Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 3 No. 5 (May) (2025)

Assessment of Urdu phonological awareness of typically developing children aged 5-7 years in Pakistan

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Abstract
Purpose: Phonological awareness is a foundational skill for early literacy development, yet there is a lack of standardized assessment tools in Urdu for typically developing children. This study aims to assess a newly developed Urdu Phonological Awareness Tool designed for children aged 5 to 7 years.
Methodology: The tool includes tasks targeting rhyming, oddity, blending, segmentation and manipulation considering culturally relevant vocabulary and images. A sample of 156 typically developing children from private and public schools in Lahore, Pakistan, was assessed.
Findings: The results indicate that the tool is age-appropriate, reliable, and effectively identifies varying levels of phonological awareness in young learners. This tool has the potential to assist educators, speech-language pathologists, and researchers in promoting early reading skills through native language support
Contribution to theory, policy and practice: We have considered staged theory, auditory processing theory and emergent literacy theory. That states the development goes on in steps and It supports that literacy development begins long before formal schooling, and phonological awareness emerges through exposure to oral language, storytelling, and print-rich environments. Early assessments should focus on environmental exposure, such as the child's familiarity with rhymes or alliteration

Keywords: phonological awareness, literacy, early childhood, speech language pathology.

Introduction

Phonological awareness refers to the ability to detect, identify, and manipulate the sound structures of spoken language, such as syllables, rhymes, and phonemes. It is considered a critical pre-literacy skill, particularly in alphabetic languages. In Urdu, which is the national language of Pakistan and spoken by millions, early literacy instruction lacks structured tools to assess these foundational skills.
Globally, tools like the Comprehensive Test of Phonological Processing (CTOPP) and Phonological Awareness Literacy Screening (PALS) have guided early interventions in English-speaking contexts. However, in Pakistan, there is a significant gap in phonological awareness assessment resources, particularly in

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

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Urdu. This limitation affects both diagnostic and instructional practices in early childhood education.

The objective of this study was to develop and assess the effectiveness of a culturally and linguistically appropriate Urdu phonological awareness assessment tool for typically developing children. By doing so, we aim to contribute to the early identification of reading readiness and support the development of literacy curricula in Urdu.

Stage Theory (Stanovich & Liberman, 1970s–80s)

Phonological awareness develops in a hierarchical sequence, beginning with an understanding of larger sound units such as syllables, and gradually progressing to more refined skills like identifying individual phonemes. The typical developmental progression moves from **syllable and rhyme awareness**, to **onset and rime awareness**, and finally to **phonemic awareness**. Therefore, phonological assessments should be structured to reflect this progression—starting with simpler tasks like syllable segmentation and advancing to more complex tasks such as phoneme manipulation.

Auditory Processing Theories (Tallal, 1970s–80s)

According to auditory processing models, difficulties in processing rapid changes in speech sounds can hinder the development of phonological awareness. Children with such deficits may struggle with auditory discrimination. Assessments should, therefore, include tasks that evaluate auditory discrimination abilities, and interventions can be designed around rhythmic and auditory-motor activities, such as clapping syllables or tapping to speech patterns, to improve temporal processing.

Emergent Literacy Theory (Teale & Sulzby, 1980s)

This theory suggests that literacy development begins well before formal schooling, rooted in early interactions with spoken language and exposure to print in the environment. Assessments should take into account a child's early language experiences and print exposure. Effective interventions in this stage include **shared reading**, **storytelling**, and **engaging word-based games** that promote phonological sensitivity and familiarity with print.

Empirical Review

Phonological awareness development in Arabic

Phonological Awareness Assessment in Arabic

Al-Shaboul et al. (2013) developed a phonological awareness (PA) assessment tool for 100 native Arabic-speaking children (49 girls and 51 boys) aged 7 in Jordan. The tool categorized PA development into three levels: delayed (10–15%), emerging (30–35%), and developed (70–80%). Validation involved consultations with academic experts and teachers, and the tool demonstrated high reliability ($r = .93$). The authors emphasized the need for further studies on the role of PA in Arabic-speaking children's reading development.

Tamer (2015) created another PA tool for Arabic-speaking children aged 5–8. The instrument measured rhyme recognition, syllabic awareness, and phonemic awareness using 50 words of varying syllable structures (mono-, di and tri-syllabic). Each task was scored on a binary scale (0 or 1). Reliability was

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

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determined through a test-retest method, while validity was established by correlating individual task scores with overall performance. The findings confirmed a strong positive relationship between PA and reading proficiency.
Sana Tibi (2010) examined the development of PA in 140 Arabic-speaking students from grades 1 to 3. Tasks included rhyming, identifying initial sounds, syllable deletion, and phoneme segmentation. The results supported the hierarchical nature of PA development, with phoneme segmentation identified as the most challenging task. Significant performance differences were observed in grade 3, indicating progressive PA skill development across grades.

Oral Language and Early Reading Development
Cooper et al. (2002) conducted a longitudinal study involving 39 children to examine the connection between oral language skills and early reading outcomes. The study found that while phonological awareness predicted early word reading, reading comprehension in grade 2 was more strongly associated with semantic abilities rather than PA.

Letter-Sound Knowledge and PA
Foy (2006), in a study conducted in Los Angeles, demonstrated that both letter-sound knowledge and phonological awareness were significant predictors of reading ability in preschoolers. The research also found a reciprocal relationship, where early PA skills influenced the development of letter-sound knowledge.
Similarly, Lerner (2016), in research conducted in Florida, reported a positive association between letter knowledge and PA among preschoolers. While phonological awareness continued to develop over time, vocabulary showed no significant progression. Letter knowledge was consistently linked with all levels of PA.

Phonological Awareness and Literacy
A large body of research supports phonological awareness as a key predictor of reading and spelling success (Snowling & Hulme, 2005). In the early stages, children acquire the ability to break down words into syllables, recognize rhymes, and eventually identify individual phonemes. These foundational skills serve as a bridge between oral and written language.
Assessment tools for PA are well-developed in English and other widely spoken languages, incorporating tasks such as rhyme recognition, onset-rime awareness, and phoneme manipulation (Torgesen et al., 1999). However, in Urdu, despite studies like Ahmed & Rana (2016) addressing aspects of literacy development, a standardized PA assessment tool remains absent.

Urdu Phonological Structure and Literacy Implications
Urdu's unique phonological system—which includes aspirated consonants, nasalized vowels, and a script derived from Persio-Arabic—affects both phoneme perception and instruction methods. These linguistic characteristics highlight the importance of developing culturally and linguistically appropriate PA tools for Urdu-speaking children.

Implications for Educational Psychology and SDGs
With growing emphasis in educational psychology on mother-tongue instruction,

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ISSN Online: 3007-3154
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the development of PA tools in native languages like Urdu aligns with Sustainable Development Goal 4 (Quality Education). Such tools are essential for the early identification of learning difficulties and for supporting foundational literacy development.

Gaps in Research

Existing literature shows limited exploration of the link between oral narratives and phonological awareness in Urdu. While broader studies suggest a positive correlation between these variables, more research specific to Urdu is needed. Additionally, factors such as maternal education, family income, and the home literacy environment have been shown to positively influence both oral narrative skills and PA. However, findings regarding the relationship between letter-sound knowledge and PA are mixed, indicating a need for further investigation.

Objective of the study: to design a culture and language specific tool for measuring phonological awareness that can be applied to typical settings and clinical settings.

Methodology

Research Design: Study was based on cross -sectional matched group research design

Location: Sample was taken from Shadman Lahore Pakistan

Sample: Sample size was determined through G power. The sample for main analysis was estimated with medium effect size of .03, alpha of .05 and beta of .95. The calculated total sample was 150 participants.

Purposive sampling technique was applied for the selection of the participants, 156 typically developing children from three age groups; 5.0-5.11, 6.0-6.11 and 7.0-7.12 years were taken.

The sample was divided as 52 participants in each age group. The characteristics of participants were having average IQ, normal language development and fluent Urdu. They were recruited from 2 private and 2 govt. schools of Shadman town in Lahore, consisting equal number i.e., 26 boys and 26 girls in each groups

Criteria

Inclusion criteria

Participants in the study were selected on the basis of following criteria:

- 5.0 to 7.11 typically developing children, (Rolando, 2003). It was measured by average IQ score on Slosson Intelligence Test.
- Children who have normal language development (Macfarlane, 2017). It was measured by test of narrative retell (TNR).
- Children who speak Urdu fluently (Sardelić, 2008) it was measured by speech rate of word per minute (wpm).

Exclusion criteria

1. Children with any hearing, speech and language impairments (Puranik etal., 2009, Harris 2011). It was ruled out through questions in demographic sheet and oral motor examination.

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ISSN Online: 3007-3154
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2. Children with physical/medical conditions eg: Cerebral palsy, epilepsy, cleft lip or palate (Critten, 2014). It was ruled out through questions in demographic sheet and oral motor examination.

Descriptive statistics was applied to demographic variables: age, gender, type of school as govt. and private, number of siblings, child's number in siblings, child's care taker, mother education, mother occupation, father education, father occupation, family income, family system, habit of story listening, mode of story listening and grades in school.
Ethical approval for the study was obtained from the relevant institutional review board. Informed consent was obtained from parents or guardians before their children participated in the study Ethical approval for the study was obtained from the relevant institutional review board. Informed consent was obtained from parents or guardians before their children participated in the study

Assessment Measures for Data Collection
Screening Measures
Slosson Intelligence Test–Revised, Third Edition (SIT-R3; Slosson, Nicholson, & Hibshman,2001):
To estimate general cognitive and verbal intelligence, the Urdu-translated version of SIT-R3, developed by the Center for Clinical Psychology, Punjab University (2017), was used. This test consists of 187 items that evaluate a range of cognitive abilities, including vocabulary, general knowledge, comprehension, logical reasoning, quantitative skills, and auditory memory. It provides an overall IQ score. Participants with IQ scores within the average range (89–109) were included in the study. The test-retest reliability of SIT-R3 is reported to be .96, indicating strong consistency.

Research Measures
Test of Phonological Awareness (Ikhlaq, 2019):
An Urdu-language phonological awareness assessment tool was developed by the researcher to evaluate phonological processing in children aged 5.0 to 7.11 years. The test assessed multiple components of phonological awareness, including:

- Rhyming (rhyme identification and rhyme production)
- Oddity and Blending (syllable and phoneme blending)
- Segmentation (syllable and phoneme segmentation)
- Manipulation (phoneme substitution, deletion, and addition)
- Letter-sound correspondence

The assessment consisted of 100 items, each scored on a binary scale (0 or 1), reflecting the presence or absence of the target skill.
Assessment of Narrative Generation (McConnell, 2011):
Narrative ability was measured using a story generation task, specifically the well-known fable "The Lion and the Mouse." A series of ten sequentially arranged illustrations from the story were presented to each participant. Children were asked to generate a story based on the images. Only an initiating line was provided, with no additional prompts or cues, to evaluate the child's spontaneous narrative skills. Stories were analyzed using story grammar analysis to assess structural and linguistic elements of narration.

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Demographic Sheet
A structured demographic questionnaire was used to collect detailed background information on each participant. The form included data on age, gender, school type, number of siblings, birth order, primary caregiver, family structure, and parental education and occupation. It also gathered details about household income, language development milestones, learning and educational history, and narrative development background.

Procedure
Test Development
Assessment of Phonological Awareness (Ikhlaq, 2019):
An Urdu phonological awareness assessment tool was developed by the researcher to evaluate the phonological abilities of children aged 5 to 7 years. The test focused on five core areas: rhyming, oddity, blending, segmentation, and manipulation, with an additional section for phoneme-to-grapheme correspondence.

Subtests Overview
1. Rhyming Task
This section included two subtests: **rhyme identification** and **rhyme production**.

- *Rhyme Identification:* The child was presented with a series of words (e.g., شان، کام، نام) and asked to identify the two that rhyme.
- *Rhyme Production:* The child was provided with a word and asked to produce two additional rhyming words.
- **Reliability:** 0.77
-

2. Oddity Task
This subtest, presented through images, required the child to identify the item that began with a different initial sound from a set of three (e.g., *sofa, zebra, star* — the word *zebra* has a different initial sound).

- **Reliability:** 0.60

3. Blending Task
Divided into two subtests:

- *Syllable Blending:* Words were segmented into syllables (e.g., در–وا–زہ) and the child had to blend them to form the word.
- *Phoneme Blending:* Words were broken into phonemes (e.g., گ–ا–ڑ–ی) for the child to blend and say the complete word.
- **Reliability:** 0.76

4. Segmentation Task
This involved two tasks:

- *Syllable Segmentation:* Children clapped to separate syllables and counted them in words like کپڑا or خربوزہ.
- *Phoneme Segmentation:* Children were asked to break words into individual phonemes.
- **Reliability:** 0.77

5. Manipulation Task
This section assessed the ability to substitute, delete, and add phonemes. Tasks were conducted using a string of beads to represent phonemes.

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www.thedssr.com

ISSN Online: 3007-3154
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- *Substitution:* e.g., replacing س with ج in ساگ results in جاگ.
- *Deletion:* e.g., removing چ from چابی results in آبی.
- *Addition:* e.g., adding پ to آس forms پاس.
- **Reliability:** 0.84
-

6. Phoneme-to-Grapheme Correspondence
Children were shown groups of letters and asked to identify and name them. The time taken to complete this task was recorded to assess automaticity.

Test Construction Process
Step 1 – Content Selection:
Words were chosen from textbooks commonly used by children aged 5 to 7.11 years. The framework followed the levels of phonological awareness proposed by Adams (1990): rhyming, oddity, blending, segmentation, and manipulation. Each category included two subgroups (except manipulation, which had three), with ten items per subgroup. A separate phoneme-to-grapheme section was also added. The total number of items was 100, scored as 0 (incorrect) or 1 (correct).

Step 2 – Word Arrangement
Words were categorized by complexity into monosyllabic, disyllabic, and tri-syllabic levels. Syllable structures included:

- *Monosyllabic:* CV, CVC, CVCC, VC
- *Disyllabic:* CV.CV, VC.VC, CVC.CV, CV.CVC
- *Tri-syllabic:* CV.CV.CV

Simpler forms were presented first, followed by more complex words.

Step 3 – Stimulus Material Preparation
For the oddity task, image-based items were selected. Specially designed cards were created for the phoneme-grapheme correspondence task. To control difficulty, diacritic-heavy words were avoided, with only basic diacritics (like *zabar*) used in the final few items.

Step 4 – Validation
The tool's content validity was ensured through consultation with senior speech-language pathologists, university professors, and school teachers. A binary scoring system was applied for all items (0 = incorrect, 1 = correct).
This Urdu Phonological Awareness Tool, consisting of ten subscales with ten items each, provides a comprehensive assessment of foundational literacy skills. Its development is rooted in linguistic theory and aligned with practical classroom vocabulary, ensuring both theoretical relevance and field applicability.

Pilot Study
A pilot study was conducted using an assessment battery that targeted key areas of phonological awareness, along with a phoneme-grapheme correspondence test. The tool was piloted with a sample of 16 Urdu-speaking children, comprising eight children from each age group within the study's target range. The purpose of this phase was to evaluate the clarity, appropriateness, and feasibility of the test items. The research topic and methodology received formal approval from the Departmental Doctoral Program Committee (DDPC) at the Center for Clinical

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Psychology, University of the Punjab, Lahore.

Main Study Procedure

Permissions and Recruitment

Permission to use standardized assessment tools was formally obtained. The researcher approached ten schools located in the Shadman area, providing principals with detailed information sheets outlining the study's objectives and procedures. Of these, four schools granted permission to conduct the research.

Participant Selection

Children were selected based on their date of birth to ensure age-appropriate grouping. Information sheets, consent forms, and demographic questionnaires were distributed to parents. Only children whose parents returned signed consent forms were considered for participation. Initial screening was conducted using the demographic forms to rule out any known physical, developmental, or language-related anomalies.

Screening Assessments

Eligible participants were individually assessed using the Slosson Intelligence Test (to confirm average or above-average intelligence) and a Narrative Retelling Test (to ensure typical language development). Only children who met these inclusion criteria proceeded to the main assessment phase. School authorities were requested to provide a quiet, furnished room suitable for one-on-one testing. Before administering the formal assessments, rapport was established with each child through casual conversation. Assessments were conducted individually, starting with the intelligence screening followed by the language task. From each school, 45 students were initially assessed, and ultimately 13 children from each age group were selected, totaling 39 participants per school. Each participant was allocated approximately 20 minutes for the main testing session. The data collection process was organized in two stages:

- Screening phase: 15 minutes per child
- Rest interval: 15 minutes (during which the next participant was prepared

To maintain participant engagement, positive verbal reinforcements (e.g., "great," "good work") and small incentives (candies, chocolates) were provided. All phonological awareness components were administered orally, with trial items included at the beginning of each subtest to familiarize participants with the format. Some tasks involved showing pictures, while others used letter cards. All sessions were audio-recorded and evaluated by a professional with over ten years of experience in speech-language assessment. Data collection spanned 75 days. Out of 200 children initially considered, 156 were assessed, while 35 forms were excluded for not meeting the inclusion criteria, and 14 participants withdrew during the process.

Ethical Considerations

1. Ethical Approval: The research received formal approval from the Departmental Doctoral Program Committee (DDPC).
2. Informed Consent: Written permissions were obtained from the authors of standardized tools, school administrations, and parents of participating children.

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3. Voluntary Participation: Participants were informed of their right to withdraw from the study at any point, without any consequence.
4. Confidentiality and Anonymity: All data were treated with strict confidentiality, and identifying information was kept anonymous.
5. Data Usage Assurance: Parents were assured that all collected data would be used solely for academic and research purposes.

Descriptive statistics and Cronbach alpha were used to measure consistency and item reliability. Age-wise performance trends were observed using mean scores and standard deviation.

Results and Discussion

The tool showed strong internal consistency (Cronbach alpha = 0.77). Age-wise performance

Table: Reliability Analysis of Subscales of Phonological Awareness through Cronbach Alpha (N=156)

Subscale	*Items (K)*	*M*	*SD*	*α*	*Range*	
					Potential	*Actual*
Rhyming	20	15.06	2.72	.77	9-20	11-20
Rhyme identification	10	8.63	1.42	.60	5-10	5-10
Rhyme production	10	6.42	1.50	.60	5-10	5-10
Oddity	10	7.84	1.18	.60	4-10	6-10
Blending	20	14.42	3.49	.76	12-20	8-20
Blending of syllable	10	7.21	1.74	.50	7-10	3-10
Blending of phoneme	10	7.65	1.93	.64	7-10	3-10
Segmentation	20	14.47	3.72	.77	16-20	4-20
Segmentation of syllable	10	7.65	1.93	.64	9-10	1-10
Segmentation of phoneme	10	6.83	2.24	.64	8-10	2-10
Manipulation	30	19.38	5.52	.84	21-30	9-30
Phoneme substitution	10	5.92	2.10	.60	8-10	2-10
Phoneme addition	10	8.56	1.76	.68	8-10	2-10
Phoneme deletion	10	4.89	2.56	.71	7-10	0-10

Children demonstrated the highest performance in syllable segmentation and rhyme recognition, while phoneme blending proved to be the most challenging, particularly for younger participants. Although girls slightly outperformed boys, the difference was not statistically significant. The tool was well-received by both children and teachers, requiring minimal instructions, which reflects its ease of use and suitability for typical classroom settings.

Discussion

The results indicate that the Urdu Phonological Awareness Tool is a reliable and age-appropriate measure for evaluating early literacy skills in typically developing children. The progression of scores with age aligns with developmental patterns observed in international studies (e.g., Lonigan et al., 1998), reinforcing its validity.

The tool's effectiveness is further supported by its cultural relevance and inclusion of commonly used Urdu words, which likely enhanced children's familiarity and

ISSN Online: 3007-3154
ISSN Print: 3007-3146

engagement during testing. These findings emphasize the critical need for early phonological interventions, particularly in public schools where access to literacy resources remains limited.

However, a key limitation of this study is the limited diversity of the sample, as it primarily included urban, Punjabi-speaking children. Future research should aim to include participants from varied linguistic and regional backgrounds to ensure broader applicability and generalizability of the tool.

Conclusion

This study highlights the feasibility and potential of developing a structured, developmentally appropriate phonological awareness assessment in Urdu. The tool demonstrates strong promise for use in both educational and clinical settings to identify children at risk for reading difficulties at an early stage. Introducing such assessments into Urdu-medium classrooms can help bridge the gap between oral language development and early literacy, contribute to teacher training, and ultimately lead to improved reading outcomes nationwide.

Recommended next steps include:

- National standardization of the tool
- Development of targeted intervention resources
- Longitudinal studies to monitor literacy progress over time using this assessment

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