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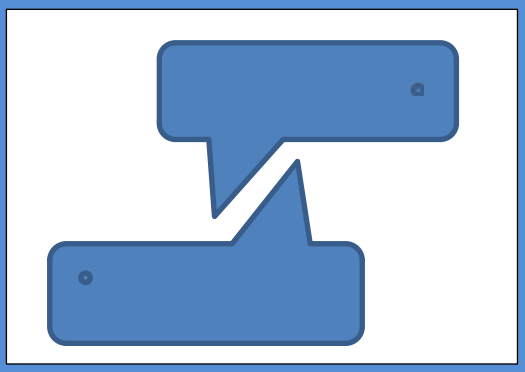

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Iranian children's comprehension and production of Persian actional and psychological passive structures

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Parvin Safari[1]
Shiraz University, Iran

Saeed Mehrpour[2]
Shiraz University, Iran

Abstract

Over the past years, the acquisition of passives by children has attracted researchers' attention, leading to a wide range of investigations in FLA researches. From early beginning days of birth, a child is overwhelmed with huge bulk of input from environment which paves the way for increasing the chance of successful acquisition of their first language, but in most studies, passives were found to be the lately acquired constructions among children. Reviewing literature on children's acquisition of languages, the researchers found there is a gap concerning Iranian children's production and comprehension of actional and psychological passives in Persian as their native language. The facilitative or debilitative role of age is also investigated in the current research, to see if it contributes to the success/failure of production and comprehension of such structures. To unearth the differences, 25 Iranian children from different age groups of 3.5-5, 5-7, and 7-9 were randomly selected from 4 day-care centers and 2 kindergartens of Yazd and Shiraz, Iran. Two narrative tasks to assess children's production; and an elicitation task to determine their comprehension ability of actional and psychological passives were utilized to find the answer to the theme of the research. Using SPSS to analyze the data, researchers found passives are late acquired constructions among children; they comprehend and produce truncated or short passives more frequently than long passives, and acquisition of actionals occurs earlier than psychological passives.

Key words: Iranian children, Actional passives, Psychological passives, Adjectival passives, Age differences, Children's comprehension and production ability.

1. Introduction

Over the past decades, passive structures have been the focus of attention in a substantial body of research, investigating them from linguistic theory or language acquisition perspectives. According to Allen and Crago (1996), passive structures are considered to be central in linguistic theory since

[1] **Parvin Safari** is a PhDc. in ELT at Shiraz University, Iran. She has presented and published several papers at national and international conferences and in reputable international journals. Her areas of interest include critical pedagogy, teacher education, child language acquisition, and discourse analysis. Corresponding author: psafari2009@gmail.com

[2] **Saeed Mehrpour** is an Associate Professor of TEFL at the Department of Foreign Languages & Linguistics, Shiraz University, Iran. He has presented and published several articles in national/ international conferences and reputable international journals. His main interests are Child Language Acquisition, Second Language Pedagogy, and Sociolinguistics. smehrpur@yahoo.com

they establish the presence of underlying subject and object as well as the constituent movement. In language acquisition, the research on passives is crucial due to the fact that such investigation enhances our understanding of children's comprehension and production.

A large number of studies in these two areas have shown the complexity of passive constructions. A great deal of evidence shows that children until the age of 5 years have greater difficulty in comprehending and producing passive constructions (Hirsch & Wexler, 2004a). The difficulty with passives have been reported in English by different researchers (Bever, 1970; Maratsos et al., 1985; Gordon & Chafetz, 1990; Fox & Grodzinsky, 1998; Stromswold et al. 2002; Perovic et al. 2007). A wide range of investigations in other languages such as Catalan (Parramon, 2009), Greek (Terzi & Wexler, 2002; Terzi et al., 2014), Spanish (Pierce, 1992), German (Bartke, 2004), Dutch (Verrips, 1996), Japanese (Sugisaki, 1998; Sano, 2000), and Russian (Babyonyshev & Burn, 2003) also yielded findings which provided evidence for children's problem with passives.

In line with research in other contexts, Gavarró and Heshmati (2014) compared typically developing children of Persian with the children of the same language with autism and found while significant differences existed between these two groups, the normal children still had difficulty with the comprehension of passive structures. Reviewing literature on children's acquisition of passives, the researchers of the current study found there have been no studies investigating both comprehension and production of passives by normal children of Persian. In fact, the present study makes an attempt to investigate the Persian speaking children's production and comprehension of actional and psychological passive structures.

1.1. Review of Related Literature

Children's acquisition of passive structures has widely been investigated in different languages. In most of the studies, passive structures are shown to be one of the lately acquired constructions. For instance, children acquire it relatively late in English by age 4, in German by 5, and in Hebrew by 8 years of age. The difficulties in production and comprehension of passives reported for different languages have indicated that children before the age of 5 to 6 do not have adult-like competence of syntax concerning passive constructions (Border & Wexler, 1987; Hymas & Snyder, 2005, 2006).

A number of researchers have indicated that the late acquisition of passive constructions is due to the paucity of such structures in a child's input. In many languages, children are rarely exposed to passives because the child-directed speech and colloquial speech lack such constructions. Thus, the acquisition of passive structures becomes very difficult (Gavarró & Heshmati, 2014). Demuth, Moloi and Machobane (2010) also highlighted that in languages with a large amount of passive production such as Sesotho, children can comprehend passive sentences at a younger age. However, this argument is not plausible since there are a large number of cases in child language acquisition that the children acquire the underrepresented structures; that is, those that are rare in the input as they might have no access to fair enough information from the learning environment. For instance, multiple interrogatives are rare in the input but

Slavic children acquire these structures very early (Grebenyova, 2011; Gavarró, Lewandowski, & Markova, 2010). Another piece of evidence which shows the amount of input is not concerned with the emergence of passives in children's speech was what Babyonyshev et al. (2001) called the late acquisition of passives under the stimulus abundance. The Russian genitive of negation is also an example which shows children's late acquisition of such feature in spite of its available abundant input in the environment (Partee & Borschev, 2006).

The late acquisition of passives has led the researchers to suggest that something special exists in the case of such constructions. The early account of this issue suggested by Brown and Hanlon (1970) maintains that passives are considered to be non-canonical and derivationally complex, as lexicalist or non-movement account (Bresnan, 1982) illuminates that passives are non-canonical (infrequent) and complex structures. Thus, it takes long for children to acquire them (Bever, 1970). In contrast, in their proposal, Border and Wexler (1987) developed a hypothesis named *maturation hypothesis* or *A-Chain Deficit Hypothesis* (ACDH) and claimed that the principle which governs A-chains or argument-chain movement would mature about 4 or 5 years of age. Such a hypothesis illuminates that certain principles of syntax are matured like biological functions. In other words, the ability to form A-chains develops through age and is biologically determined. Such concepts can be further elaborated as Crystal (2003), based on government-binding theory indicated that "a moved constituent and its co-indexed traces form a chain". A chain can become an *A-chain* if the head of the chain is in an A(rgument)-position or where a theta role is assigned to an *argument*. In generative grammar, argument is a term which refers to any noun phrase position in the sentence. Thus, subjects and objects function as arguments. In passives, object is an *internal argument* or argument of the verb which locates within the verb phrase while subject is an *external argument* that lies out of this domain. In each sentence, each argument performs a *thematic role* with reference to a set of thematic functions known as *agent, patient, locative,* and *goal.* In an active sentence, subject and object are assigned the thematic roles of agent and patient respectively.

As De Villiers and Roeper (2011) state, in passive sentences, objects move into subject position through *A (rgument) movement* because the moved constituent moves into the position of another argument. Border and Wexler (1987) suggested *A-Chain Deficit Hypothesis*, based on which A-chain formation between the underlying subject and object is not possible for young children. Hirsch and Wexler (2006a) claim that due to the absence of this chain, children do not possess any syntactic means to assign the right thematic role to the moved object. Thus, they interpret passives as sentences that do not include movement, i.e., as active sentences. This theory predicts that children are able to interpret active sentences correctly, but interpret passive sentences as their active counterparts. Border and Wexler (1987) argue that formation of passive constructions which involve A-chain movement is related to linguistic maturation. This, according to De

Villiers and Roeper (2011) means that at first children are born without the ability of creating A-chains but after the age of five, their ability of making A-chains matures as they are able to comprehend passive sentences.
This hypothesis is considered as an account of children's late acquisition of passives and as a response to Maratsos et al.'s (1985) research findings. These researchers found that although 4-year-old children failed to comprehend *non-actional* passives (1), they could understand the *actional* passives (2).

(1) The grandma was loved/remembered/seen by the boy.
(2) The grandma was kissed/hugged/helped by the boy.

This finding was also confirmed by other studies investigating active/passive voice and different types of verbs (Maratsos, Fox, Becker, & Chalkley, 1985; Sudhalter & Braine, 1985; Gordon & Chafetz, 1990; Fox & Grodzinsky, 1998; Hirsch &Wexler, 2004a; Hirsch & Wexler, 2006; Hirsch & Hartman, 2006). The explanation for this result was that passive acquisition was semantically constrained so that children firstly generalized passives to transitive verbs including action verbs. The generalization of such constructions to non-actional verbs like experiential or psychological verbs was done at a later age.
Border and Wexler's (1987) maturation hypothesis as an alternative argument also highlighted children's late acquisition of passives. For instance, before 5 years of age they are unable to form argument chains which move the argument from the object position to the subject position; hence, they resort to certain strategies to compensate for late maturation. Children can comprehend actional verbs but not non-actionals, as in the latter case, they cannot form A-chains. Their success with actional passives can be attributed to the interpretation of such passives as adjectival passives which is used as a strategy for the representation of actional passives at a younger age. Children's spontaneous production of very few non-truncated passive sentences (passives with *by phrases*) is used to support such a claim (Fox & Grodzinsky, 1998).
Fox and Grodzinsky (1998) alternatively proposed the late movement of external thematic role to the oblique noun phrases. Hence, to interpret passives, children use the strategy of assigning an agentive thematic role to *by* of the prepositional phrase. That is, children's problem with passives is due to their inability to reassign the theta role of the logical subject to prepositional phrase. Thus, they comprehend actional passives because this strategy works effectively for them. Accordingly, they tend to possess an agent subject role. This strategy is ineffective for non-actional passives since their external argument is a theme or an experiencer which does not take the preposition *by*.
Although a large number of studies have indicated that acquisition of passive constructions occurs at a later age, still there is controversy over this issue among researchers of the field. Budwig (1990), for instance, found that children around the age of three produced passives in their spontaneous speech. Accordingly, through the use of passive primes and picture descriptions, Huttenlocher et al. (2004) elicited passive constructions from children at the age of 4. Moreover, Tomasello, Brooks,

and Stern (1998) exposed children to passive structures with novel verbs. The findings showed that children who heard such constructions generated more passives than the children in the control group. The production of passive structures with novel verbs suggested that children at this age were able to generalize the passives to the novel verbs.
In order to shed more light on this issue, there is a need for a wide amount of investigation in different languages to explore the acquisition of passive structures by children. A review of literature makes it clear that rarely or not has any study on the production or comprehension of passives been done in some languages, such as Persian. This study is, in fact, an attempt to explore Persian speaking children's production and comprehension of passive constructions which include actional and psychological verbs.

1.2. Persian Passive Structures

Persian is regarded as a language of the Indo-Iranian, a branch of the Indo-European family of languages and as a subject-object-verb word order or an SOV language with a rich verbal inflectional system (Gavarró & Heshmati, 2014). According to Abdi (2010), Persian passivization is based on the following steps:

1. Deletion of the subject of active sentence;
2. Deletion of object marker "*rā* ";
3. Formation of past participle from the main active verb;
4. Formation of present or past auxiliary verb from the infinitive verb "šodæn" (to become);
5. The agreement between the subject and the verb.

The passivization of the active sentences is shown in the examples (1a) and (1b). Note that in the examples, some abbreviations are used. They include: OM (object marker), PTCP (participle), INDF (indefinite), PRES (present), SG (singular), PL (plural), EZ (ezafe = addition), PLM (plural marker), and PP (prepositional phrase).

(1) a. Mahsa sib *rā* khord.
Mahsa apple OM ate 3SG.
'Mahsa ate the apple'.
b. sib tævæsote Mahsa khord-eh šod.
sib by Mahsa eaten PTCP became 3SG.
The apple was eaten by Mahsa.

Sentence (1a) indicates an active sentence in which the object of the transitive verb or the internal argument is marked by the objective marker *rā*. According to Bohnacker and Mohammadi (2012), *rā* is the only case marker which is postnominal and shows the grammatical function of direct object. It is also referred to as a suffix, a postposition, or enclitic particle. Gavarró and Heshmati (2014) state that when the objective marker *rā* is associated with demonstrative pronouns and proper nouns, it becomes

obligatory; but it does not occur with unidentifiable and unspecific nouns. In this regard, Lazard (1992) proposes that definite objects are almost always *rā*-marked and specific indefinites are sometimes marked by *rā* whereas generics and nonspecific indefinites are not marked by *rā.* In Lazard's sense, specificity and definiteness are two key factors which determine the *rā*-marking.

Sentence (2) illustrates this issue:
(2) Mæn be pærænde-ha qæza (*rā**) midaham.
I to birds PLM food (OM*) give PRES-1SG.
I feed birds.

As it is clear in the above example, *birds* is an unspecific indefinite noun which does not take object marker *rā.* Let's return to example 1(b) which shows a passive sentence. In 1(b), the internal argument signaled by *rā* has moved from object position to the subject position, and replaces the external argument. The reason for this movement, according to Honda (2012), is that in passive sentences the verb is not able to assign case to its complement. Thus, this causes the object to rise to the subject position where it takes the nominative case.
When the object is raised to the subject position, *rā* is dropped and the internal argument signals its case with no marker. The main verb is changed into the past participle (*khord-eh*) accompanied by the passive auxiliary verb '*šodæn'* (to become). The agentive PP or the adjunct phrase (*tævæsote Mahsa 'by Mahsa'*) precedes the main verb and is considered as a marginal prepositional phrase in Rezaei's sense (2011); hence its presence is not obligatory in the sentence.
According to Nemati (2013), the passivization is summarized as: (a) the subject demotion; (b) the object promotion to subject position; (c) the morphological change which includes the change of the main verb into past participle and the insertion of auxiliary verb '*šodæn'* (to become) which is inflected for tense and person. When the object is moved to the subject position, it becomes *Nayeb Fael* in Persian.
As Gavarró and Heshmati (2014) put it, '*šodæn'* can also be found in non-verbal constructions. For instance, they can be adjectival and not extracted by A-movement. In fact, the adjectival passives resemble verbal passives in a homophonous way.

Sentence (3) indicates an adjectival passive.
(3) otagh-ha (tævæsote bæcheha) tæmiz šodænd.
Rooms-PLM (by children) clean became 3PL.
'The rooms were cleaned by children.'

1.3. Actional and Psychological passives in Persian

The verbs in Persian can be categorized on the basis of whether the verb has an agent *(?amel* in Persian) subject or not. The verbs with agent subjects or those which show an action are called actional. Different names are suggested for actional verbs in Persian, for instance, they are called *?æfaal-e ?æmali*, *?ænjami,* or *koneši* (Safi-Pirloojeh, 2010 & Rezaei, 2012). Most of

the verbs in Persian are in the form of action. The verbs such as *'khordæn'* (to eat), *'hol dadæn'* (to push), *'keshidæn'* (to draw), *'niš zædæn'* (to bite), *'peida kærdæn'* (to find), etc. are classified as the actional.
In contrast to the actional verbs, the non-actional or psychological verbs are associated with experiencer (*tajrobe-gær* in Persian) or non-agent subjects. In Persian, they are called *æfaal- e zehni, væziyæti,* or *?ista* (Safi-Pirloojeh, 2010 & Rezaei, 2012). One way to distinguish such verbs is that they cannot be in the form of progressive or *?estemrar* in Persian. For instance, it is impossible to say:

(4) *? u dær hale dust daštæ*n* ?ast.
*He is loving.

Verbs such as *didæn* (to see), š*enidæn* (to hear), *be yad Aværdæn* (to remember), *dust daštæn* (love), etc. are categorized as psychological verbs. The active/passive sentences including actional and psychological verbs are respectively illustrated in the examples (5) and (6):

(5) (a) N*æ*vid mašin *rā* hol dad.
Navid car OM pushed past-3SG.
Navid pushed the car.
(b) mašin tævæsote N*æ*vid hol dad-eh šod.
car by Navid pushed PTCP became 3SG.
The car was pushed by Navid.

(6) (a)?u dustan-æš *rā* dær mædrese mibinæd.
She friends-her OM at school sees PRES-3SG.
She sees her friends at school.
(b) dustan-æš dær mædrese did-eh mišævænd.
Friends-her at school seen PTCP become PRES-3PL.
Her friends are seen at school.

1.4. Objective and significance of the Study

Over the past decades, passive constructions have been the focus of many studies of language acquisition. In most studies, passives were found to be the late acquired structures by young children. While a vast amount of research has been conducted in different languages in this regard, almost no studies have been done in Persian to show the acquisition of passives. This study is, in fact, an attempt to fill this knowledge gap, trying to investigate Iranian children's acquisition of comprehended and produced actional and psychological passives in Persian. So, this experimental study addresses the following questions:

1. Is there any significant difference between children's production of actional, psychological, and adjectival passives and their age difference?
2. Is there any significant difference between the number of comprehended actional and psychological passives among the three age groups of children?
3. Is there any significant difference between the number of comprehended short/long actional and short/long psychological passives among the three age groups of children?

2. Methodology

2.1 Participants

The participants of this study were 25 Iranian children of different age groups who constituted three groups based on three different age ranges. The first group included 7 children aged 3.5 to 5, the 6 children of the second group were within the age range of 5 to 7, and the 7-to- 9 year old children in the third group were 8 in number. All male/female children were native speakers of Persian, with typical development and no hearing problem. To gather more valid data, the children for this study were randomly selected from 4 day-care centers and 2 kindergartens of Shiraz and Yazd, Iran.

2.2. Data collection and processing

Two Persian story books which were available on the market and published for Iranian children were selected for the first task. The names of the story books were *muš muši væ mar-e khal khali* (the mouse and the spotted snake) written by Najjar (2003) and the other one written by Barjastehbaf (2004) was *Majera-ha-ye-Nadia* (Nadia's adventures). In the case of the second task, 20 pictures including 10 actional and 10 psychological passives were used. The 10 passives for each category involved 5 short and 5 long passives. The researchers elicited children' comprehension of short/long actional and psychological passives through posing questions based on the pictures.

The main theme of this research was to investigate the effect of age on children's competence to produce and comprehend Persian passive voice. To assess children's comprehension and production of Persian passive constructions, the researchers used two kinds of tasks. To do so, they tested each child in a quiet room. The first task was a narrative one through which the researcher told the child a story. To make the story more appealing, the researcher used the story book which had beautiful colorful pictures. While narrating the story, the researchers produced passives including actional and nonactional ones. At the end of the story, in order to see how many passive verbs were produced by the child, the child was required to narrate the story once more. At this time, the researchers used cellphone to record his or her voice. This task was used to explore the children's production of passive structures. In this study, we explored the Persian passive structures based on three categories including Actional, Psychological and Adjectival. While adjectival constructions in this task are not real passives, we also took children's production of this kind of structure in their narratives into

account to provide more insightful data. It actually helped us to pursue the children's developmental path of Persian passives.
The second task was an elicitation task which assessed children's comprehension of actional and psychological passive and active sentence structures. The researchers used 20 pictures to elicit the appropriate response from the child. In so doing, the researcher showed each picture to the child and asked one or two questions. The questions were constructed in a way that elicited children's comprehension of the passives and actives. To collect accurate data, the researchers used their cellphones to record children's voices.

3. Findings

At first, the analysis of the data related to the narrative task or children's production of passive constructions are taken into account. Through the transcription of the children's narratives from different ages, the researchers counted the number of the produced verbs. The average number of verbs narrated by children was about 76 in total. Then, the passive constructions including actional, psychological, and adjectival were counted. With regard to the long (with *by*) and short passives (without *by*), it should be noted that all the produced passives were of the short type. Thus, we did not take this variable into account for the production task. As we had a small number of children in each age group, we adopted Kruskal-Wallis one-way analysis of variance as a non-parametric method of testing as it is used for comparing two or more independent samples. Table 1 shows the comparison between the production of the three categories of actional, psychological, and adjectival passives between the three age groups.

	Test Statistics		
Passive Categories	**Chi-Square**	**df**	**P-value**
Actional 1	17.254	2	0.00
Psychological 1	1.852	2	0.396
Adjectival	2.946	2	0.229

Table 1. Comparison of production of actional, psychological, and adjectival passives among the three age groups

In Table 1, the Chi-square, degree of freedom (df.), and p-value for each of those three passive categories are indicated. As the p-value for actional passives is zero and less than $\alpha=0.05$, so if we are supposed to review the results with 95% confidence, it should be said that the children of the three groups performed differently on the production of actional passives. In other words, the number of produced actional passive verbs among the three age groups of children is significantly different. While age has a significant effect on produced actional passives, there is no such an effect on those two adjectival and psychological passives. So the statistical analysis showed a significant difference in the number of produced actional passive verbs

among the three age groups of children. In Table 2, the descriptive statistics of the produced actional verbs is shown.

Production of Passive Constructions			
	Actional 1		
Age Brackets	**N**	**mean**	**Std. deviation**
3.5-5	7	0.57	0.53
5-7	6	2.33	0.52
7-9	8	3.87	0.83

Table 2. Descriptive statistics of the produced actional verbs among the three age brackets

Table 2 demonstrates the mean and Std. Deviation for number of produced actional passive verbs among the three age groups of children. As the mean for actional passive verbs produced by age range of 7-9 is higher than the two other groups, it can be found that increase of age has its own effects on children's ability to produce actional passives. Tables 3 and 4 show the means and Std. Deviations for produced psychological and adjectival passives among children of the three age groups respectively.

Production of Passive Constructions			
Age Brackets	**Psychological 1**		
	N	**mean**	**Std. deviation**
3.5-5	7	0.00	0.00
5-7	6	0.17	0.41
7-9	8	0.25	0.46

Table 3. Descriptive statistics of the produced psychological verbs between the three age brackets

Production of Passive Constructions			
	Adjectival 1		
Age Brackets	**N**	**mean**	**Std. deviation**
3.5-5	7	2.14	0.69
5-7	6	1.50	0.55
7-9	8	2.00	0.76

Table 4. Descriptive statistics of the produced adjectival verbs between the three age brackets

As shown in Tables 3 and 4, and based on the descriptive statistics of Table 1, there is no significant difference among the number of these two

produced types of passives in all three age groups. Figure 1 shows the summary of data presented in Tables 1-4. The highest mean of produced passives is observed in actional passives among the age range of 7-9 and the low mean is related to psychological and adjectival passives among the age range of 3.5-5. Generally speaking, the lowest mean is revealed in psychological passives and the highest is related to actional in all three age groups.

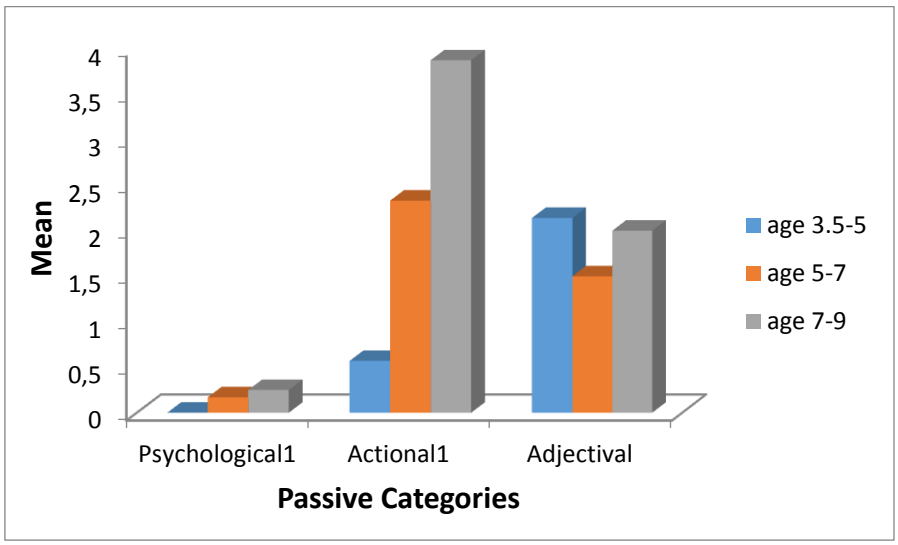

Figure 1. The comparison of the means of the different passives produced between three age brackets

For comprehension task, we consider the second research question to see whether there is any significant difference between number of comprehended actional and psychological passives among the three age groups of children. As we have a small number of children in each age group, we adopted Kruskal-Wallis one-way analysis of variance as a non-parametric method of testing since it is used for comparing two or more independent samples.

	Test Statistics		
Passive Categories	**Chi-Square**	**Df**	**P-value**
Actional2	18.236	2	0.00
Psychological2	17.598	2	0.00

Table 5. Comparison of comprehended passive categories of actional and psychological verbs between the three age brackets

Table 5 shows the Chi-square, Degree of Freedom (df.) and p-value for both actional and psychological passives. The results show that p-value for both is zero and lower than α=0.05. So, if we are supposed to examine the results with 95% confidence, it can be said that the children in the three groups

performed significantly different on the comprehension of actional and psychological passives. In other words, the number of comprehended actional and psychological passives in the three age groups is significantly different. So, age is an important factor in comprehension of these two types of passives.

We found a significant difference based on statistical analysis among comprehended actional and psychological passives in the three age groups. Tables 6 and 7 show the means and Std. deviations for comprehension of these two types of passives. The results show that the average of comprehended passives based on these two comprehension tasks are higher among the age range of 7-9, so age has a direct effect on their comprehension ability.

Comprehension task			
	Actional 2		
Age Brackets	**N**	**Mean**	**Std. deviation**
3.5-5	7	3.00	1.00
5-7	6	6.50	0.55
7-9	8	9.63	0.52

Table 6. Descriptive statistics of the comprehended actional verbs between the three age brackets

Comprehension task			
	Psychological 2		
Age brackets	**N**	**Mean**	**Std. deviation**
3.5-5	7	1.00	0.82
5-7	6	2.67	0.52
7-9	8	6.50	0.53

Table 7. Descriptive statistics of the produced actional verbs between the three age brackets

Figure 2 shows the obtained results in Tables 5-7. The highest mean of comprehended passives belongs to actional passives in the age range of 7-9 and the lowest is related to psychological passives among the age range of 3.5-5. Generally speaking, the lowest mean is allotted to psychological passives and the highest mean belongs to actional passives among all the three age groups.

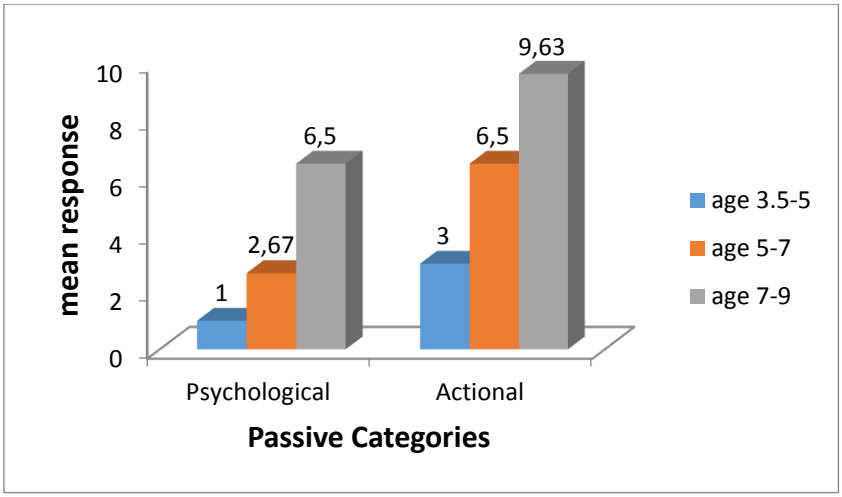

Figure 2. Comparison of the means of the comprehended different passives between the three age brackets

In this study, each comprehension task was also divided into two categories, as *short psychological passives (without by)* and *long psychological passives (with by);* and *short actional passives* and *long actional passives*. Thus, Wilcoxon signed-rank test was adopted to analyze the obtained data from psychological and actional passives among the three age groups of children. For further analysis, we took into account the third question to examine whether there is any significant difference between the number of comprehended actional (long / short) and psychological (long / short) passives among the three age groups of children.

Test Statistics				
Age Brackets	***Long psychological (with by) - Short psychological (without by)***		***Long actional - Short actional***	
	Z-Statistics	**P-value**	**Z-Statistics**	**P-value**
3.5-5	-1.732	0.083	-1.667	0.096
5-7	-1.807	0.071	-1.89	0.059
7-9	-2.392	0.017	-1.732	0.083

Table 8. P-values for both actional and psychological comprehended passives among the three age groups

Table 8 shows the calculated Z-Statistics and p-values for both actional and psychological comprehended passives among the three age groups. Based on these values, p-value for psychological passives in the age range of 7-9 is less than α=0.05 (about 0.02). So if we want to analyze the data with 95% confidence, it should be said that there is a significant difference in the number of comprehended psychological passives (long and short) within the age range of 7-9. While there is no such a difference in the number of

comprehended passives (long and short) and other age groups. Table 9 shows the descriptive statistics of data including means and Std. Deviations for comprehended actional passives (short and long) among the three age groups of participants. As it is clear in the table, the amount of comprehended short actional passives is more than that of the long actional ones. This shows that the comprehension of long passives is more problematic among the three age ranges.

Actional passives						
	Short* actional *passive (without by)			***Long* actional *passive (with by)***		
Age Brackets	**N**	**mean**	**Std. deviation**	**N**	**mean**	**Std. deviation**
3.5-5	7	1.86	0.69	7	1.14	0.69
5-7	6	3.67	0.52	6	2.83	0.41
7-9	8	5.00	0.00	8	4.63	0.52

Table 9. Descriptive statistics of comprehended short and long actional passives between the three age brackets

Figure 3 depicts the comparison of the means of comprehended long and short actional verbs by different age brackets.

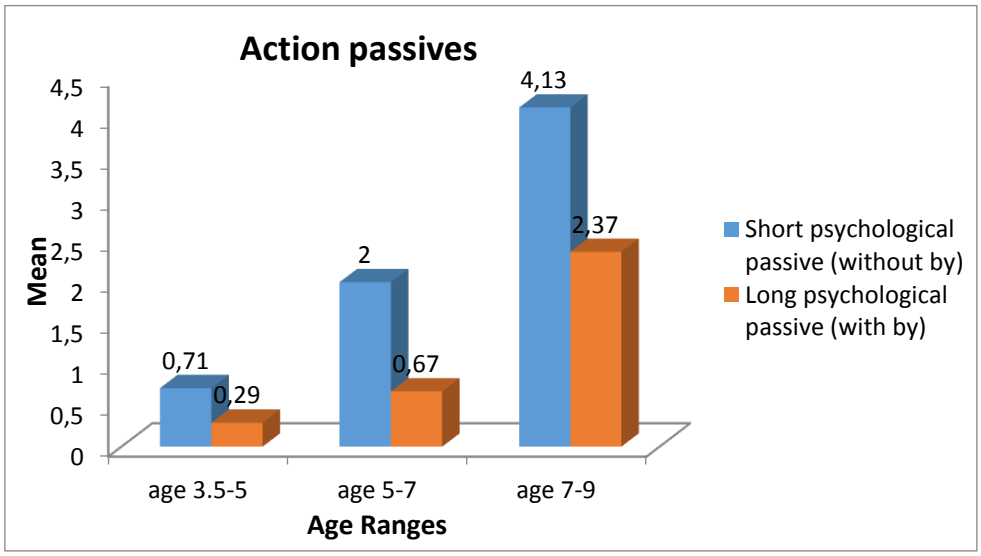

Figure 3. Comparison of the means of comprehended actional verbs categories by three age brackets

Table 10 also shows the descriptive analysis of data including means and Std. Deviations for comprehended psychological passives (long and short) among the three age groups of participants. In the case of psychological passives, a slower rate of development can be seen for the two categories of long and short passives. However, the lowest mean of long passives among the different age groups shows that the comprehension of such constructions is the most demanding for the three age groups.

Psychological passives						
Age Brackets	***Short psychological passives (without by)***			***Long psychological passives (with by)***		
	N	**mean**	**Std. deviation**	**N**	**mean**	**Std. deviation**
3.5-5	7	0.71	0.49	7	0.29	0.49
5-7	6	2.00	0.63	6	0.67	0.82
7-9	8	4.13	0.64	8	2.37	0.52

Table 10. Descriptive statistics of comprehended short and long psychological passives between the three age brackets

And finally, Figure 4 illustrates the comprehension of two types of psychological passives by the three age ranges.

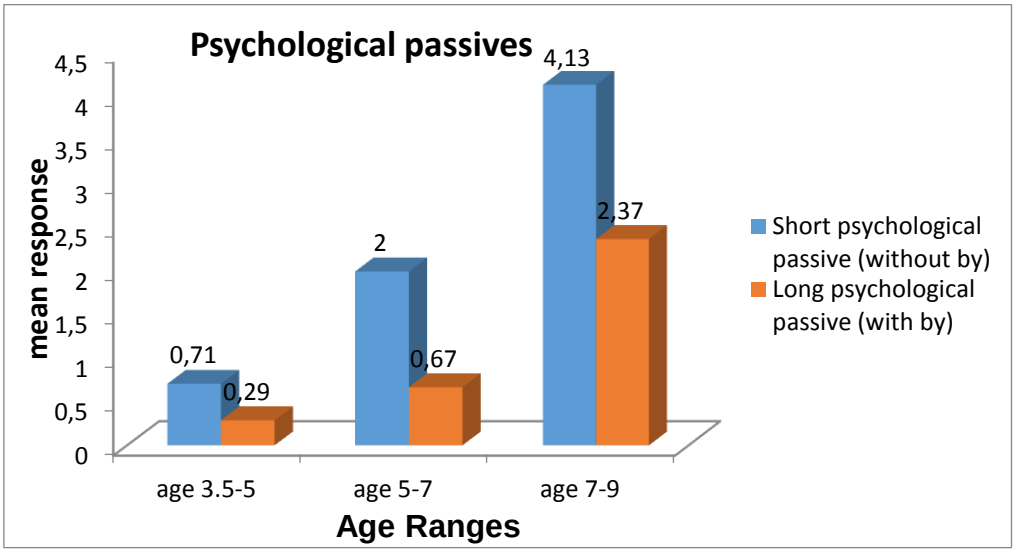

Figure 4. Comparison of the means of comprehended psychological verbs categories by the three age brackets

4. Conclusions and Discussion

This study investigated the Persian children's acquisition of passive constructions which are considered as an important issue of interest to many researchers, linguists, and psycholinguists. In line with a number of studies conducted on the respective issue in other languages, the findings of this study show that passives are the types of constructions which are acquired late by children. In this study, it was also revealed that children comprehend and produce truncated or short passives more frequently than the long passives and that the acquisition of actional passives happens earlier than that of the psychological passives. In fact, the findings of the current study confirm the theories developed by linguists such as Border and Wexler's (1987) theory of *maturation hypothesis* or *A-Chain Deficit Hypothesis* (ACDH) and Fox and Grodzinsky's (1998) theory of *by-phrase.*

The insightful findings of this study can be helpful to the researchers, linguists, and scholars who investigate the children's acquisition of passives in different languages. Undoubtedly, further insights in this area can increase our understanding about the commonalities between the acquisition of diverse languages all over the world.

The exploration of Persian children's production of actional and psychological passives showed that the production of actional passives is observed at the age range of 3.5-5 but it was more developed and adult-like at the 7-9 years of age. That is, the children produced actional passives more with an increase in age. This late acquisition shows that passives are complex structures for children so that they do not fall in place until children are at 4-5 years of age (e.g., Fox & Gordzinsky, 1998, Gorden & Chafetz, 1990, Hirsch & Wexler, 2004, Maratsos et al., 1985).

The findings of this research regarding Persian children's acquisition of actional and psychological passives confirms Border and Wexler's (1987) *Maturation Hypothesis* according to which the principle of A-chain or argument movement is acquired about 4 or 5 years of age. In the case of the produced psychological passives, a small amount of production among all the three age groups was in line with other studies which scrutinized the children's acquisition of passives including both actional and psychological passive constructions (e.g., Fox & Grodzinsky, 1998; Gordon & Chafetz, 1990; Hirsch &Wexler, 2004a; Hirsch & Wexler, 2006; Hirsch & Hartman, 2006 Maratsos, Fox, Becker, & Chalkley, 1985; Sudhalter & Braine, 1985). The justification for the difference in the rate of acquisition between these two passive categories according to Maratsos et al. (1985), would be due to passive transitivity which means that passive acquisition is semantically constrained. Children firstly acquire the actional passives because they have high transitivity and then generalize the psychological passives which have lower semantic transitivity.

In this research, the analysis of adjectival passives shows that there is no significant difference between the three age groups with respect to the production of adjectival passives. This suggests that the production of such structures not be problematic for children at different age ranges. As Israel et al. (2000) put it, adjectival participles are derived from lexicon and hence, young children can produce such structures. But in the case of actional and psychological passives, they are not able to generate them until the four years of age because they are in lack of the principle for A-chain movement. Embick (2004) proposes the major difference between eventive or verbal passives and the resultant state (adjectival) passives is that the eventive passives own an agentive on verb while the resultant state passives do not. He claims that the agentive feature on verb licenses the components such as external arguments such as the by-phrase.

The researchers also explored the children's comprehension of short/long actional and psychological passives. For instance, the following pictures including short/long actional and psychological passive sentences were shown to the child and asked:

Researcher: Ki dær âquš gerefte mišævæd? (Short actional passive)
Who hug taken PTCP become PRES-3SG?
Who was hugged?
Melika (5 years old): Ni-Ni.
Baby.

Researcher: kudæk tævæsote che kæsi buside mišævæd? (Long actional passive)
Child by who kissed PTCP become PRES-3SG?
Who is the child kissed by?
Sajjad (7 years old): tævæsote mâmâneš.
By mom-her.
By her mom.

Researcher: kiâ be yâd âværdeh mišævænd? (Short psychological verb)
Who remember PTCP become PRES-3SG.
Who are remembered?
Farnaz (4.5 years of age): un pesâr.
That boy.
That boy.

Researcher: kârton tævæsote ki dide mišævæd? (Long psychological passive)

Cartoon by who watched PTCP become PRES-3SG.
By whom the cartoon is watched?

Parisa (9 years old): tævæsote un dokhtær.
By that girl.

With respect to the short/long actional and psychological passives, the analysis of the narratives indicated that Persian children almost rarely produce long passive constructions. This finding corresponds with the similar findings of research in other languages. The naturalistic data from many languages such as English (Horgan, 1978), French (Sinclair, Sinclair & Marcellue, 1971; cited in Suzman, 1985), German (Mills, 1985), and Hebrew (Berman, 1985) have shown that spontaneous full or long passives, having an agent by-phrase are quite rarely produced in child language.
Regarding the comprehension of short/long actional and short/long psychological passives, the data analysis showed that Persian children at the three age ranges comprehended short passives much more than the long passives. In this regard, Maratsos et al. (1985), Borer and Wexler (1992), in addition to Fox and Grodzinsky (1998) found that English children were able to interpret the passives without *by*-phrase or an agent phrase but had trouble when a theta role was assigned to the *by*-phrase including theme or experiencer. Fox and Grodzinsky's (1998) theory was on the basis of the idea that the theta role can rightly be assigned when the object moves to the subject position. But children do not possess the mechanism to transmit the theta-role allocated to the subject of the active sentence and construct *by*-phrase. Not having the syntactic process related to the thematic-transmission, children are expected to have no trouble with truncated passives (short passives), but show difficulty with full passive constructions.
Through the comparison between the two passive categories, it is revealed that long/short actional passives are better interpreted by the Persian children at the three age groups than long/short psychological passives. Also, previous studies on children's comprehension of passive constructions have frequently referred to the point that children interpret actional passives better than psychological (non-actional) passives (Bates, Burkardt, & Good, 1991; Borer & Wexler, 1987; Gordon & Chafetz, 1990; Hirsch & Wexler, 2004; Maratsos et al., 1985; Marchman, Fox & Grodzinksy, 1998; Sudhalter & Braine, 1985). Although Persian children have difficulty with the production and comprehension of psychological passives, this does not mean they cannot acquire such constructions. As it is seen in the data analysis, children ultimately acquire different passives including long/short actional and psychological passives.

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Case markers in typically developing 3.1-5 years Konkani children

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Debora D'Souza[1]
Mangalore University
Satish Kumaraswamy[2]
Mangalore University

Abstract

Communication is an essential feature in every living being. It is important to know and follow the rules of the language such as tense markers, Person Noun Gender markers, Case Markers and so on to communicate effectively. The case marker is a formal device associated with a noun phrase that signals the grammatical role of that noun phrase. In multilingual country like India various languages are spoken and standardized test materials are limited. Therefore it is important to establish the database to study the language acquisition in children in different languages allowing to strengthen the assessment and intervention programme in a systematic and structured way. Hence the present study was taken as one step in the process to understand the language acquisition, by understanding the case markers in 3.1- 5 years typically developing 18 Konkani speaking children. The data was collected from conversation and monologue (picture and topic description) tasks were subjected to statistical analysis and results indicate that Nominative case is well developed and used in all the given tasks when compared to other Case Markers which were inconsistent. This shows that acquisition of case markers might have been achieved and depends on the task which elicits the response, which implies that the task used to elicit the response also plays an important role in identifying the case markers. Hence the data could be used as normative for identifying, diagnosing and assessing the Konkani speaking children in west coastal region of India.

Keywords Case markers, Konkani Language, Language acquisition

1. Introduction

Language is a complex and dynamic system of conventional symbols that is used in various modes for thought and communication. Contemporary views of human language hold that: language evolves within specific historical, social, and cultural contexts; language, as rule-governed behavior, is described by at least five parameters — phonologic, morphologic, syntactic, semantic, and pragmatic; language learning and use are determined by the interaction of biological, cognitive, psychosocial, and environmental factors;

[1] Bio: Debora D'Souza, MASLP from Dr. M. V. Shetty College of Speech and Hearing affiliated to Mangalore University, is currently working as Clinical Audiologist and Speech Language Therapist at Super Quality Hearing Aid and Speech Therapy Centre in Oman. Her research interests are language acquisition, cognitive processing, Speech perception, Bilingualism. Corresponding Author: deboraaslp@gmail.com
[2] Bio: Satish Kumaraswamy working as Assistant Professor and pursuing Ph.D. at Dr. M. V. Shetty College of Speech and Hearing, Affiliated to Mangalore University, Mangalore. His area of interest include Language Acquisition, Language disorder and Speech disorders. Corresponding Author: sat8378@yahoo.com

effective use of language for communication requires a broad understanding of human interaction including such associated factors as nonverbal cues, motivation, and sociocultural roles. (American Speech and Hearing Association, 1982). Language will be effective if one knows and follow the rules of the language and one example is the morphosyntax, which deals with tense markers, Person Noun Gender markers, Case Markers, plurals and so on.

Morphosyntax refers to the grammatical categories or linguistic units that have both syntactic and morphological feature. This study entirely focuses on studying the case markers of Konkani language in typically developing Konkani speaking children. A case marker is a formal device associated with a noun phrase that signals the grammatical role of that noun phrase. In Konkani, Nine Case markers have been noted by Francis (1882). They are as follows;

1. Nominative- /mɑtjɑ:nθ sɔrɔp ɑsɑ/
2. Dative- /jɔvn̩ak ɑɪlɔ/
3. Accusative- /burgjɑ:n fɔtɪ mɑrlɜ̃/
4. Instrumental- /θɔ θɑkɑ θɑlvɑrɪn mɑrθɑ/
5. First locative- /θɜ̃ kʊdɑ:nθ ɑsɑ/
6. Second locative- /gɑdɪjɑ:l̩ mɜzɑ:r ɑsɑ/
7. Original- /θɔ gˈɑrɑ gɜlɔ/
8. Original with Lagin/Kade (lɑgĩ/ kɑdɜ) - /ðɜvɑ lɑgĩ mɑ:g/
9. Original with postpositions- /ðɜvɑ θɑĩ ɑmkɑ sɑbɑ:r kɑɪðɜ ɑsɑθ/

Two more Case markers are studied since the use of those case markers has been observed in Native Konkani adult speakers and is analyzed in present study.

10. Ablative- /θɔ hɑŋʌ θɑ:vn gɜlɔ/
11. Genetive- /pɜtjɑtʃɪ sɑnkʌl sʊtljɑ/

The description of Language acquisition in children is a basis to provide data on normal language acquisition so all language groups need to be studied. It is known that first word combinations tend to lack function words and the bound morphemes that mark plural, possessive case or tense. Later, children start to produce longer utterances, combining three and more words. As children start to put words together in longer sequences, they also start to add the function words and bound morphemes that were missing in their first word combinations (Hoff, 2014). Some language acquisition data work has been done extensively in western countries like Chomsky (1957), Snow (1989) and some attempts on Indian languages are also carried out (Subba Rao, Sreedevi). Brown (1973), cited in language development by Hoff, stated that the child's grammar at the two word level is a vehicle for expressing a small set of semantic relationships.

Moyle, Weismer, Evans and Lindstrom (2007) examined the longitudinal relationships between lexical and grammatical development in typically developing and late-talking children for the purposes of testing the single-mechanism account of language acquisition and comparing the

developmental trajectories of lexical and grammatical development in late-talking and TD children. They suggested that for late-talking children, syntactic growth may be less facilitative of lexical development.
Subba Rao (1995) did a descriptive analysis of language samples obtained from typical children of 4-6 years and mentally matched intellectually disabled children and stated that accusative and vocative case is performed better by intellectually disabled children than typical children of 4-6 years.
Sreedevi (1976) noted that by 2.3 years, children showed no case markers, but by 2.11 months, certain case relations were evident.
Vijayalakshmi (1981) reported that 2.5 years typically developing children showed the presence of locative, dative, accusative and possessive case markers.
Uma (1993) reported that children between 2 to 2.6 years showed an ability to comprehend all the case markers. Only around the age 2.6- 3 years they start using grammatical markers to indicate case system and stated that around 4 years, all of the case markers of Kannada are seen in the production of children.
There are formal Indian standardized test materials available for assessment and intervention such as 3D- Language Acquisition Test (Herlekar, 1986), Screening Test of Syntax Acquisition in Kannada (Vijayalakshmi, 1981). Although formal standardized tests are the ideal method of investigation, in scenarios where there is lack of such formal test materials, informal language assessment methods are the appropriate method of choice.
It is observed that Konkani, being the most prominent language across the west coastal region of India, has a very few studies. But there is no much of detailed study on individual syntactic structures which would provide a developmental pattern of each structure. There are few studies done on semantic relations in Konkani by D'Souza (2014), Monteiro (2013), Morphophonemic structures in Konkani by Fernandes (2008). The research needs to be focused on various aspects of language acquisition and the present study is the step in the process. The present study attempts to understand the usage of case markers in Konkani.

1.1 Need for this study

It is vital to study the language acquisition in children in different languages and in a country like India with various languages, is challenging for Speech Language Pathologists to assess and plan for intervention programmes using standard test materials. Hence the research needs to be focused on various aspects of language acquisition in every language. Konkani, one of the popularly spoken language by majority of population in the west coastal region of India, is even spoken by majority of people in and around Mangalore and hence understanding of language acquisition in typically developing Konkani speaking children is important for screening, diagnosis and intervention of language disordered native Konkani children. Since, there is insufficient research on language acquisition in Konkani Language, the present study tries to study the usage of case markers in Konkani speaking typically developing children. Its specific goal is to investigate the

usage of case markers within and across 3.1-4 and 4.1-5 years Konkani speaking typically developing children.

2. Methodology

2.1 Participants

Eighteen typically developing Konkani speaking children in the age range of 3.1- 5 years, further divided as 9 children each in the age range of 3.1-4years and 4.1-5 years, attending kindergarten in Mangalore city, with no history of speech and language disorder, hearing problem, psychological, ophthalmic and neurological problem participated in the present study.

2.2 Test procedure and data collection

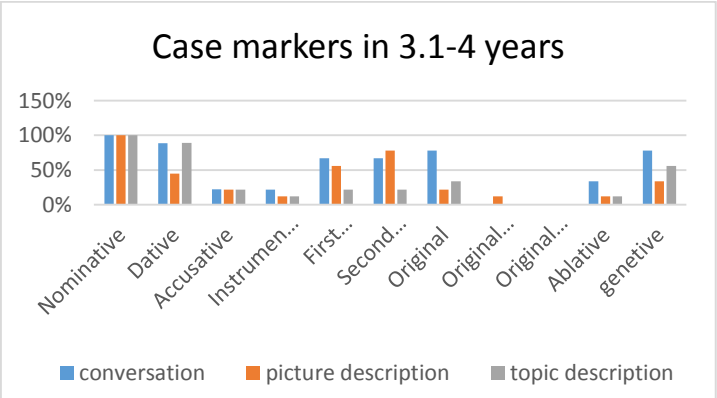
Each subject was individually focused. Before the task could continue, the clinician confirmed that each subject had no hearing and/ visual problems. The sample was collected in a quiet room with acceptable noise level. The subjects were seated next to the examiner at one foot distance in front of the standard laptop with inbuilt microphone. Prior to the collection of speech sample, the clinician had an informal interaction with every child to build a good rapport. Children were instructed to respond properly in all the 3 tasks such as conversation task, picture description, and topic description. Speech samples of minimum 100 utterances from the given tasks were audiotaped.

2.3 Data analysis

The audiotaped samples were further analyzed based on a list of total 11 case markers, out of which 9 case markers given by Francis (1882) and 2 case markers were additional based on the current usage of a typical Native Konkani speakers. The usage of various case markers were analyzed to determine the presence of case marker in each group.

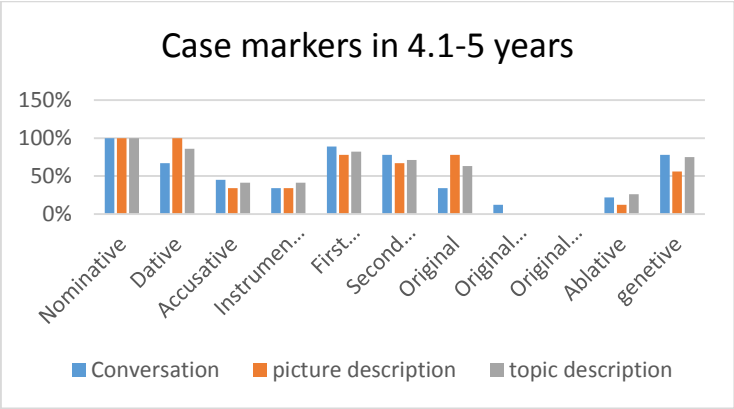
3. Findings

Descriptive analysis of data from 3.1-4 years group obtained revealed that Nominative case is used by all the subjects in all the 3 tasks and the least used case marker is original with lagin/kade (lɑgĩ/ kɑdɜ) for picture description task and Original with post positions were not seen in 3.1-4 years group.

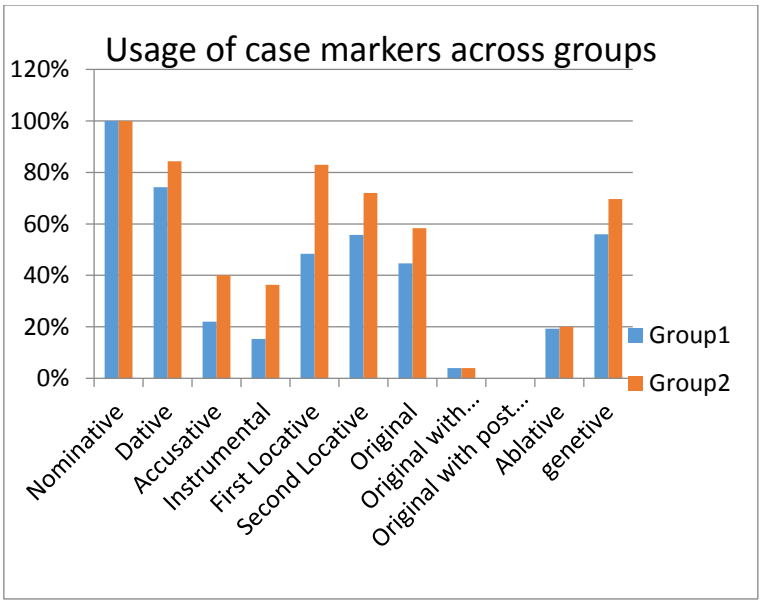


Graph 1. The case marker usage in 3.1- 4 years typically developing children

Descriptive analysis of data from 4.1- 5 years groups, revealed that Nominative case marker was used by all the subjects for all 3 tasks and the least used case marker was original with lagin/kade (lɑgĩ/ kɑdɜ) for conversational task. Similarly, original with post positions was not seen in the group.



Graph 2. The case marker usage in 4.1-5 years typically developing children



Graph 3. The usage of case markers across groups

From the above chart we conclude that,

1. Nominative and Original with lagin/ kade (lɑgĩ/ kɑdɜ) are equally present in both groups.
2. Original with post positions is not present in both groups.

3. The other case markers in group 2 are present more number of times when compared to case markers of group 1.

4. Conclusions

The present study was attempted to study the usage of case markers in 3.1-5 years typically developing 18 Konkani speaking children. Two age groups were categorized to study the case markers in and across the two groups. The speech sample was obtained through conversation and description tasks (picture and topic description). The obtained data was subjected to statistical analysis and results indicate that Nominative case is well developed and used by both groups when compared to other Case Markers. Original with post positions were not present in both the groups. As presumed, the usage of case markers is better in 4.1-5 years of age group. The usage of case markers for different tasks by the participants in this study state that the simple case markers are well used in various contexts and the markers such as original with lagin/ kade (lɑgĩ/ kɑdɜ) is least used and are not often used by the typically developing Konkani speaking children. The original with postposition marker is absent in both the age groups, indicating that the case marker is not used in the day to day communication, rather used in formal context such as preaching, formal speeches etc.

From the above study, we can infer that based on one task one cannot come to the conclusion on usage of the syntactic abilities. During the informal language assessment of the child, one has to focus on the response of the child rather than the tasks. This implies that irrespective of the context, the response given by the children is essential. Hence while assessing, different tasks to elicit the response should be given. Secondly, this study states that around 3.1 to 4 years of age, Konkani speaking typically developing children will be using the case markers in Konkani and same case markers are well used by 4.1 to 5 years. But the use of original with lagin/ kade (lɑgĩ/ kɑdɜ) and original with postpositions case markers can be least expected in the Konkani speaking typically developing children.

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Acquisition of speech sounds in Tulu language

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Parinitha P. Shetty[1]
Mangalore University
Shwetha Prabhu[2]
Mangalore University

Abstract

Since every language has its own phonological system, in a multi-lingual country like India, there has been a need for development of language specific articulatory skill acquisition norms. Although data has been obtained in some of the major Indian state languages like Kannada, Tamil, Malayalam, Telugu, and Bengali, there have been very limited studies on regional non-official languages spoken by a substantial number of people in India. The current study aims to obtain speech sound acquisition data in a south Indian language of Dravidian origin called 'Tulu', spoken by approximately 3 million people. 53 picture items, with 20 target consonants in initial, medial and final positions of the words were obtained from 'Picture Articulation Test in Tulu language' (Shetty, 2012). This was administered on 50, 3-8 years old Tulu speaking children, who were grouped in an interval of 12 months. Speech sound was determined as acquired if 80% of the children in an age group articulated the sound correctly in all given positions (Initial, Medial and Final). It was seen that all consonants were acquired by 3.0-3.12 years, except for retroflex /l/ and trill /r/. A comparison of the findings was made with existing data on speech sound acquisition in western and Indian literature.

Keywords Indian, Tulu, child language, Language acquisition, speech sounds

1. Introduction

Language has served as a major tool for social animals like humans to communicate, survive and be part of the society from prehistoric times. When language is expressed orally, it is termed as speech. Speech is the most efficient and frequently used mode of language expression, produced with the help of speech mechanism structures like tongue, jaw, lips, etc in complex co-ordination with the nervous system. The ability and the age at which a particular speech sound is produced may vary across languages as every language has its own phonological system. When children show a delay in the acquisition of speech sounds, or when the pattern of acquisition differs from most children of the same age, then there exists what is known as articulatory impairment. It is defined as "Atypical production of speech sounds that may interfere with intelligibility" (ASHA, 1993). The etiology may be functional and organic. Functional articulation disorders exist in the absence of any apparent cause and are related to deficiencies in the relatively peripheral motor processes (Bauman–Waengler, 2000); whereas,

[1] Bio: M.A.S.L.P., Department of Speech-Language Pathology, Dr. M.V. Shetty College of Speech & Hearing, Mangalore University, India. Corresponding author: parisshetty@gmail.com

[2] Bio: Assistant Professor, Department of Speech-Language Pathology, Dr. M.V. Shetty College of Speech & Hearing, Mangalore University, India.

organic articulation disorders exist due to causes such as cerebral palsy, cleft palate, and/or hearing impairment, or they may result from TBI or other conditions/syndromes. Children typically acquire articulatory skills by 5-8 years. When there is a deficit in the acquisition of speech sounds due to different causative factors, it impedes normal communication and may later lead to social, emotional, and interpersonal relationship issues, thereby raising parental concern to seek professional advice early in life. By knowing the age at which a speech sound in a particular language is acquired and with the knowledge of what speech sounds precede/ follow the acquisition of a particular sound, a Speech-Language Pathologist can detect the presence or the absence of an articulation disorder, plan therapy and also use the data in parental counseling.

Since the 1930s many researchers have extensively studied and determined the age at which single phonemes are mastered in groups of English speaking children. To judge a speech sound as acquired or not, a cut- off criteria was determined. According to Sander (1972), the age of customary production is the age at which 50% of the children tested produced the sound correctly in at least 2 positions, and age of mastery is the age at which 90% of the children tested produced the sound correctly in all 3 positions. Considering the individual variation in speech sound acquisition, an addition of 75% cut-off criteria was made to determine the age of acquisition of the speech sounds. Here, a sound is considered as acquired if 75% of the children in an age group produced the sound correctly in all 3 positions (Amayreh & Dyson, 1998). Different authors have studied the age of sound production of single phonemes among English speakers by using different cut-off criteria and by considering children from different age ranges. 65 children in the age range of 2.6-8.6 years were tested with 23 consonants in the initial, medial and final positions of the words. Questions about pictures, objects and actions were asked and modeling was provided when required. The cut-off that was considered to judge a sound as mastered was 100%. It was observed that consonants /m/,/h/,/p/,/w/,/b/ were mastered at 3.6 years; /n/,/ŋ/,/ɖ/,/j/,/k/,/g/,/ʈ/ at 4.6; /f/ at 5.6; /ʃ/,/v/,/l/ at 6.6; while /s/,/r/,/z/, /θ/,/hw/ were not seen to be mastered until 7.6 years (Poole, 1934). A larger sample of children in the similar age range with inclusion of greater number of target sounds for testing showed that pre-school children spontaneously labeled picture stimuli or repeated the test words, whereas 6-8 year old children read the test word or repeated after the tester. Mastery of consonants /m/,/n/, /h/, /f/, /p/,/w/,/ŋ/ was seen at 3 years, /j/ at 3.6; /b/,/k/, /g/,/ɖ/,/r/ at 4; /s/,/tʃ/, /ʃ/ at 4.6; /l/,/ʈ/,/v/ at 6; and /z/ at 7 years when 75% was used as the cutoff. In this study, 480 children aged 3-8 years were tested with 176 sound elements (Templin, 1957). Similar studies were carried out using different cut-offs taking into consideration the socio economic background, race and the region from where the sample was obtained. When picture stimuli and questions consisting of 133 speech sounds were used in the initial, medial and final positions of the words to elicit responses from 204 children, aged 2-6 years from high socio-economic background, it was seen that /m/,/n/,/h/,/f/,/w/,/b/ were acquired by 3 years; /p/,/j/,/k/,/g/,/l/ by 4 and /ɖ/, /ʈ/, /s/, /r/,/tʃ/,/v/,/z/ were acquired by 5 years. Here, 75%

considered as the cut-off to label the sounds as acquired (Wellman, Case, Mengert, & Bradbury, 1931). Another study tested 147 Caucasian children aged 2-4 years with 44 picture cards consisting of consonants in only initial and medial positions of the words. 75% was used as the cut-off score and sounds were considered as mastered if they were produced in the 2 positions correctly. Results showed that sounds were produced correctly at an earlier age than that seen in other English studies. /m/,/n/,/h/,/p/ were mastered at 2; /ŋ/, /j/,/k/,/g/,/f/, /ɖ/ at 2.4; /b/,/w/,/ʈ/ at 2.8; /s/ at 3; /r/,/l/ by 3.4; /tʃ/,/ʃ/ at 3.8; and /z/,/v/ at 4 years (Prather, Hedrick, & Keren, 1975). A study on 1049 children based in Iowa and Nebraska in the age range of 3-9 years were assessed for the production of consonants in all three positions using test items from a standard assessment tool. 90% cut-off criteria was used to consider the sounds as mastered by the child. Results revealed that /m/ was acquired at 2 years; /n/ at 2.5; /ɖ/, /k/,/g/, /p/, /f/, /v/ /b/ at 3 years; /ŋ/,/ʈ/ at 4; /ʃ/,/v/ at 5; /l/ at 5.5; /s/,/z/ at 6; /k/,/g/,/j/,/g/, /ʈ/, /tʃ/ at 7 and; /ŋ/ and /s/ were acquired as late as 7.9 years (Smith, Hand, Freilinger, Bernthal & Bird; 1990). In all these studies phoneme production errors decreased with advancing age. Moreover, similarities were observed in patterns of sound acquisition, but with differing age norms. This could be due to the varying cut-off criteria adopted by the researchers to assign a sound to an age level. Most of the recent investigations on articulatory acquisition in English language have extended onto understanding of cluster acquisition in children (Zamuner, Gerken & Hammond, 2004; Kirk & Demuth, 2005; Kirk, 2008; McLeod & Arciuli, 2009). One of the recent studies in English that has looked at articulatory acquisition of single phonemes is an extensive research involving 5500 children, aged 1.5-18 years (Fudala & Reynolds, 2001). 90% criteria was adopted and items from Arizona Articulation Proficiency Scale were used as stimuli. But, unlike other studies, the criteria was set separately for initial and final positions, thereby reporting separate acquisition norms for each of the positions. The other recent study on single phonemes was carried out on 684 British speaking children aged 3-6 years. It was observed that the findings were similar to the norms obtained for children from Iowa and Nebraska. Sounds were reported to be acquired by 8 years except for the phonemes /s/ and/v/ which were acquired by 3 and 4 years respectively (Dodd, Holm, Hua & Crosbie, 2003).

In a multilingual nation like India with a population of 1,236,344,631 which makes it the second most populous country in the world, there exists 15 official (Central Intelligence agency, 2015) and several non-official languages, with about 2000 dialects across the country, varying every 200 km. Hence, there is a great need to obtain normal articulatory acquisition data from different languages of India to add to the existing child language development literature. With the intention to fulfill this need, studies have been carried out in some of the state languages of India such as Kannada, spoken in the state of Karnataka; Tamil spoken in Tamil Nadu, Malayalam in Kerala, Telugu in the state of Andhra Pradesh, and Bengali spoken by people from the state of West Bengal. To establish the age of acquisition of different phonemes in Indian languages, researchers have used test items from the articulation tests that were developed in the respective languages. Kannada

Articulation Test (Babu, Rathna & Bettagiri, 1972) was administered on 180 school going children in the age of 3-3.6 years, grouped in 6 months age interval. Cut-off criteria was set as 75% and it was found that sounds /m/,/ɳ/,/p/,/b/,/j/,/k/,/ɡ/,/l/,/ɖ/,/ʈ/,/s/ were acquired by 3 years; and the sounds /r/, /tʃ/, /ʃ/ were acquired by 4.6, 3.7 and 5.1 years respectively (Tasneem, 1977). The acquisition norms were further updated recently with a 90% cut-off criteria (Prathima & Sreedevi, 2009) which revealed all sounds in the child's production repertoire to occur around 3-3.6 years. It was observed that acquisition of /ʃ/ had moved from 5.1 years to an earlier age of 3.6-4 years, and /tʃ/ had moved from 3.7 to 3-3.6 years, while acquisition of other phonemes remained at approximately the same age as in the previous study. To document speech sound acquisition in Tamil, Tamil Articulation Test was administered on 180 children in the age range of 3-6 years, grouped in an age interval of 6 months. Using pictures as stimuli and 75% as the criteria to determine the age of acquisition of speech sounds, it was found that /m/,/ɳ/,/p/, /b/,/j/,/k/,/ɡ/,/l/,/ɖ/,/ʈ/,/s/,/ʈ/ were acquired by 3 years except for /ʃ/ which was not acquired until 6 years (Usha, 1986). The norms were re-established (Ushakiran, 2010) using the same cut-off criteria. Subjects were seen to acquire the sound at approximately a year earlier than that was reported in the previous literature. Phonemes /m/,/ɳ/,/p/, /b/,/j/,/k/,/l/ had moved from the age of acquisition of 3 years to 2-2.3 years; /ɡ/,/ɖ/,/ʈ/,/ʈ/ had moved from 3 years to 2.3-2.6 years; and /ʃ/ and /s/ were articulated by 2.6-2.9 years. Acquisition of phonemes in Telugu was studied by administering contents from Test of Articulation and Discrimination in Telugu on 160 Telugu speaking children in the age range of 2.5-4.5 years, grouped in an interval of 6 months. Picture naming or repetition were the tasks adopted. It was reported that, on using 75% as the cut-off criteria for speech sound acquisition, consonant sounds /m/,/ɳ/, /p/, /b/, /j/, /k/, /ɡ/, /l/, /ɖ/, /ʈ/, /ʈ/, /tʃ/ were found to be acquired by 2.6 years except for /r/ and /ʃ/ which were acquired at 3.9 and 3.6 years respectively (Padmaja, 1988). To obtain age norms for Malayalam phonemes, 86 words in the form of picture cards from articulation test battery in Malayalam were used to elicit responses from 240 children in the age range of 3-7 years, grouped in an interval of 6 months. Pictures were presented one after the other keeping auditory cues at a minimum. 75% was used as the criteria to consider the sound as acquired. The phonemes /m//ɳ//p//b//j//k//ɡ//l//ɖ//ʈ//s//r//tʃ//ŋ/ were seen to be acquired by 3-3.6 years, except for /ʃ/ which was acquired by 5-5.6 years (Maya, 1990). These age norms were updated by Divya and Sreedevi (2010) using the same cut-off criteria. On re-establishing the norms after 20 years, it was observed that phonemes /m/,/n/,/p/,/b/,/j/, /ɖ/, /ʈ/, /tʃ/, /ŋ/ that were previously documented to occur at 3-3.6 years had moved to an earlier age of 2-2.3 years, /g/ had moved to an earlier age of 2.3-2.6 years, and /r/ was observed at an earlier age of 2.6-2.9 years. Similarly, to obtain acquisition norms in Bengali speakers, 118 words from a screening articulation test in Bengali were administered on 165 Bengali speaking school going children in the age range of 2-8 years who were grouped in 1 year interval. Responses to picture card stimuli showed that consonants /m/,/ɳ/, /p/, /b/ /ŋ/ were

acquired by 2.5; /k/ at 2.7; /j/,/g/,/l/,/d/, /tʃ/,/ʈ/, /ʃ/, /ʈ/ at 3 and /r/ around 4 years when 90% cut-off criteria was considered (Banik, 1988). Similar to western studies percentage of errors decreased with advancing age.

Although several speech acquisition data are available in different state languages, literature on sound acquisition in regional languages is almost nil except for one study on a language spoken in the Madikeri district of south India (Somanna, 2007), a district which is the commercial hub for coffee in the country with a population of approximately 33,000 (Madikeri City Muncipal Council, 2015). Hence the present study focuses on obtaining age norms for acquisition of speech sounds in Tulu language, one of the important regional languages spoken by a community living in South India. It has lost its script to time, yet is spoken and is continuing to be spoken by more than 3 million people across the country (Kamila, 2009). It is a southern branch of the Dravidian language family (Krishnamurti, 2003), the family that originates from the Dravidian ethnic group, forming 25% of the current Indian population (Central Intelligence Agency, 2013).

1.1 Need for this study

Since every language has its own phonological system, in a multi- lingual country like India, there has been a need for development of language specific articulatory skill acquisition norms. Although data has been obtained in some of the major Indian state languages like Kannada (Tasneem,1977), Tamil (Usha,1986), Malayalam (Maya,1990), Telugu (Padmaja, 1988) and Bengali (Banik, 1988), there have been very limited studies on community and regional non-official languages spoken by substantial number of people in India. To fulfill this need the current study is carried to obtain speech sound acquisition data in a south Indian language of Dravidian origin called 'Tulu' spoken by approximately 3 million people. The specific aims of the study were, to administer 'Picture Articulation Test in Tulu' (Shetty, 2012) on 50 children aged 3-8 years; to establish norms for speech sounds based on the responses; and to compare the data obtained with that of the earlier reported studies in English and other Indian languages.

2. Methodology

2.1. Participants

Fifty children who spoke Tulu at home and had English as the medium of instruction at school were considered for the study. All children were from middle class socio-economic status. The information on language use and economic status of the children were obtained from the school from where the children were selected. They were divided into 5 discrete groups as: 3.0-3.12 (mean= 3.4), 4.0-4.12 (mean= 4.4), 5.0-5.12 (mean= 5.5), 6.0-6.12 (mean= 6.4), 7.0-7.12 (mean= 7.3) years, each group comprising of 10 children. They were selected based on normal speech, language and motor histories with no otology problems as informally screened by a Speech-Language Pathologist.

2.2. Stimulus

To obtain data on consonant acquisition, word list with 20 consonants in different positions of the words, that were available from Picture Articulation Test in Tulu language (Shetty, 2012) were considered. The list is given in Appendix 1.

2.3. Test administration

Test was carried out in a silent room away from external disturbances. Pictures corresponding to the target words were presented on a computer screen. Children were made to sit on a comfortable chair about 2 feet away from the computer for clear visibility. Each child was instructed to label the pictures in Tulu. Spontaneous responses were encouraged. When the child failed to express the target word, a phonemic cue or a syllable cue was provided. If the child failed to label the word with help of the cues, modeling of the word production was done by the examiner. Lower age group was tested before proceeding with the higher age group.

2.4. Obtaining Response and Scoring

Every correct production of a phoneme that was embedded within a word, free from substitution, omission, distortion and addition errors were scored 1, while any inaccurate response was not scored at all. Mean scores and standard deviation were calculated for each of the age groups. This was necessary to determine if differences in scores between the age groups existed.

In order to obtain an estimate of norm, percentage of subjects who could produce the sounds correctly were determined. If the target phonemes were produced accurately by 80% or greater than 80% of the subjects in all positions of the words they were presented in, then the speech sound was considered acquired for that age.

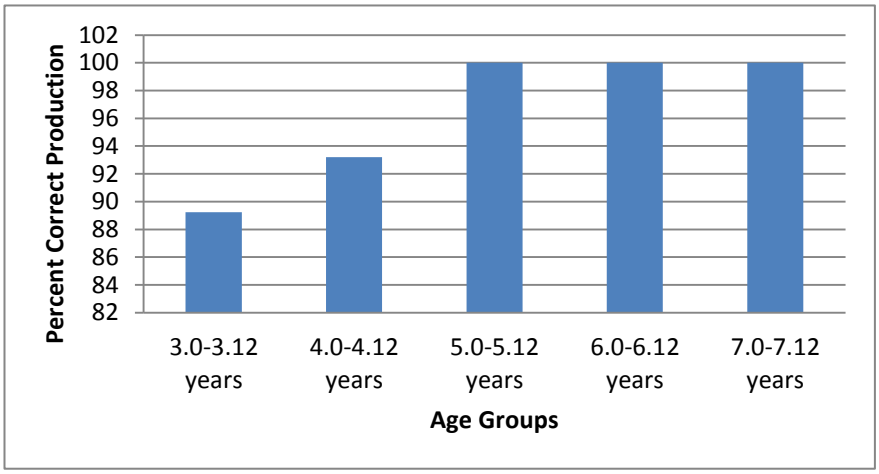
3. Findings

The present study looked at establishing age norms in typically developing Tulu speaking children. Test items consisted of picture stimuli with target consonants in different positions of the words. Responses were elicited from 50 children aged 3-8 years, who were divided into 5 discrete groups i.e., 3.0-3.12 years, 4.0-4.12 years, 5.0-5.12 years, 6.0-6.12 years, and 7.0-7.12 years. Mean scores and standard deviation for each of the age groups were calculated based on their responses. This is given below in Table 1 and graphically represented as average percentage score for each age group in Graph 1 below.

Table 1: Mean scores and standard deviation for the 5 age groups

Age	3.0-3.12 years (N=10)	4.0-4.12 years (N=10)	5.0-5.12 years (N=10)	6.0-6.12 years (N=10)	7.0-7.12 years (N=10)
Mean	47.3	49.4	53	53	53
S.D	3.12	2.36	0	0	0

The comparison of mean scores were made using Analysis of Variance. ANNOVA revealed statistically significant differences in articulatory scores between the age groups [F(4,45)=22.8, p<0.05].



Graph 1: Average percentage of words produced correctly by 10 subjects in each age group

Average percentage of words produced correctly by 10 subjects was 89.24% (SD = 5.9) in the age group of 3.0-3.12 years, 93.2% (SD = 4.4) in the age group of 4.0-4.12 years, and 100% in the age groups of 5.0-5.12 years, 6.0-6.12 years and 7.0-7.12 years.

The percentage of subjects who were able to articulate the phonemes accurately within each age group is tabulated in Table 2 (a), 2(b) and 2 (c) below. Based on this information interpretations were made, as to what phonemes were acquired within which age group.

Table 2 (a): Percentage of subjects articulating the phoneme accurately in 3-3.12 years

Speech sounds	Percentage of children articulating the sound accurately	Acquired/ Not acquired (Cut off criteria = 80%)
/p/ /b/ /j/ /ʃ/ /ŋ//m//ɳ//s//g//ʈ/	100%	Acquired
/ɖ/ /k//dz/ /ʈ/ /ɖ/ /ɳ/ /tʃ/	90%	Acquired
/l/ /r/	80%	Acquired
/ɭ/	70%	Not Acquired

Table 2 (b): Percentage of subjects articulating the phoneme accurately in 4-4.12 years

Speech sounds	Percentage of children articulating the speech sounds accurately	Acquired/ Not acquired (Cut off criteria = 80%)
/p/ /b/ /j/ /ʃ//ŋ/	100%	Acquired
/m/ /s/ /g/ /k//dz//ɖ//ʈ/ /ʈ/ /ɖ/ /ɳ/ /ɳ/	90%	Acquired
/tʃ/ /l/	80%	Acquired
/r/	70%	Not Acquired
/ɭ/	50%	Not Acquired

Table 2 (c): Percentage of subjects articulating the phoneme accurately in 5-5.12 , 6-6.12 and 7-7.12 years

Speech sounds	Percentage of children articulating the sound accurately	Acquired (Cut off 80%)
/p/ /b/ /j/ /ʃ//ŋ/ /m/ /s/ /g/ /k/ /dz/ /ʈ/ /ʈ̪/ /ɖ̪/ /ɳ̪/ /ɳ//tʃ/ /l//r//ɭ/ /ɖ/	100%	Acquired

It can be seen in Table 2(a), 2(b) and 2(c) that, at the age of 3.0-3.12 years speech sounds /p/, /b/, /j/, /ʃ/ and /ŋ/ have been scored 100%, which means all subjects were able to produce the phonemes accurately in all the target positions of the words. Phonemes /m/, /s/, /g/, /k/, /dz/, /ʈ/, /ʈ̪/, /ɖ̪/, /ɳ̪/, /ɳ/ scored 90% indicating all but one subject being able to articulate the phonemes accurately within the age group, and still satisfying the acquisition criteria. Similarly, /tʃ/ and /l/ were considered acquired among children in this age range, as these sounds scored 80%, meaning they were produced by 80% of the subjects in all target positions. However, /r/ and /ɭ/ with 70% and 50% scores respectively, fell below the required cut-off to be considered as acquired for the age.

Speech sounds /m/, /s/, /g/, /ʈ̪/, /j/ and /ŋ/ which had obtained a score of 90% in the 3.0-3.12 years age group, scored 100% in the age group of 4-4.12 years. Similarly, lower acquisition scores for /tʃ/, /r/ and /ɭ/ in 3.0-3.12 years age group improved to 90%, 80% and 70% respectively. However, phonemes /ɖ/, /k/, /dz/, /ʈ/, /ɖ̪/, /ɳ̪/ still retained the 90% score that was obtained in the age group of 3-3.12 years.
Age groups 5.0-5.12 years and beyond obtained 100% score for all the speech sounds.

4. Discussion

Percentage errors on production of words decreased as age increased (as seen in Graph 1), suggesting that some sounds are mastered earlier than the others. This is in correlation with the western (Poole, 1934; Templin, 1957; Wellman et al., 1931; Prather et al.,1975; Smith et al., 1990) and Indian studies (Tasneem, 1977; Prathima & Sreedevi, 2009; Usha, 1986; Padmaja, 1988; Maya,1990; Banik, 1988) that report decrease in error production with increasing age. Thus neuro-muscular maturation with advancing age has lead to increased motor control and thereby increased articulatory skills.
Consonants /p/ /tʃ/ /l/ /ɖ̪/ /b/ /m/ /s/ /g/ /k/ /dz/ /ʈ/ /ʈ̪/ /ɖ/ /n/ /ɳ/ /j/ /ʃ/ and /ŋ/ tested were acquired by the age of 3.0-3.12 years, except for /r/ and /ɭ/ which were produced only by 70% and 50% of children respectively, thereby not fulfilling the criteria for the sound to be considered as acquired. However, by 4.0-4.12 years, there was an increase in percentage of children demonstrating the acquisition of /r/ and /ɭ/, where /ɭ/ was produced by 70% of the children and /r/ by 80% of the children. By the age of 5.0-5.12 years all children were able to produce both /r/, /ɭ/ and all the other speech sounds accurately in all given positions in the test signifying that the articulation development was complete by this age. It was noted that children with the ability to accurately produce the speech sound

in one of the given positions, were also able to produce it accurately in the remaining positions. Moreover, if the cut-off criteria of 75% was considered to determine the age of acquisition as suggested by Amayreh and Dyson (1998), instead of a stricter criteria of 80% that is considered in the present study, the same interpretation would result. Hence comparison of the current findings is made with previous literature that have adopted 75% as their cut-off criteria. Acquisition of /p/,/tʃ/,/l/, /ɖ/, /b/, /m/, /s/, /g/, /k/, /dz/, /ʈ/, /ʈ/, /ɖ/, /n/, /ɳ/, /j/, /ʃ/ and /ŋ/ by 3.0-3.12 years is in agreement with Indian studies that have used the cut-off criteria as 75% (Ushakiran, 2010; Tasneem, 1977; Maya, 1990). Acquisition norms in Tamil (Ushakiran, 2010), Kannada (Tasneem, 1977) and Malayalam (Divya & Sreedevi, 2010) languages show these phonemes to occur in the child's production repertoire by the age of 3 years, with the exception of consonants /tʃ/ and /ʃ/ which are reported to be acquired at a later age among Kannada speakers. If a lower age range was considered and if the age interval was narrowed down in the current study, precise pointing of the age of acquisition for particular speech sounds would have been possible. However, comparison with other literature was made by determining if sounds considered as acquired in different languages fell within this broad age range. Thus, it can be said that the age of acquisition norms in the current study is in consonance with that of the other Indian languages except for trill /r/ which has shown to vary in its age of acquisition across studies. Furthermore, when comparison was made with English studies that adopted the similar cut off criteria, it was seen that, Caucasian children acquired these single phonemes by 4 years (Prather et. al.,1975), which contrasts with the present findings where phoneme acquisition is complete only by 5 years. Contrastingly studies by Templin (1957) and Wellman (1931), showed that fewer phonemes were acquired by the end of 4 years compared to Tulu.

Acquisition of /r/ by 4.0-4.12 years occurred later in time than in other Indian languages, where they are acquired at 2.6-2.9 years in Telugu (Ushakiran, 2010) and Malayalam (Divya & Sreedevi, 2010)~~ languages~~. However, the finding is in correlation with Kannada studies which report the age of acquisition of phoneme /r/ to be 4.6 years (Tasneem, 1977). Since recent study in Kannada language has not reported the acquisition norm for /r/, the comparison with earlier findings in the same language has to be made considering the environmental, social and cultural factors at the time that might have yielded the findings. Studies in English language by Smith et.al., (1990) and Poole (1934) showed the acquisition of /r/ as late as 8 years (cut off criteria 90%) and 7.5 years (cut off criteria 100%) respectively; but this could be because they had adopted stricter criteria to label the sounds as acquired. Hence from the current study it can be said that the acquisition of /r/ occurs later in time compared to the findings in English and other Indian languages. Comparison of retroflex /ɭ/ with other studies could not be done given the lack of normative data, in addition to the differences in the phonological make up of the languages.

5. Conclusions

The age of acquisition of all consonants in the present study was in the age range of 3.0-3.12 years, except for retroflex /ɭ/ and trill /r/. Acquisition of

most of the consonants by 3.0-3.12 years is in agreement with other Indian studies that have considered a similar cut-off criteria to judge a phoneme as acquired, even though comparison with western literature revealed varying findings. However by the age of 5.0-5.12 years, speech sound development of the commonly used single phonemes in Tulu language was noted to be complete.

Strengths: The current study serves as a preliminary data, based on which further studies can be directed. Since the study shows that the speech sound acquisition is complete by 5-5.12 years, children below this age group can be considered while using a larger sample size to establish norms. This can save time while effectively providing the required information.

Limitations: Small sample size and lack of inter-rater reliability check

Future direction: Obtaining the same data on a larger sample size that represents all sections of society, with narrow age intervals.

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Appendix 1: List of words with target speech sounds considered for the study

Consonant	Position of target consonant in the word	Words with target consonants
/p/	Initial	/pu:/
	Medial	/tʃəpa:ti/
	Final	/ʈop'i/
/tʃ/	Initial	/tʃəpa:ti/
	Medial	/bartʃɳɛ/
	Final	/putʃ'ɛ/
/l/	Initial	/la:də/
	Medial	/na:la:i/
	Final	/pal'i/
/ɖ/	Initial	/ɖuɖu/
	Medial	/maɖimɛ/
	Final	/parɳɖə/
/b/	Initial	/ba:dzi/
	Medial	/sa:bu:ɳə/
	Final	/kərmbu/
/r/	Initial	/rail/
	Medial	/birɛl/
	Final	/kat'ɛri/
/m/	Initial	/maŋgɛ/
	Medial	/vima:ɳa/
	Final	/bim'a/
/s/	Initial	/sa:bu:ɳə/
	Medial	/kɛsər/
	Final	/mi:sɛ/
/g/	Initial	/go:ɳi/
	Medial	/ugur/
	Final	/maŋgɛ/
/k/	Initial	/kap'ɛ/
	Medial	/saikəl/
	Final	/kuk'u/
/dz/	Initial	/dzɛdɛ/
	Medial	/kudzəl/
	Final	/oɲdzi/
/ʈ/	Initial	/ ʈop'i/
	Medial	/paʈa:ki/
	Final	/ ʈuʈi/
/ʈ/	Initial	/ʈɛ ʈi/
	Medial	/kaʈ'ɛri/
	Final	/pɛʈ'a/
/ɖ/	Initial	/ɖab'i/
	Medial	maɖikɛ/
	Final	/koɖɛ/
/ɳ/	Initial	/ɳa:ji/
	Medial	/boɳɖa/
	Final	/a:ɳɛ/
/j/	Initial	/jɛ:ɳi/
	Final	/ɳa:ji/
/ɳ/	Medial	/maɳo:li/
	Final	/kaɳ'/
/ɭ/	Final	/kuɭ'i/
/ɻ/	Initial	/ɻaŋka/
	Final	/rɻi/
/ŋ/	Medial	/aŋgi/

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The characteristics and properties of the root infinitive stage in early child Polish

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Marta Maria Tryzna[1]
Gulf University for Science and Technology
Kuwait

Abstract

In contrast to the previous studies on the early finiteness in Polish (Bar-Shalom and Snyder, 1987), the present paper argues for a brief root infinitive (RI) stage in child Polish and discusses the interpretive and syntactic characteristics of RIs. Based on data from three monolingual Polish children Basia, Inka, and Kasia, aged 17-24 months (CHILDES, MacWhinney and Snow, 1985), this paper demonstrates that child Polish contains up to 14% of RIs. From the interpretive viewpoint, Polish RIs support both the Eventivity Constraint and Modal Reference Effect (Hoekstra and Hyams 1998). Unlike RIs in Dutch or Russian, Polish RIs never denote present or past events. Syntactically, RIs are shown to never appear in wh-questions, and their overt subject rate is at 60%. Evidence in support of the Null Modal Hypothesis (Boser et al, 1992) is provided by the children's early production of a Polish future construction, which in adult grammar involves a future form of BE and a lexical verb in its past imperfective form. Our data demonstrate that the earliest productions of this construction involve only the imperfective complement with the null auxiliary. The paper concludes with a proposal that Polish RIs, allowing exclusively for irrealis interpretation, involve a null modal in the underlying syntactic representation.

Keywords root infinitives, child Polish, normal development, syntax

1. Introduction

Root Infinitives (RIs) are non-finite verb forms marked by specific infinitival morphology, which appear in the matrix verb position where adult grammar requires a finite form. The RI stage during which children produce a substantial amount of non-finite forms alongside finite clauses has been found in a number of languages including, among others, Dutch (Winjen 1996), German (Boser et al. 1992), Swedish (Plunkett and Stromqvist 1990), French (Ferdinand 1996), and Russian (Bar-Shalom and Snyder 1997).

In terms of the syntactic properties, in languages like German, Dutch, Swedish and Danish, RIs have different syntactic distribution from finite verbs, which always surface in verb-second position. In child German and Dutch, RIs appear in the position of infinitives, i.e. clause–finally (Boser et al.1992) and after a negative verb in the Scandinavian languages (Plunkett and Stromqvist 1990). In French, RIs appear to the left of the negation

[1] Bio: Having earned her MA in 1997 in English Language and Literature from the University of Silesia, Poland, Dr. Marta Maria Tryzna worked as an English teacher trainer at the Pedagogical Academy in Czestochowa, Poland. After graduating with a PhD in 2009 from the University of Iowa, USA, she joined American University of the Middle East (AUM) in Kuwait to establish the undergraduate writing program and the graduate business communication program. Having completed her task, she joined the Gulf University for Science and Technology (GUST) in Kuwait, where she teaches undergraduate linguistics courses including syntax, pragmatics, discourse analysis, the history of the English language, and applied linguistics. Contact: tryzna.m@gust.edu.kw

marker pas, while finite verbs precede pas, e.g. [+finite]: Ca tourne pas 'that turns not'; [-finite]: Pas tomber bebe 'Not fall baby' (Pierce 1992). Cross-linguistically, it has been observed that RIs are subjectless in most cases and are not attested in wh-questions (Hoekstra & Hyams 1998).
In terms of the distributional properties, it has been observed that RIs are limited to eventive predicates, a generalization known as the Eventivity Constraint (Hoekstra and Hyams 1998). The constraint states that the stative predicates including the elements of the Aux category, which express time and modality, always appear finite, while event-denoting predicates may be realized as RIs.
Finally, it has been noticed that RIs overwhelmingly have modal or future interpretation, which is known as the Modal Reference Effect (Hoekstra and Hyams 1998) Since the syntax of the RI construction lacks an overt modal, its interpretation must be inferred from linguistic and extra-linguistic context of the utterance.

1.1. The underlying structure

1.1.1. Verbal morphology

Polish is a pro-drop language with rich verbal morphology, including person, number and gender agreement as well as tense inflections. The present tense in Polish is a zero morpheme, while the past tense is marked by the *-ł* suffix. The future tense morpheme as such does not exist, but the addition of a perfective prefix in combination with present tense morphology produces the synthetic future paradigm. The periphrastic future paradigm involves the future form of AUXBE and the imperfective infinitive or an imperfective past form, which is marked for tense, gender and number. The infinitive is marked by *-ć* suffix added onto the verb stem.

1.1.2. The role of the infinitive

Infinitives in Polish are distinctly marked by the *–ć* suffix, e.g. *robi-ć* 'make-inf'. The infinitive functions as a complement of modal auxiliaries and, in its imperfective form, as a complement of AUXBE in the periphrastic future construction. In root contexts in adult Polish, infinitives appear in interrogative sentences (1a), commands (1b), and the so-called *Mad Magazine* sentences (1c).

(1) a. Co kupić ?
what buy-inf
'What should I buy?'
b. Wstawać!
rise-inf
'Get up!'
c. Ożenić się z nią? Nigdy!
marry-imp refl with her never
'Marry her? Never!'

Thus, RIs are grammatical in adult Polish, including wh-questions (1a). This fact is potentially problematic for the non-finite analysis of RIs, as wh-

questions involve the projection of a full clausal structure including the Infl node and the CP where the wh-element can be hosted.

1.1.3. Aspectual distinctions

In Polish, as in all Slavic languages, the category of aspect is fundamental in the verbal system, so that every verb is specified as perfective or imperfective.Perfective markers in Polish include perfective prefixes, stem alternations and zero marker, where in the perfective/imperfective pair, it is the imperfective that is marked by a suffix –wa (pronounced /va/) (7a,b,and c respectively)

(2) a. robić$_{imp}$ - **z**robić$_{perf}$ 'make' [PREFIXATION]
b. siadać$_{imp}$ - siąść$_{perf}$ 'sit down' [STEM ALTERNATION]
c. da**wa**ć$_{imp}$ - dać $_{perf}$ 'give' [ZERO PERFECTIVE]

Apart from morphological markings, it is also possible to assign a verb to perfective or imperfective category by syntactic criteria, for there are syntactic frames where only imperfectives occur. Thus, a verb which occurs in a periphrastic future construction with AUXBE is imperfective.

(3) Max będzie robić / ***z**robić placki
Max be-3sg.fut make-inf.imp./ make-inf.perf pancakes
'Max will be making pancakes.'

In (3), the auxiliary is obligatorily complemented by an imperfective infinitive, while the perfective one is ungrammatical. The periphrastic future construction can also be realized by AUXBE plus the lexical verb in its past imperfective form.

(4) a. Max robił placki [past imperfective]
Max make-3sm.past.imp pancakes
'Max was making pancakes.'
b. Max będzie robił placki [future imperfective]
Max be-3sg.fut make-3sm.imp pancakes
'Max will be making pancakes.'

In (4a) the form *robił* denotes a past imperfective eventuality, while in (4b), *robił* complements the future-marked AUXBE and has future imperfective interpretation. The past imperfective form in this construction functions like a participial complement, preserving the aspectual interpretation and the agreement features (ϕ-features) such as gender and number. Although the form is marked by the past tense morpheme *–ł*, its past interpretation is blocked by the presence of AUXBE which is marked for future tense. The meaning of (4b) is equivalent to the meaning of the future construction in (3), and the syntactic requirement on the imperfectivity of the complement holds.

1.1.4. The syntax-discourse interface account

Given that children produce finite utterances very early, Hoekstra and Hyams (1998) argue that full clause structure must be, in principle,

available to children from the beginning. They claim that the differences between child and adult grammars are attributable to a different set of restrictions on the morphosyntax-discourse interface conditions. Since children produce a considerable number of RIs, which lack tense and agreement features but have interpretive properties identifiable through discourse, early grammar is said to be far less restricted at syntax-discourse interface than adult grammar. Children have the option of anchoring the temporal interpretation of a clause in the discourse (D-linking) rather than through morphology.

1.1.5. The maturational account

The second approach to the underlying structure of RIs stems from Borer and Rohrbacher's (2002) Strong Continuity Hypothesis, which assumes that children have full syntactic structure available from the beginning. RIs are claimed to be a result of children's lack of morpho-phonological material which would check the relevant features. The unchecked features are spelled out in form of infinitives, i.e. forms lacking any head features. Since the value of the features is said to be 'open', their interpretation may be linked to discourse. This approach has tremendous cross-linguistic explanatory power by combining the universal syntactic mechanisms of any grammar (feature checking / feature spell out) with the language-specific morpho-phonological realizations of the syntactic heads. While the syntactic mechanisms are believed to be available to the child from the beginning, their morpho-phonological realizations are subject to maturation.

1.1.6. The Null Modal Hypothesis

At its most extreme extension, the Strong Continuity Hypothesis is known as the Null Modal Hypothesis (NMH), originally suggested in the work of Plunkett and Stromqvist (1990), and later developed by Boser et al. (1992), Krämer (1993) and Ferdinand (1996). It relies on the assumption of the availability of full clausal structure and syntactic mechanisms from the beginning. According to NMH, a seemingly non-finite clause in child grammar has an underlying finite structure, with the finite verb being a null (i.e. phonologically unrealized) auxiliary. The auxiliary, regardless of its phonological realization, selects an infinitival complement; hence, infinitives in child grammar are not instances of non-finite forms in root context, but adult-like complements of a non-adult like null auxiliary. On this approach, child grammar does not differ from adult grammar in terms of the clausal architecture. The difference between the two grammars lies in their inventory of the null syntactic heads. In the present paper, this approach will be shown to have some explanatory power in accounting for the presence of non-adult-like verb forms in child Polish.

1.2. Background research on Polish RIs

1.2.1. Bar Shalom & Snyder (1997)

Bar Shalom and Snyder (1997) found that early child Polish, in contrast to Russian or Italian, contains no RIs. Their study is based on transcripts of Marta, Bartosz and Kubus from CHILDES database (MacWhinney and Snow, 1985). Their analysis revealed a negligible amount of RIs in Polish: 9 RIs out

of 4,519 utterances. At the same time, their study on child Russian revealed 9.4% of RIs. This is not a surprising finding, argue Bar Shalom and Snyder, since Polish and Russian, though both have rich verbal morphology, differ substantially with respect to their pro-drop properties. While Polish is an Infl-licensed null subject language, Russian is a topic-drop language, where thematic null subjects have to be licensed in the discourse (Franks 1995).
The background for such an explanation is provided by Rhee and Wexler's (1995) theory, which purports that RI stage occurs only in languages with impoverished verb morphology or languages that disallow null subjects. Since Polish does not meet either criterion, it is not expected to exhibit an RIs stage. However, as Bar-Shalom and Snyder (1997) point out, children acquiring pro-drop languages such as Italian or Spanish actually do produce RIs. In contrast to children acquiring prototypical RI languages, Spanish or Italian children produce fewer RIs and stop producing them at an earlier age. According to a summary of previous studies (Hoekstra & Hyams 1998), the RI rate in null subject languages falls between 3% and 16 %. Thus, a more accurate prediction is that Polish children should produce no more than 16% of RIs and their RI stage should be relatively short.

2. Methodology

2.1. Data collection and processing

The present study is based on longitudinal data available on CHILDES (MacWhinney and Snow, 1985), involving three monolingual Polish children: Inka (age 1;6 – 1;11, MLU 1.64 – 3.68), Basia (age 1;8 – 2;0, MLU 1.78 – 3.03) and Kasia (age 1;5 – 1;09, MLU 1.66 – 3.44). Each file represents data recorded over the period of one month. The analysis is based on utterances involving a lexical verb in finite or non-finite form. Excluded from the analysis are bare auxiliaries, imperative verbs, interrogative RIs, repetitions, self-repetitions, citations and uninterpretable utterances. The interpretation of the non-finite utterances involved the situational context as well as parental input.

3. Findings

The findings of the present study are summarized in the table below.

Table 1. The summary of the findings.

	Inka	Basia	Kasia	Total
Analyzable utterances	659	358	631	1648
Agreement errors	12 (1.8%)	13 (3.5)	11 (1.9%)	36 (2.1%)
Finite Utterances	600 (91%)	308 (86%)	543 (86%)	1451 (88%)
RIs	59 (9%)	50 (14%)	89 (14%)	198 (12%)

Table 1 shows that out of 1648 analyzable verbal utterances collected for the three subjects, 198 (12%) involved an infinitive in contexts where adult

grammar requires a finite verb. In terms of individual RI rates, the three subjects show the values between 9% and 14%, which is comparable to the RI rates in child Spanish or Italian (c.f. 6% - 16%). Another important finding is the low percentage of agreement errors at the earliest production stage, which is less than 3%. Thus, when children use finite forms, and they use them on average 90% of the time, they use them correctly in terms of subject-verb agreement. Thus, Polish children's early verb productions are in line with the cross-linguistic expectations, in particular with the generalizations concerning morphologically rich languages with pro-drop properties.

3.1. The imperfective participle form

All three subjects were found to occasionally produce the past imperfective form (here called the imperfective participle) to express future.

(5) a. Inka Ø pisała [Inka, File 4]
Inka write.3sf.past.imp.
'Inka will write.'

b. Basia nie Ø (s)pała [Basia, File 3]
Basia NEG sleep.3sf.past.imp.
'Basia will not sleep.'

The imperfective participle is marked with the past tense suffix *-ł* and its future interpretation hinges on the obligatory presence of AUXBE in adult grammar (cf. 4b). While the total number of bare participles is relatively low (9 in Inka's, 2 in Kasia's, and 2 in Basia's files), the underlying syntactic structure which appears to involve a null modal will have consequences for the syntactic analysis of Polish RIs presented in section 6.

3.2. The dynamics of the RI stage

Let us now compare the dynamics of the RI stage for the individual subjects. The chart below illustrates the proportion of RIs in a given file over the period of 5-6 months.

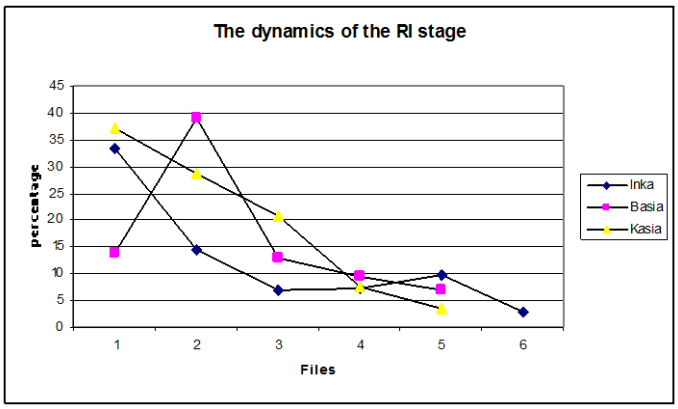

Figure 1. The RI rate over the 6 month period.

Figure 1 shows that during the initial acquisition period when MLU is less than 2, the proportion of RIs as compared to the total of verbs is relatively high, namely 33% in Inka's File 1, 39% in Basia's File 2, and 37% and 28% in Kasia's File 1 and 2 respectively. In File 3, when the subjects' MLU is greater than 2 but less than 3, the RI rate decreases to about 20% or below. The downward tendency continues in the subsequent files, until it reaches the lowest point in File 5 or 6, when MLU for all three subjects is greater than 3. Thus, while the very initial RI rate approximates the value recorded for the typical RI languages (i.e. 30% or more), its rapid decrease results in an overall low rate (14% or less), reflecting the tendencies observed in non-RI languages. Also, given a rather low percentage of RIs at around the age of two (2-6%), the RI period appears to last no longer than 6 months, which supports the prediction on the relative brevity of the RI stage in Polish.

3.3. The properties of RIs

3.3.1. The syntactic properties

RIs in child Polish can be characterized by three syntactic properties. Firstly, just like in the case of finite verbs, RIs appear with pre-verbal negation, where the negative proclitic *NIE* cliticizes onto the infinitive.

(6) Nie spac Basia [Basia, File 4]
NOT sleep.inf Basia
'Basia (=speaker) doesn't want to sleep'

Secondly, unlike their finite counterparts, child RIs do not appear in WH-questions. (@ indicates an unattested form)

(7) a. Cio lobi tata? [Basia, File 1]
what do.3s.pres. daddy
'What is daddy doing? '
b. @ cio lobić tata?

Thirdly, in contrast to finite verbs, RIs less frequently appear with overt subjects. The chart below shows the proportion of overt subjects with RIs which is at least 25% lower than with the finite forms.

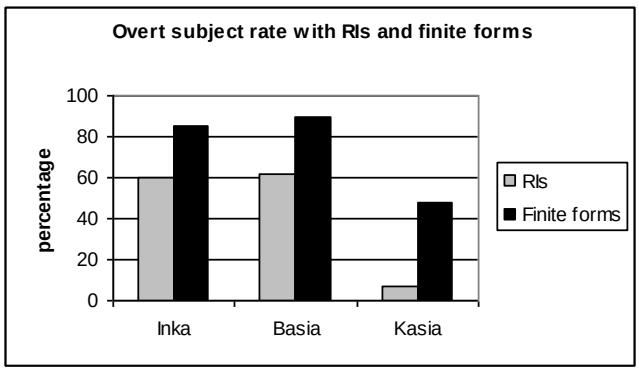

Figure 2. Overt subject rate with finite and non-finite verbs

The findings for Inka and Basia demonstrate that finite forms consistently appear with overt subjects (85% and 90% respectively), while RIs appear with overt subjects around 60% of the time. In Kasia's transcripts, the overt subject rate is low (10%), while finite forms are at chance level. Still, the generalization that the overt subject rate for RIs as compared to finite verbs is at considerably lower holds.

3.3.2. The interpretive properties

In terms of their interpretive properties, Polish RIs illustrate a perfect match between a form and a particular temporal reference, as illustrated in Table 2.

Table 2. Temporal reference of finite utterances and RIs.

	Finite Utterances			RIs		
	Present	Future/modal	Past	Present	Future/modal	Past
Inka	65.3%	11%	23.7%	-	100%	-
Basia	45%	39.2%	15.3%	-	100%	-
Kasia	68.3%	19.2%	12.5%	-	100%	-

Table 2 shows that while within the finite utterances the temporal reference varies, RIs uniquely have future or modal reference, providing strong support for the Modal Reference Effect. In addition, the unique interpretation of the infinitival form as having irrealis reference, i.e. as denoting eventualities unrealized at the speech time, can be taken as an instance of a perfect match between a particular verbal form and its temporal reference. Our findings suggest that the irrealis interpretation maps onto non-finiteness, an observation which calls for further research.

With regard to the aspectual class of verbs which emerge as non-finite, Polish RIs are subject to the Eventivity Constraint as they only involve eventive predicates. In other words, while the auxiliaries, e.g. *być* 'be', *chcieć* 'want' and lexical statives, e.g. *kochać* 'love', *boleć* 'hurt', are always finite, the eventive predicates, e.g. *pisać* 'write', *bawić* 'play', are only optionally finite.

Our data show that Polish children go through a brief RI stage characterized by a relatively low RI rate (9 -14%) and a short duration (up to 2 years of age). In terms of their syntactic properties, the majority of Polish RIs appear with overt subjects (60%), and their overt-subject rate is at least 25% lower than in finite utterances. With respect to NEG placement, RIs behave like finite verbs, with the proclitic *nie* cliticizing onto the infinitive. From the point of view of wh-movement, child RIs differ from adult RIs as none have been found in wh-questions. In terms of their interpretive properties, Polish RIs do not distribute over auxiliaries and other non-eventive predicates, thus providing support for the Eventivity Constraint. The temporal interpretation of RIs is uniquely future or modal, which supports the Modal Reference Effect.

3.4. Syntactic analysis

3.4.1. The underlying representation

In the following analysis, the structure proposed by Gueron & Hoekstra (1995) will be used.

(8) [$_{CP}$ TO [$_{TP}$ [±Past] [$_{VP}$ (e-role)]]]

In the above structure, finiteness is understood as a product of a syntactically licensed T-chain, which consists of a tense operator TO in the Spec of CP and tense feature [±Past] in T. The TO fixes reference time (R-time) and Speech time (S-time) in COMP. The default value of R-time is 'now (RT=ST). A verb in the V head provides the T-chain with an eventuality role (e-role) defined as a distinction between stative and eventive predicates.

3.4.2. The syntax of the imperfective participle

Before we discuss the syntax of Polish RIs, it is necessary to focus on the underlying structure of the imperfective participle, discussed in section. 5.2.1. ((5a) is repeated here as (9))

(9) Inka Ø pisała
Inka write.3s.past.imp.
'Inka (will be) writing'

The verb form *pisała* is marked for past by the *–ł* suffix but children produce it in future contexts, where adult grammar requires the overt auxiliary *będzie*.

(10) Inka będzie pisała
Inka be.3s.fut. write.3s.past.imp.
'Inka will be writing'

The syntactic structure below illustrates the sentence in (10).

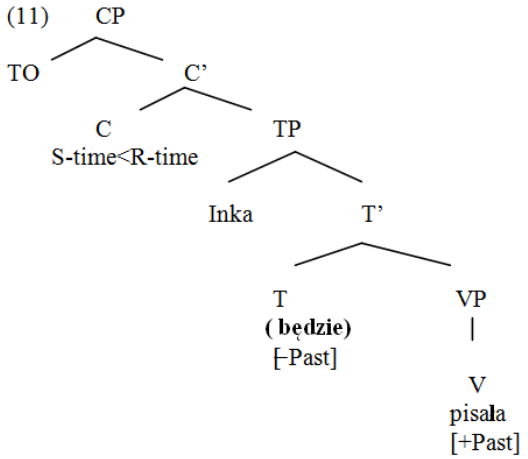

Figure 3. The illustration of sentence (10).

In the above structure, the presence of the [-Past] auxiliary in T ensures that the [+Past] feature on *pisała* is blocked, which results in the future interpretation of the utterance (S-time precedes R-time). If the auxiliary, regardless of its phonological realization, is absent from the underlying structure, the imperfective participle cannot be prevented from checking the [+Past] tense feature in T, which would result in the past interpretation of

the utterance (R-time precedes S-time). The presence of the auxiliary, whether overt or null, warrants the future interpretation of the utterance thus providing evidence for the Null Modal Hypothesis.

3.4.3. The syntax of RIs

Having established the validity of the Null Modal Hypothesis in child Polish, it is tempting to consider it as an explanation for the RI stage. The fact that Polish RIs are uniquely found in future/modal contexts which in adult grammar require an overt auxiliary indicates that it is the production of the auxiliary that is especially problematic for the children. Since there is independent evidence that child grammar employs a null auxiliary, it is legitimate to assume that the same syntactic mechanism is behind all seemingly non-finite utterances. Thus, the null auxiliary selects an eventive predicate as a complement (cf. the Eventivity Constraint), which surfaces as an RI. The default interpretation of the null auxiliary construction is irrealis, which is wholly supported by the data (cf. Modal Reference Effect). The high rate of overt subjects with RIs as well as the NEG placement indicate that in these two respects RIs do not differ from finite clauses.

On the other hand, Polish RIs have not been found in wh-questions, which is a substantial counter-argument to the null modal approach. If RIs are to be treated as finite structures, they are expected to exhibit symmetrical behavior to finite clauses in all respects, including wh-questions (Hoekstra & Hyams 1998). The lack of examples of wh-question with RIs in our data may be indicative of a syntactic deficiency in child grammar (i.e. CP projection), and may ultimately invalidate the Null Modal Hypothesis. However, longitudinal studies have severe limitations with regard to the available data, and more research is needed to establish whether wh-questions with RI could be part of the child grammar.

Alternatively, RIs may be successfully accounted for by the syntax-discourse interface approach (Hoekstra & Hyams 1998) or the maturational approach (Borer and Rohrbacher 2002), as the present study does not bring in evidence against either theory.

4. Conclusions

The present paper argues for a brief RI stage in child Polish, with the RI rate between 9 and 14%. Polish RIs are subject to the Eventivity Constraint as well as Modal Reference Effect. Also, RIs are found to appear with overt subject 60% of the time, and to behave like finite clauses with respect to NEG placement. No RIs are found in wh-questions, though finite wh-questions are present in child grammar. Despite evidence for the Null Modal Hypothesis from the past imperfective participle construction with future reference, the application of NMH to the syntax of RIs is invalidated by the lack of RIs in wh-questions.

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