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The Emergence of Word Forms in Typically Developing Children in the Early Years of Life in Hindi Speaking Children: A Preliminary Study

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Reeny Roy[1]
Naseema Institute of Speech and Hearing, Bangalore
N. Sreedevi[2]
All India Institute of Speech and Hearing, Mysore

Abstract

Infants either develop word forms that express their intention or have no intention or just simply play with their articulators. It has been found that combinations of babbling and meaningful speech in a single utterance are produced by typically developing children (Branigan, 1977; Stoel- Gammon & Dunn, 1985). In this context, it is quite essential to investigate the emergence of syllabic shapes, suggesting a production yardstick in the later stages of babbling to their first word productions. The present paper is focused on the appearances of words in 8-12-month-old infants of native Hindi- speaking families. The participants included 20 infants, 10 in each of 2 age groups. from native Hindi speaking families. Audio recordings were carried out to obtain word forms according to Vihman and McCune's (1994) criteria for word identification. The data was analyzed using IPA to obtain the frequency of the word forms.

Keywords Protowords, true words, Hindi, babbling, phonological development

1. Introduction

The transition from babbling to meaningful speech is a very important milestone in the development of articulation and phonological skills. It is at this point that the child moves from pre-linguistic to linguistic phonological development. There is typically an overlap of a few weeks to several months in the use of babbled and meaningful productions (Stoel-Gammon & Dunn, 1985, Vihman et al., 1985). Children may even use a combination of babbling and meaningful speech in a single utterance (Branigan, 1977).

A child's first meaningful productions have been labeled protowords (Menn, 1983). Protowords are also known as vocables (Ferguson, 1978), phonetically consistent forms (Dore, Franklin, Miller, & Ramer, 1976), invented words (Locke, 1983), sensori-motor phonemes (Carter, 1979) and quasi-words (Stoel-Gammon & Cooper, 1984); they are vocalizations with no recognizable adult model that are consistently produced by the infant. However, they cannot be considered babbling either because they have some phonetic consistency (Stoel-Gammon & Dunn, 1985). Protowords are the language which are invented by the child's own and differs from babbling (Blak & Fink, 1987). This was also described by Ferguson (1978) that protowords as

[1] Bio: Associate Professor, Dept. of Speech Language Pathology and Audiology, Naseema Institute of Speech and Hearing, Bangalore, India. Contact: luckyreeny7@gmail.com
[2] Bio: Reader in Speech Sciences, Dept. of Speech Language Sciences, All India Institute of Speech and Hearing, Mysore, India. srij_01@yahoo.co.in

"babbling-like sounds used meaningfully". Protowords are frequently tied to a specific context and are often accompanied by a consistent gesture. These vocal productions have frequently been considered the link between babbling and adult-like speech. Researchers have reported four phonetic forms that are frequently used in protowords: (1) syllabic nasals, (2) syllabic fricatives, and (3) single or repeated consonant-vowel syllables in which the consonant is a nasal or a stop (Ferguson, 1978; Halliday, 1975; Lewis, 1951 and Vihman & Miller, 1988).

At the end of the first year, vocalizations begin to be affected by the phonetic make-up of the specific language of the child's environment. Carter (1979) observed the transition of protowords to true words in a single subject. The subject's productions were termed as "sensori-motormorphemes". She reported between the age range of 1 year 1 month, and 1 year 2 months, the subject produced vocalizations that differed from babbling, had some phonetic consistency and were frequently accompanied by a gesture.

Ferguson (1978) stated that children develop about 12 vocables as they undergo the transition from babbling to the use of adult-based words, which was contradicted by Stoel- Gammon and Cooper's study (1984). Their study with 3 subjects showed greater variations among children. Stoel – Gammon and Cooper found that 1 subject used 13 vocables during the acquisition of 50 conventional words, while the other 2 subjects used only one vocable each during the same period. Elbers and Ton (1985) recorded play-pen monologues of a 1 year old Dutch boy for 20-30 minutes each day, for a period of 6 weeks. The mother kept a diary and noted the occurrence of new words. During the study, the infant acquired 4 new words, and it was found that prior babbling "prepared for" the selection and production of these true words.

Stoel-Gammon and Cooper (1984) studied 3 infants' productions in English, from late babbling to the acquisition of the first 50 words. The goal of the study was to determine the relationship between word acquisition and phonological development. In their study, they distinguished between babbling, acquisition of adult words and creation of child based "quasi-words". They found that the vocalizations produced by infants were not the same as in English and therefore concluded that they would not appear in real words. They also concluded that the infants use a limited number of "patterns" in the first words.

Locke (1985) noted that a number of researchers have reported that there is a tendency for words for "father" to appear earlier than words for "mother". Such gender differences are common across cultures. In English, 'dada' is produced much earlier before than 'mama'. Many infants referred 'papa' as 'baba' because they might have, in fact, perceived [b] and [d] as voiceless, unaspirated stops. It was also noted that infants were more likely to say a bilabial or an alveolar stop than a bilabial nasal. The infants had a 10% preference for producing bilabial nasals for example, probably "mom" was referred for dad more often.

Laakso et.al (2010) studied the patterns of protowords in the interaction with parents. The study revealed that at the age of twelve months children start to acknowledge or reject parental interpretations. The patterns consisted of acquisition of shared meanings embedded in the sequences of

first proto-utterances and their interpretations in the course of daily activities at home. For gaze orientation or pointing gesture, the sequences of proto words varied according to the contexts as interpreted by the parents.

As cited in Gotzke and Goose (2007), during the 7- 9month period, infants may produce protowords or phonetically consistent forms of vocalizations with consistent structures that do not resemble an adult model (Menn & Stoel- Gammon, 2005; Sachs, 2005). These protowords may be recognized as an important step towards first words, as they suggest that the infants to have some degree of voluntary control over the vocal mechanisms and a certain degree understanding that sound sequences have unique meanings. Infants begin to produce consistent vocal patterns as that function as words early as nine months (Owens, 2001). It could be inferred that protowords have a somewhat stable sound and syllabic structure.

By the end of 10 to 12 months, most infants produce their first words (Owens, 2001 & Sachs, 2005). The first word may be the name of a toy, food or family member (Owens,2001) or may be a greeting, farewell or other social phrase such as peek –a-boo (Menn & Stoel-Gammon,2005). These first words may be used to gain attention. According to Pan (2005), first words tend to be similar for toddlers across cultures. The phase of initial production of words is referred to as "The First Fifty Word Stage" Ingram (1976). This stage encompasses the time from the first meaningful utterance that is a true word at approximately one year of age to the time when the child begins to combine two words together at approximately 18-24 months of age. A first word is usually defined as an entity of relatively stable form that is produced consistently by the child in a particular context and is recognizably related to the adult like word form of a particular language (Owens, 1996). Vihman and McCune (1994) have put forth certain criteria or the identification of true words, which were considered in the present study. 1) Determinative context- at least one use that occurs in a context which strongly suggests a word. 2) Maternal identification- the mother identifies at least one instance of the form of the word which either involves acknowledging or rejecting the word choice. 3) Multiple use- the child uses the target form/word more than once and 4) Multiple episodes- more than one episode of use.

Ferguson and Farwell (1975) stated that variability in children's own pronunciation of words reveal incomplete knowledge on the part of the child, indicating the immature status of child's linguistic and neuromotor capabilities in his/her formative years. The difference in canonical babbling in pre-term and full term infants was investigated by Lehithalmes, Heikkinen, Olsen and Yliherva (2012). The study revealed that extremely low birth weight infants failed to produce more different kinds of canonical syllable types and remained in the babbling phase longer than reaching the first meaningful words compared to the full term infants.

In the Indian context, a study conducted by Rupela and Manjula (2006) on 30 Kannada-speaking children from the age range of 0 to 5 years revealed bisyllabic words emerging at 6-12 month and increased by 18 months. This revealed the fact that as children grow they learn to carry out their vocal mechanism effectively, thereby increasing their word length and complexity.

Shishira (2013) carried out a study on the early phonetic repertoire in typically developing native Kannada-speaking children in the age range of 12 to 18 months. Results were analysed based on criteria given by Vihman and McCune (1994). Holophrastic words were found to be present in all the participants with a mean percentage of frequency of occurrence of 25.8%. Protowords existed in abundance, with the mean percentage of frequency of 41.6%. True word productions exhibited a reverse trend as that of holophrastic and protowords productions. The participants exhibited a mean percentage of 32.6% frequency of occurrence for true words and later showed a gradual increase in the participants nearing 16-18 months.

2. Methodology

It must be noted that much of the review is of older literature findings; this was due to dearth of recent studies in this particular area of research on early word forms in children below the age of 1 year, especially in the Indian context. There is limited number of studies in the context of Indian language acquisition on early word forms and older references have findings on children on a higher age range, hence the researchers have included them in this preliminary study.

2.1. Participants

A total of 20 participants from Hindi-speaking families were selected. Many of the studies have focused on children above the age of 1 year. The present study considered participants in the age groups of 8;0 to 12;0 months. This age group was considered to investigate if children had early word productions. Each age group consisted of ten infants comprising of five boys and five girls. A written consent was obtained from the parents for the participation of the infants.

Participants were identified from native Hindi speaking families and were assessed using the Developmental Screening Checklist (Swapna, Jayaram, Prema, & Geetha, 2010). It assesses receptive and expressive communication skills, auditory, motor and cognitive skills. The checklist was standardized on typically developing children in the Indian population and a good reliability and validity was obtained. It was ensured that both the parents were educated up to a minimum of 10th grade and were from middle socio-economic standing. The proficiency of the native language of the parents was assessed using the Language Proficiency Questionnaire: An adaptation of LEAP-Q in the Indian context by Maitreyee and Goswami (2009). A score of "5" would categorize the parent/ caregiver to be a "perfect" native speaker. Based on the perceptual analysis and transcription of the babbling utterances for each of the 20 participants, the frequency and type of protowords and true words was obtained based on the Vihman and McCune (1994) criteria.

2.2. Data collection and processing

One-hour audio recordings were carried out by the investigator in a fairly quiet room with minimal distractions at the respective homes of the participants. Parents/ caregivers were asked to interact naturally with the child. Each individual participant was audio recorded with a hand held Sony

MZ-55 digital voice recorder with an integrated microphone. The audio recordings were carried out by the researcher from a reasonable distance so as not to distract the infant. Only one recording was carried out for each participant, hence a measure was established to obtain a minimum of 100 utterances (that would include any kind of production from beyond the 50 word stage also)from each participant to ensure an increase in utterances to obtain a better quality of the sample. All the recordings were transferred to a computer for analysis. The audio recordings were analyzed using the VLC media player software. No additional play materials were introduced into the environment, so that samples would reflect the infants' typical vocalizations in familiar surroundings.

On parental interview the type and frequency of protowords and true words (early words) were established. The parents were enquired on the words uttered by the infants and the word forms were then classified by the researcher. This was carried out during parent-child interaction. Two (post graduates) speech language pathologists and the 1st author served as judges for determining inter-subject reliability for the language. 10% of each of the subject sample was transcribed by each of the three Speech Language Pathologists, including the researcher. The researcher transcribed 10% of each of the subject sample for intra-judge reliability. Cronbach's alpha co-efficient was consistent and found to be 0.70 and 0.75 for inter and intra transcriber reliability respectively.

2.3. Data analysis

Considering the small number of participants non-parametric tests were carried out. Descriptive statistics for the mean percentage of occurrence of protowords and true words with respect to language. Mann-Whitney U-test was used for comparison of between the two age groups.

3. Findings

3.1. Comparison of early words across age in Hindi participants

Few participants produced early word forms such as proto words and true words sparingly from 6 months onwards, these word forms were produced by 2 participants each. The next higher age group of 8 to 10 months had 8 proto words but no true word productions by 3 participants. However the older age group of 10 to 12 months had a whopping production of 50 proto words and 36 true words which yet did not meet the 60% criteria (productions produced by 6 out of 10 participants), since there were only 5 participants in each who produced them. These early word productions are provided in Appendix A. On observation, protowords produced by the participants were centred on the child's basic needs. This was similar to the findings by Shishira, Sushma and Sreedevi (2014) in Kannada speaking children of 12 to 24 months. The median (Mdn) percent and inter quartile range (IQR) for the combined scores of boys and girls in Hindi for early word forms are presented in Table 1.

Table 1
Descriptive statistics (Median percent and inter quartile range) of early words in Hindi

Early word forms	Hindi			
	Age range (in months)			
	8;0 to ≤ 10:0 Group III		>10;0 to ≤ 12:0 Group IV	
N=10	Median	IQR	Median	IQR
Proto words	0.00	0.00-100.00	26.47	0.00-74.28
True words	------	-------	17.14	0.00-60.29

Note: ---- indicates no production

As seen in Table 1, it is evident that proto words increased in occurrence from 8 months onwards, suggesting an increase in the emergence of word forms in the later stages of babbling. In the next age group of 10 to 12 months, early word forms comprised a total of 36 true words and 50 proto words; although they were produced by few participants (i.e did not meet 60% criteria).

As stated earlier, it was interesting to note that infants aged 6-8 months also exhibited a few word forms. The early emergence of word forms may be due to the added language stimulation by the non working mothers. This is in support of a study by Bergelson and Swingely (2012) that by 6-9 months, infants already began to link words to their referents in terms of comprehension and not production. The presence of early word forms in the younger age group (6 to 8 months) and absence in the immediate age group (8 to 10 months) is perhaps due to the cross sectional design considered in the present study. In other words the two age groups consisted of different participants.

In the present study the complexity in word productions advanced with age (Reeny & Sreedevi, 2014; Stoel- Gammon, 2011), although Mann- Whitney U test revealed no significant difference across age for proto words for Group III (8 to 10 months) and Group IV (10 to 12 months) in Hindi. Group III, i.e 8 to 10 months was lower in production of proto words (eight words) compared to the 10 to 12 month age group, having produced 50 proto words. Thus, the hypothesis that there is no significant difference in the phonetic behavior of protowords and true words across age in Hindi is accepted.

In conclusion, studies in the Indian context on infant early word production have focused on investigating on children above the age of 1 year and there are no studies that have profiled the early word productions in infants less than a year. Determining the phonetic behavior of early words in infants from the age of 8 months to 12 months with a native background of Hindi is a first attempt in the Indian context solely focused on the pre-linguistic stage. Understanding the emergence and nature of early words in infants will help to provide a better understanding of early phonological development. There is an increased awareness to educate parents who are sensitive to even the child's early speech development. The preliminary findings of the present study would help speech language pathologists to provide clinical

services to children who are at risk for communication disorders. However, it is recommended that the study would be carried out to a larger group of native Hindi speaking children.

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Appendix A

Protowords and True word productions in Hindi learning infants

Age Groups	Protowords	Truewords
>6;0 to ≤ 8:0 months	/ t̪i t̪i:/- give, / t̪a t̪I/- bye	/mama/-mom, /papa/-dad, / d̪I d̪I/- sister
8;0 to ≤ 10:0 months	/ɛmɛmæ:/-mom, /bə/- balloon /appa/-dad	------
>10;0 to ≤ 12 months	/t̪i:/-tree, /ha/-eyes, /daI/-dog, /kaI/-carrot, /d̪aI/-dad, /d̪Iya/-give, /papa/-dad,/pɔd̪ə/-powder, ɔd̪ə/- that side, /t̪Ikɔtə/-pet name /əma/-mom, /d̪əd̪ə/- give, / d̪ad̪I/-dad, / d̪ad̪æ/-dad, /u:/-bow bow, /jɛjɛjɛ/- meow, /m:a/-flying kiss, /ka/-uncle, /pa/-plane, /dadI/- dad , / d̪ad̪a/-dad	/æppa/- dad, /nana/ -grandpa /kaka/-uncle, /papa/- dad, /hɛtu/-Jesus, /təbə/-t.v, /tIku/-name, /hakɛ/- okay, , /əI/- jai , /dədədə/-give /t̪It̪I/-give, /tat̪I/-bye,/mama/-mom, /papa/-dad, / d̪Id̪I/-sister, /ɛmɛmæ:/-mom, /bə/-balloon, /amma/-mom, /bu:/-bow /əma/-mom, / d̪əd̪ə/- give bow, /amma/-mom, , /æpəl/-apple, /bələn/ -balloon, /nja/- meow, /papa/-dad, /mama/-mom, /kjaə:/-what