<.01$), and "Social Engagement" ($r = 0.69$, $p<.01$), suggesting that play behaviors are closely associated with communication skills in both groups.

Table 12: ***Bivariate correlation among study variables (N= 18)***

Variables	1	2	3	4	5	6	7
1. Social Engagement	1	.83**	.42	.56*	.47**	.69**	.80**
2. Using Communication – Form		1	.73**	.65**	.58*	.82**	.95**
3. Using Communication – Function			1	-.64**	.43	.64**	-.83**
4. Understanding Communication				1	.67**	.58*	.79**
5. Imitation					1	.45	.64**
6. Play						1	.87**
7. Social Communication Checklist Revised (SCC-R)							1

Comparison of ASD and TDC Groups. The comparison of mean scores between the ASD and TDC groups across all subscales is presented in Table 13. Significant differences were observed between the two groups on every subscale (p<.000). For example, on the "Social Engagement" subscale, the ASD group scored significantly lower (M = 10.44, SD = 2.38) than the TDC group (M = 22.37, SD = 3.18), t (42) = 13.32. Similar patterns were observed for other subscales such as "Using Communication-Function," where the ASD group scored (M = 9.77, SD = 3.57) compared to the TDC group (M = 24.25, SD = 2.09), t (42) = 16.47. The Cohen's d values, all above 3.56, indicate very large effect sizes, suggesting a substantial difference between the two groups across all communication and play skills (Lakens, 2013).

Table 13: Mean, standard deviation and t-values for Autistic and Normal kids on different subscale of skills (N = 42)

	Autistic (*n*=18)		**Normal (*n*=24)**				**95%CI**		
Variables	*M*	*SD*	*M*	*SD*	*T* (42)	*p*	*LL*	*UL*	Cohen's d
SE	10.44	2.38	22.37	3.18	13.32	.000	-13.74	-10.12	4.24
CFEL	10.50	3.25	22.08	2.93	12.08	.000	-13.52	-9.64	3.74
CF	9.77	3.57	24.25	2.09	16.47	.000	-16.24	-12.69	4.95
UCRL	5.44	2.00	11.79	1.53	11.63	.000	-7.44	-5.24	3.56
Imitation	4.17	0.98	8.87	1.15	13.91	.000	-5.39	-4.02	4.39
Play	7.39	2.89	17.41	1.38	14.91	.000	-11.38	-8.67	4.42

These results demonstrate that the SCC-R is a valid tool for differentiating between ASD and TDC populations, with significant group differences and strong internal correlations across most subscales. However, some subscales, particularly Imitation, may require further refinement to improve reliability.

Discussion

The discussion section of this study aims to synthesize the findings, interpret their relevance, and explore the implications of using the Social Communication Checklist Revised (SCC-R). The study successfully demonstrated the reliability and cultural relevance of the adapted tool, while also highlighting areas for further improvement. The Social Communication Checklist Revised (SCC-R) proved to be an effective tool in assessing social communication skills in children with ASD. Significant differences were observed between the ASD group and Typically Developing Children (TDC) across all subscales, including Social Engagement, Communication Form and Function, Understanding Communication, Imitation, and Play. These findings support the utility of the SCC-R in distinguishing between children with ASD and typically developing children in terms of their social communication skills. Importantly, the checklist's ability to detect meaningful differences between these groups further validates its relevance in clinical settings and research focusing on ASD. Moreover, the high content validity of the SCC-R, as assessed by a panel of experts, underscores its appropriateness for the Pakistani context. The translation and adaptation processes ensured that the tool retained its intended meaning while being culturally sensitive to the unique linguistic and social nuances of the target population. This adaptation is crucial, as prior research has consistently highlighted the importance of culturally tailored assessment tools to ensure accurate and reliable evaluation of developmental disorders such as ASD in non-Western contexts. Despite the positive findings, certain challenges and limitations were identified, particularly concerning the reliability of specific subscales. The Imitation subscale, in particular,

exhibited lower reliability compared to the other subscales. The relatively low corrected item-total correlations suggest that imitation behaviors may be more difficult to capture accurately with the current items. This limitation indicates the need for further refinement of the Imitation subscale to improve its reliability and better reflect the range of imitation skills in children with ASD. Refining these items will be crucial in future iterations of the SCC-R to ensure that all subscales contribute equally to the tool's overall psychometric robustness.

The findings of this study have significant implications for the future of ASD interventions in Pakistan and similar low-resource settings. The successful adaptation of the SCC-R demonstrates the feasibility of using it with evidence-based interventions in non-Western contexts. The cultural tailoring of these tools ensures that they are both linguistically and contextually appropriate for the target population, increasing their utility in diverse clinical and research settings. Another consideration is the need for further validation studies to assess the SCC-R's utility across different regions and socioeconomic backgrounds within Pakistan. Given the country's linguistic and cultural diversity, additional studies with larger, more varied samples could ensure the tool's generalizability and adaptability beyond the urban settings of Rawalpindi and Islamabad. Such studies would also help refine the tool's applicability in rural and underserved areas, where the need for culturally appropriate ASD assessments is particularly high. Finally, the successful adaptation of the SCC-R suggests possibilities for similar adaptations of other assessment tools used with children with neurodevelopmental disorders in Pakistan. As awareness and diagnosis of ASD increase in the country, validated tools like the SCC-R can support more accurate identification and intervention planning, potentially leading to better developmental outcomes. This study thus not only contributes to the assessment of social communication in Pakistani children with ASD but also sets a precedent for culturally adapting psychological tools to improve accessibility and relevance in low-resource settings. Overall, the findings of this study demonstrate the importance of culturally adapting and validating assessment tools to ensure their effectiveness in diverse populations. The SCC-R has shown great promise in the Pakistani context, providing a foundation for future research and practical applications aimed at improving the developmental outcomes of children with ASD.

Conclusion

The results of this study demonstrate the validity and reliability of the Social Communication Checklist Revised (SCC-R). The content validity assessment, conducted by a panel of experts, indicated that the SCC-R has high content validity across all subscales, with strong agreement on the relevance of the items. Additionally, the psychometric evaluation and comparative analysis provided evidence that the SCC-R is an effective tool for differentiating between children with ASD and Typically Developing Children (TDC). Significant differences between the groups were observed in all communication and play-related subscales, confirming the checklist's ability to accurately assess social communication deficits. Despite the overall positive findings, some subscales, such as Imitation, exhibited lower reliability, suggesting that certain items may benefit from further refinement. Overall, the SCC-R proves to be a valuable instrument for future research and clinical assessments of social communication in children.

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