Some Results of Descriptive Analysis of the Phonological Development in the Early Speech of the Mongolian Children

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Abstract. Each language differs in pronunciation, grammar, and intonation from one another. Mongolian sounds are pretty different from other languages in that they require the flexibility and muscle development of speech organs. This study aimed to identify the characteristics of children's pronunciation in phonetic and phonemic acquisition to identify how differences in pronunciation vary from child to child and pronunciation changes. Utilizing interviews with each child saying a single sound and word saying task, we randomly selected 1083 children q1aged 2- to 5-year-olds. As a result, we have found: a) early childhood sound pronunciation status whose mother tongue is Mongolian; b) at first, children pronounce sounds clearly which involve organs in front of the speech organ, and the speech sounds that are pronounced in the middle and behind places of speech organs become more apparent later c) the most challenging speech sounds for young children are [r], [s], [ts], [sh], [dz], [dj] and [ch]; d) the Aprocess of changes of pronunciation changes differs in each child and has 2–3 stages. Today, there are no significant studies on early childhood sound pronunciation skills. We assume that policymakers and early childhood educators should periodically investigate this study.

Keywords: Consonants · Language development · Mispronunciation · Sound pronunciation · Vowels

1 Introduction

Language development is one of the leading indicators of human development. Language development is a systematic understanding that includes many domains such as phonology, semantics, morphology, syntax, and pragmatics. Children can acquire abilities to pronounce phonemes accurately, understand word meanings, choose correct words, and express meaningful speech in early childhood [6]. Each of these aspects refers to a specific language domain; the parts do not develop in isolation from each other [12].

Phonology is the basis of language development in early childhood. A phoneme is the smallest linguistic unit of sound combined with other phonemes to form words [12]. Children acquire the ability to produce words by creating syllables by repeating the phonemes which they hear, then combining syllables into the words. Phonology is

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significant because sounds alter the word's meanings [14]. Even if a child mispronounces a sound, the listener may misunderstand the intentions of the speech he is trying to convey. Therefore, phonology should be the essential criteria for inquiries of early childhood physique and cognitive and social development evaluation.

The practical approach to speech disorders in children is correctly assessing the child's speech and vocal system [16]. A comprehensive evaluation of speech sound may include a standardized single word test, additional single word test, linked speech sampling, phonological analysis, awareness testing, and discrepancy testing [9]. In articulation and phonological evaluation analysis methods, the age range usually starts from 3, and children acquire sound pronunciation at three [4]. To evaluate the phonological skills, it is necessary to know the age ranges in which the sounds that make up the child's mother tongue are acquired [14].

This paper aims to introduce the research results that identify the gravity of Mongolian-speaking children's sound production. It could be normative data for the phonological Acquisition of Mongolian children.

2 Literature Review

2.1 Sound Acquisition

The phonological acquisition is an essential part of acquiring a complete mother tongue. Several models explain the early phonology development: a) traditional or behaviorist model; b) linguistic; c) psycholinguistic [11]. Behavioral models assume that external stimuli play a significant role in a child's phonetic pronunciation, while natural models consider language natural [11]. The universal structure theory by Jakobson, which refers to the linguistic model, postulates a relationship between phonological acquisition in children [17]. Young children produce a highly restricted set of consonants; the segments produced are similar cross-linguistically, and early words are limited to one- and two-syllable forms [10].

Phonology acquisition is a process that has standard features indicated in most languages. Therefore, many researchers have developed a pattern of phonology acquisitions, mispronunciation, and its types [8], [10].

There have been two techniques for exploring the development of an arrangement of differentiation by young children. The first research [1], [13] focused on differences and processes in children's language. These specialists stressed that early language methods should consider a child's individuality [7]. The second approach to review the securing of differentiation is to assume that a part in grown-up phonological cycles is gained on time, as the phonological action of elements signals children to focus on those elements [7].

Simplification strategies in child language must be universal since their cross-linguistic occurrence is adequately widespread to be labeled child language patterns. While some child language processes are optional and some more common than others, some processes are simply unavoidable to children, as we saw in the case of reduplication. Let us now look at another joint, probably inevitable, process in children [8].

Young children's phonology development can be examined in two ways: phonetic and phonemic acquisition. The term "phonetic" alludes to speech sound production

(articulatory/coordinated abilities), and the word "phonemic" refers to speech sound use (functions, behaviors, and organizations of the speech sound system) [3].

To my knowledge, there are minimal studies related to early phonology acquisition in Mongolia. Most studies investigating early childhood phonology acquisition examined consonant production in initial, medial, and end positions and strategies children use to ease their pronunciation. These studies emphasize a few limited theoretical perspectives and not many new findings that contribute to early childhood phonological development.

3 Research Method

This research assessed 1083 Mongolian native-speaking children aged between two and five years, from two of the biggest cities and six provinces of Mongolia. Table 1 summarizes the sample's demographic characteristics.

To meet the standard of the SES in terms of age and particular geographic areas, assessors randomly selected children whose parents had agreed to participate in the study.

The pre-service teacher training students conducted this survey. They participated in a two-day training that explained the purpose of the study, interview running approaches and methods, consent letters for parents, and an assessment sheet.

The assessors interviewed each child individually, and each assessor transcribed the child's pronunciation phonetically. Assessor and child were seated confronted, looking at each other in a room not to disturb the child's attention. If a child fails to produce sounds correctly, the assessor asks the child to repeat, allowing one more attempt. Assessors made recordings to check reliability. The 25 students who participated in the training strictly followed the rules and regulations, which made the survey more accurate and realistic.

Numerical values of the study were derived from the number of children who pronounced sounds and words correctly and as a percentage of their total sample.

The survey consists of two parts:

- Articulation is a single sound. In this task, the assessor asked the child to repeat all sounds, including vowels and consonants, after the assessor one by one.
- Articulation initially prepares words that examine a child's consonant production in CV/VC syllable context and consonants located at word-initial, word-medial, and word-final positions. In determining terms, we have held the following concepts:

Table 1. Sample demographic characteristics

Age	Sample size	Age-related date
2-year-olds	200	from 2 years one day – to 2 years 11 months 30 days
3-year-olds	258	from 3 years one day – to 3 years 11 months 30 days
4-year-old	315	from 4 years one day – to 4 years 11 months 30 days
5-year-olds	310	from 5 years one day – to 5 years 11 months 30 days

- Words with 1 to 2 syllables
- Comments that contain no more than three consonants
- Statements that are used effectively in a child's expressive language

We have analyzed the transcript production of the children to detect the age and the order of acquisition of consonants. Three criterion levels (50%, 75%, and 90%) were used to determine the age and acquisition order. A consonant phoneme is acquired when 90% of children in the examined age group could utter it correctly in all word-initial positions [5]. When 75% of the research-involved children could correctly say the target phoneme in all places, this was considered the age of complete mastering of this consonant phoneme.

4 Research Findings

4.1 Pronunciation Character of Vowel Sounds

There are primary and additional vowels (as named in Mongolian) in the Mongolian language: primary and additional. The following table indicates the pronunciation status of these two kinds of vowels:

4.1.1 Vowel Production

Table 2 shows children produce all vowels accurately. The vowels produced as a mixture of two sounds are complex for some children. These vowels are regarded as unique sounds of Mongolian because they are not available in every language. To produce these sounds, a child should toughen his lips; therefore, there is a need for muscle development of speech organs.

4.1.2 The Additional Vowels

Table 3 shows us that additional vowels are more complex than primary vowel sounds to pronounce. This table also assumes that children's sound production changes over time to correct incorrect presentation. However, children's speech becomes more accurate as they age [3]. Environment factors influence language development; therefore, we should examine early childhood language development by a longitudinal survey.

Table 2. Primary vowels' production

Primary sounds	2-year-olds' production percentage	3-year-olds' production percentage	4-year-olds' production percentage	5-year-olds' production percentage
[a, e, i, o, u]	100	100	100	100
[ö]	100	100	99	99.5
[ü]	100	100	100	99.5

Table 3. Additional vowels' production

Primary sounds	2-year-olds' production percentage	3-year-olds' production percentage	4-year-olds' production percentage	5-year-olds' production percentage
[ya]	100	98.8	96.8	100
[yo]	100	95	95.9	98.7
[ye]	99	94.2	97.1	96.8
[yu]	94	86.4	97.1	93.5

Table 4. The Mean age of acquisition of [r]

	2-year-olds	3-year-olds	4-year-olds	5-year-olds
[ɹ]	52	64.9	81.9	88.7

4.2 Pronunciation Character of Consonants

4.2.1 Consonants Production

2-Year-Olds:

a) More than fifty-two percent of all 2-year-olds can pronounce all consonants.
b) Fifty-two percent of two- to 3-year-olds involved in research mispronounce the consonant [r]. Therefore, this is the most demanding sound to pronounce at this age. 31.5 per cents of research-involved children pronounced the consonant [r] by [l], 10.5 per cents of them by [əi], 2 per cents by [d] sound, and 4 per cents of these children did not respond.
c) The most children, 60 to 85 per cents of research-involved 2-year-olds mispronounced the following sounds such as [sh], [z], [ch], [dj], [ts], [s], [p], [j] and [t]. However, children at three, four, and five pronounce these consonants more clearly; research data shows that kindergartners continue to mispronounce these sounds.
d) Most children produce sounds correctly produced by the labial, initial part of the tongue, and tongue tip.

3-Year-Olds:

a) 64.9 percent of 3-year-olds produce all consonants understandably and adequately.
b) However, the percentage of clear pronunciation has increased comparatively to 2-year-olds; there is a continuing mispronunciation of the consonants children mispronounced at previous age. 64.9 percent of them pronounce correctly, and five-year-olds' repeat the features. Only ten to fifteen percent of 3-year-olds had improved their

phonetic skill. The consonant [r] is still the most demanding sound to pronounce for them.

c) In the last age, eleven sounds were less than 85 percent, and in three to four ages of children reduced these eleven sounds to eight.
d) It proves that young children's language develops rapidly and effectively in early childhood and proves Barbara Dodd's research result [3].
e) The sounds like [f], [t], [dz] are becoming to pronounce clearly. These sounds are produced at the tip of the tongue and are reformed easily, indicating the natural order of the vocal organ.

4-Year-Olds:

a) Children's phonetic skill improves more rapidly than at previous ages. The 81.9 percent of research-involved 4-year-olds pronounce all consonants correctly.
b) The most challenging sound [r] is still complex for 4-year-olds, and only 81.9 percent can pronounce this consonant. However, from this number, we can see the improvement in children's phonological production, and 80 percent of all research-involved children can pronounce all sounds. It influences their speaking and expressing skills and self-confidence positively. Therefore, they have noticeable improvement in communication with others and peers.

5-Year-Olds:

88.7 Percent of 5-Year-Olds Can Pronounce All Consonants. Some Interesting Data Specifies the Following:

a) Some consonants pronounced more clearly at previous ages became mispronounced. For instance, however, the children's percentage that mispronounced consonants such as [ts], [s], and [dz] was not so high at the last age. Still, at this age, the percentage of these consonants is leading.
b) The number of children that accurately produced the consonant [r], the most challenging sound in the previous ages, increased.

The following table indicates the precise production percentage of the consonant [r] by age. The sound [r] is a trilled sound that is the most challenging for children.

The age of acquisition of /ɹ/ across studies was examined in detail using descriptive statistics (mean, median, standard deviation, range) and shows that /ɹ/has the most significant standard deviation of any of the English consonants at the 90% criterion (M = 66.58, SD = 18.62, range: 30–96 months). It is important to note that many studies only reported the acquisition of /ɹ/ (frequently using the symbol /r/) in word-initial position and described "r" in word-final place as being produced as the vowels /ɝ/and/or/ɚ/ [15].

Table 5. The Mean age consonant acquisition of [r] for Mongolian-speaking children within Mongolia and children organized according to age in years

Age	Mongolian sample			Global sample		
	50–63%	63–76%	76–90%	50%	75–85%	90–100%
2-year-olds	/ɹ/					
3-year-olds		/ɹ/		/ɹ/		
4-year-olds			/ɹ/		/ɹ/	
5-year-olds			/ɹ/			/ɹ/

Note. In Mongolian sample is based on the current study survey of 1083 children. The global sample is based on 15 studies of 7.369 analyzed in the study of McLeod and Crowe [2].

Table 6. Mongolian initial-consonant acquisition for typical speech

Age	50%	75%	90%
Two-year-olds	/ɹ/	/v, ž, z, k, p, s, f, x, c, č, š, šč/	/b, g, d, l, m, n, t, /
Three-year-olds	/ɹ/	/v, ž, z, k, p, s, t, f, x, c, č, š, šč/	/b, g, d, l, m, n, x/
Four-year-olds		/ž, ɹ, č, š/	/b, v, g, d, z, k, l, m, n, p, s, t, f, x, c, šč/
Five-year-olds			/b, v, g, d, ž, z, k, l, m, n, p, ɹ, s, t, f, x, c, č š, šč/

Table 5 indicates that 3-year-olds in the consonant acquisition of /r/in the Mongolian sample are better than in the global sample. But, four- and five-year-olds are similar to the global sample.

We summarize initial consonant acquisition data and present a new report that can be fundamental data for future research. In the below table, we have adopted the criterion used in many surveys such as Crowe and Mcleod [2]. Although we did not consider the middle and ending phonetic pronunciations this time, this report is undoubtedly helpful for researchers and policymakers in the speech intervention of young children.

The consonants, produced in the initial positions of the speech organs, are produced more clearly from an early age. The consonants produced in medial and final positions of speech organs are produced incorrectly and need more strength and flexibility of the tongue.

5 Discussion

The phonology acquisition survey of 1083 Mongolian-speaking children aged between two and five years eleven months was conducted to get normative data. Two parts of the study consisted of articulation of a single sound and consonant production in CV/VC syllable context and consonants located at three different positions. The theories about

phonology acquisition conjectured those pronunciation abilities created with age, and the outcomes supported the views. However, children's production changes with age; older children have more correct pronunciations than younger ones. In this survey, we did not examine gender differences and SES factors.

6 Conclusion

Young children can produce the sole vowels, and there is no mispronunciation. But they began to mispronounce when vowels are in words. Children change vowels by other transonic vowels and other syllables when they say words with vowels, which may occur by influencing consonants.

Based on the findings, we have created a list of sounds that are difficult for young children to pronounce: [r], [s], [š], [c], [č], [ž], and [z]. These sounds are difficult to pronounce clearly, not only solely but also in words. Of these sounds, the most challenging sound is [r]. This finding is similar to the research of Crowe and McLeod [2]. We should study it profoundly and accurately with which sound the sound [l] is mispronouncing.

The research findings indicate that vocal organ development is significant in early childhood relating to the Mongolian language's phonology uniqueness. The misproduced sounds are spoken in the middle and behind places of the tongue, tongue trembling and tongue touching the palate. It means that vocal organ exercises are essential in developing pronunciation skills. Most sounds are spoken in the participation of lips and at the tip of the tongue are pronounced solely in words because vocal organs are not active when children pronounce these sounds.

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