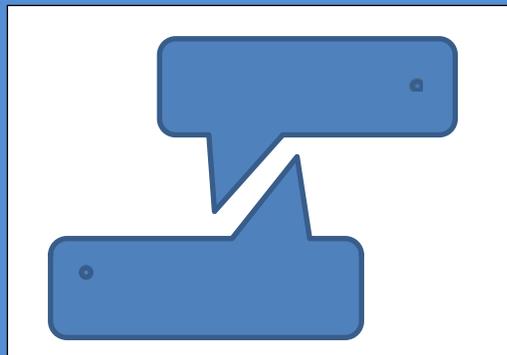


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## **Discourse Adherence and the Pronominal Status of Null-objects in French-speaking children**

Vincenzo Moscati<sup>1</sup>  
*Macquarie University*

### **Abstract**

In many Romance languages, children's and adults' grammar vary in the distribution of null objects. To explain this difference, many previous studies argued in favour of a correlation between the presence of clitics in the target language and object omissions. Recently, Pérez-Leroux et al. (2008) suggested that this correlation might be weaker than previously thought and that object omissions are not restricted to pronominal contexts alone. In order to investigate the role of the discursive context, a new experiment has been designed. We manipulate the discourse in order to disentangle anaphoric contexts from the non-anaphoric ones. The result is a significantly higher rate of null objects in the anaphoric contexts, a result that does not support the existence of a stage (the Generalized Null Object Stage) in which children omit the object in both pronominal and non-pronominal contexts.

**Keywords** Null objects, object omissions, Romance languages, discursive context, anaphoric context

### **1. Introduction**

In many languages, a prominent feature of children's first productions is the possibility to leave one or more verbal arguments unpronounced. For example, children often omit the direct complement of a transitive verb, even in contexts where the adult grammar obligatory requires the presence of an overt object. Fragments like "I give \_\_" or "I push \_\_" are well attested in children's spontaneous speech, even when adults would never produce them. One way of looking at this type of omission is to consider it as a purely phonological phenomenon: children might simply decide to cut the sentence in order to minimize their articulatory efforts. However, this type of explanation is too simplistic. In fact, once the omission pattern is closely examined, the distribution of null-objects appears to be sensitive to discursive and syntactic factors (a.o. Costa, Lobo & Silva 2009, Tedeschi 2009). Although our understanding of the omission pattern has improved over the years, many properties of null objects remain unclear. In this short paper, I will focus on two issues in particular. The first concerns the interpretive properties of sentences with a null object. Some authors have claimed (a.o. Schaeffer 2000; Hamann, Rizzi & Frauenfelder 1996; Wexler et al. 2004) that null-objects are anaphors and that their status is similar to

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that of pronouns. From this view, it follows the prediction that null-objects should obey to the same discursive constraints that rule the distribution of anaphoric expressions, as for example the availability of an explicit referent in the previous context. Furthermore, a second and closely related prediction is that null-objects should be, on a par with pronouns, in complementary distribution with full DPs. These two predictions have been challenged in recent years by Pérez-Leroux et al. (2008): they found that null-objects alternate not only with pronouns, but also with full DPs and that they do not adhere to the same discourse-pragmatic factors that licence anaphoric expressions. On these bases, Pérez-Leroux et al. (2008) advanced the hypothesis that object omission holds across-the-board and that a Generalized Null Object Stage exists in child grammar. In order to shed some light on this issue and to assess whether the results reported in Pérez-Leroux et al. (2008) genuinely support the existence of the Generalized Null Object stage - or they are an artefact of the experimental set up they employed - a new experiment has been designed.

A second issue concerns the bundle of morpho-syntactic features that are associated with null-objects. In particular, it is not entirely clear what, if any, the syntactic features that these null elements carry are. A possible way to look at this matter is to observe the verb-object agreement pattern in languages where this relation is overtly expressed (2& Emiliani 1993, Wexler et al. 2004, Moscati & Tedeschi 2009). Results are not clear-cut, however. In fact, object - past participle agreement could be problematic per se (Moscati & Rizzi 2013, 2014) and its validity as a diagnostic tool to detect the feature specification of null-objects is not as solid as previously assumed. In eliciting past participle construction, I will classify the results also in accordance to the agreement pattern. This will provide an indication on the robustness of the object-verb agreement rule in the early grammar.

The paper is organized as follows: in the next section, I will introduce the Generalized Null Object Stage hypothesis and indicate the potential confounds that could provide an alternative explanation for the Pérez-Leroux et al.'s results. In section 2, I'll present a new experimental, designed eliminate these potential confounds. In section 3, the results will be discussed, both in relation to the object omission and to the past-participle agreement pattern. Anticipating the discussion in section 4, the results show a significantly higher rate of null-objects in the anaphoric contexts, therefore suggesting that the generalized omissions found in Pérez-Leroux et al. 2008 were most likely due to the imperfect control of their elicitation procedure. For what concerns instead the development of the agreement morphology, it will be shown that the past-participle agreement rule is still optional at the age of four.

## **2. Methodology**

### *2.1 Contexts for Early Object Omissions*

A first basic distinction, useful to introduce those contexts where null objects are ungrammatical, is the typological one between languages that allow a phonetically null object and languages that require instead an overt pronoun. This difference is illustrated in 0, taken from European Portuguese:



- (1) Speaker A: E o teu carro?  
'What about your car?'  
Speaker B: Levei para a oficina hoje.  
Took to the garage today  
'I took it to the garage today.'

the example shows that, once a salient antecedent is provided, in this case “the car”, the object can be left unpronounced, like in the Speaker B’s answer. As the translation shows, this possibility is instead excluded in English. In fact, the overt pronoun “it” must be added to make the English sentence grammatical. In this respect, English patterns alike with many Romance languages that lack null objects. When we observe children early production, however, object omissions are attested also in Romance languages that do not typically allow null objects, like Italian (Schaeffer 2000, McKee & Emiliani 1992, Serratrice et al. 2004, Tedeschi 2009), Catalan (Wexler et al. 2004), French (Jakubowicz et al. 1996, Pérez-Leroux et al. 2008) and Spanish (Castilla et al. 2008, Fujino & Sano 2002). A thorough discussion of the various proposals that have been advanced in the aforementioned studies goes beyond the purpose of this short paper. In general, however, all of them capitalize on the fact that object omissions go hand in hand with the presence of clitic pronouns in the target language.

This very general view, according to which object omissions in Romance languages are tightly linked to clitics, has been recently challenged in a comparative study on English and French, reported in Perez-Leroux et al. (2008). The crucial difference between the two adult grammars is that French, but not English, has a series of clitic pronouns. Perez-Leroux et al. found no difference in the omission rate between these two languages, suggesting that the type of pronoun available in the target language is not the main factor to explain children object omissions. Moreover, in their elicited production study, Perez-Leroux et al. also tested the role played by the discursive context on the realization of the direct object. The main goal was to establish whether object omissions are dependent upon the presence of an overt and retrievable antecedent in the discourse. They used two experimental conditions, the *Individuated* and the *non-Individuated* condition, that are exemplified in (2) and (3). In (2), the Individuated condition, an antecedent was provided in the question. Instead, in the non-individuated condition in (3), no antecedent was available in the experimenter’s question:

- (2) Condition I (Individuated): What did X do with Y?

CROCO: I know! The girl is smelling the flower!  
CHILD: \_\_\_\_\_(NO)  
CROCO: No, the little girl isn’t smelling the flower?  
EXP: Please tell Croco what the little girl is doing  
with the flower.  
CHILD: (she’s drawing it)

- (3) Condition NI (non-individuated): What did X do?

CROCO: I know! I know! He's calling his friend.  
 CHILD: \_\_\_\_\_(NO)  
 CROCO: No? He isn't calling his friend?  
 EXP: Please tell Croco what Clifford's doing.  
 CHILD: [Clifford is eating (his bone).]

The Individuated condition constitutes a typical context for a pronominal object: the salient antecedent (the flower) was overtly introduced in the discourse. In (3), the non-Individuated condition, instead, the interaction was centred on the action and its theme of the action was never mentioned. In this latter context, according to Perez-Leroux et al. (2008), an object clitic was not felicitous. Given these two different elicitation contexts, a prediction follows: if null-objects are silent clitics, they should be confined to the pronominal contexts, i.e. the Individuated contexts. However, Perez-Leroux et al. (2008)'s results on Early French disconfirmed this prediction. The object omission's rate was not significantly dissimilar in the two contexts, a result that is consistent with a different hypothesis, spelled out in (4) below:

- (4) Generalized null object stage  
*Children at the initial stage will overgenerate not only null objects in individuated contexts but in all contexts.*

Is this hypothesis tenable? The problem is that the hypothesis in (4) is in contrast with the results of other analogous studies. In her elicited production study on Italian, for example, Tedeschi (2009) also used two contexts of elicitation, similar to (2) and (3) and what she found was a significantly higher rate of object omissions in the pronominal contexts.

How can this difference between the two studies be explained? A first possibility is that the target language, French in one case and Italian in the other, is responsible for this difference. Therefore, a careful cross-linguistic comparison is necessary to individuate the crucial factors. A second possibility is instead that minor variations between the two studies in the elicitation procedure generated sensitive differences in the object omission's rate. Let me discuss this second point in more depth, in order to show how the different experimental protocol might have affected the production of null objects in the two studies. In Perez-Leroux et al.'s study, the puppet Croco gave a wrong description of the picture in both contexts. For example, in (2) it said at first that the girl was "SMELLING the flower". This answer was obviously inconsistent with the pictures and, successively, the experimenter asked the child to correct Croco and tell what actually happened in the picture. Tedeschi's contexts were instead slightly simpler: the puppet directly asked the children what the character was doing in the picture. Therefore, the child had not to correct a previous wrong statement.

Why these different procedures could have influenced the object omission's rate? Consider first the Individuated condition in (2). The puppet first uttered the sentence in (5).

- (5) The girl is smelling the flower.



and then the experimenter asked the children to correct the puppet by asking “what did the girl do with THE FLOWER?”. A felicitous answer to this question would require two elements. First, the DP “the flower” is topical and should be replaced by a pronoun. Second, the wrong action mentioned by the puppet must be corrected and a contrastive focus is required on the main verb. The most felicitous answer would be something like the following sentence:

(6) [Topic~~The flower~~] She is Focusdrawing it.

In this scenario, children should correct the verb AND produce a pronoun: the most felicitous answer is the one in which the full VP constituent, in its transitive frame, is spelled out. If children have troubles with clitics, object omission is then expected.

Now consider the non-Individuated condition in (3). In this condition, the puppet uttered a sentence like (5) but later the experimenter only asked the children to tell “what did X do?”. Therefore, the focus was on the action itself and a felicitous answer could simply consist in the verb alone, used intransitively:

(7) She is Focusdrawing

If this reasoning is on the right track, we then would expect that also adults would give answers like (7). This seemed to be the case. In fact, in the Perez-Leroux’s study, English adults (26.4%) and French adults (27.8%) also produces sentences like (7), without the direct complement. In this sense, children’s and adult’s behavior in the non-individuated contexts did not differ that much. What I’m suggesting here is that it is more felicitous to give an answer that omits the direct object in the context used in the non-individuated condition than in the individuated condition. Thus the high rate of null-objects in both conditions can be due to two different factors. In the individuated condition – the one where a clitic pronoun is felicitous – null objects are of the kind only allowed in the early grammar. Instead, the null-objects used in the non-individuated condition could be due to the relative easiness to use an intransitive verb alone in the answer. Therefore the non-individuated condition does not tell us much about the existence of a *generalized null object stage*, since this type of null object is probably of the same kind of the one produced by adults. In Tedeschi’s experiment, instead, the puppet never tried a wrong answer. Therefore, there was no focus on the verb itself. A consequence of this was that adults produced null objects at negligible rate – always below 3.5%. Therefore this type of elicitation protocol seems to be more appropriate to check whether children overextend the use of null objects to contexts where adults don’t. For this reason, we decided to use Tedeschi’s procedure to eliminate the potential confound introduced by focus. Moreover, we tested a population of French-speaking children in order to get rid of any other potential cross-linguistic factor.

## 2.2 An elicited production experiment

### 2.2.1 The referential context

In order to assess if children generalize null objects to non-pronominal contexts, a new experiment was designed. The elicitation procedure was the same described in Tedeschi (2009): two different contexts were used to elicitate clitic pronouns or full DPs. Since the key factor distinguishing the two elicitation contexts is the Type of Reference, the two scenarios were labelled +anaphoric and -anaphoric. The sole difference between the two was the question asked after the presentation of a two-picture sequence. Figure 1 illustrates one sequence that was common to both the +anaphoric and the -anaphoric condition:

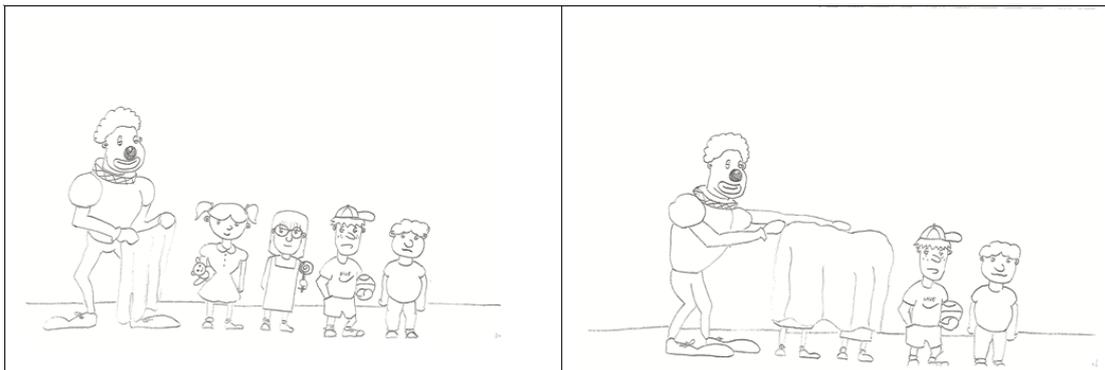


Figure 1. A simple scenario with the verb *couvrir* ‘to cover’

#### (8) +Anaphoric Scenario

Question: Qu'est-ce qu'il a fait le clown avec les petites filles?

*'What has the clown done to the little girls?'*

Answer: Il les a couvertes

he them<sub>[f, p]</sub> aux covered<sub>[f, p]</sub>

*'he has covered them'*

#### (9) -Anaphoric Scenario

Question: Qu'est-ce qu'il a fait le clown ?

*'What has the clown done'*

Answer: Il a couvert les petites filles

he aux covered the little girls

*'he has covered the little girls'*

The examples in (8) and (9) show that the two scenarios only differ in the question asked to the participants. In the +anaphoric scenario in (8), the question took the form “what has X done to Y” while in the -anaphoric scenario in (9) the direct object was not mentioned and the question was instead in the form “what has X done?”. These two elicitation contexts were



used to assess the role of the Type of Reference on the production of null-objects.

### 2.2.2 Verb type and object-verb agreement

In addition to the referential properties of null-objects, another open question concerns their morpho-syntactic status. An early account of object omissions from 2<sup>nd</sup> and Emiliani (1993) considered them to be a purely phonological phenomenon, with a null form (entirely specified for gender and

number) in free alternation with a phonologically full-fledged clitic. The main argument came from the observation of object-verb agreement. McKee and Emiliani (1992) found that, in past-participial construction, the past-participle was always correctly inflected for gender and number, even in those cases where no object was produced by children. Moreover, a causal connection between the presence of past participle agreement and clitic omission was also proposed by Wexler et al. 2004. In this respect, the syntactic operation that links the pronoun with the verbal form might increase the processing complexity, resulting in a high rate of null pronouns.

Like Italian, also Standard French presents object-verb agreement with clitic pronouns, audible with irregular verbs. Therefore, we decided to explore the role played by past participle agreement on object omission. Since past participle agreement is audible in French only with a certain class of verbs, Class II and Class III verbs, we used them in the majority of the experimental trials. In Figure 1, for example, the verb *couvrir* was elicited. This lexical verb carries audible past-participial agreement morphology and it agrees in gender and number with the feminine, plural pronominal clitic *les*. When the direct object is instead a post-verbal full DP, no past participle agreement is allowed (see Belletti 2006). Thus, if past participle agreement influences the null-objects' production, the omission rate should be higher with Class II and Class III verbs. In addition, if null-objects are full-fledged clitics without phonological content, also in this case the past participle should be inflected for gender and number.

### 2.2.3 Materials

The experiment consisted of four experimental conditions, generated by the interplay of two factors: Verb Type (-Agreement, + Agreement) and Referentiality (+Anaphoric, -Anaphoric). The examples (8) and (9) illustrate the conditions [+Agreement, + Anaphoric] and [+Agreement, - Anaphoric] since the verb *couvrir* carries audible agreement morphology. Beside the use of Class II and Class III verbs, Class I verbs were also included. This verbal category does not have audible agreement. Therefore, the other two conditions were [-Agreement, +Anaphoric] and [-Agreement, -Anaphoric]. In total, the four experimental conditions were the following:

- (10) Experimental conditions
  - a. + anaphoric, + agreement
  - b. + anaphoric, - agreement
  - c. - anaphoric, + agreement
  - d. - anaphoric, - agreement

All the verbs used in the experiment are reported in Table 1, with their relative frequency calculated on the LEXIQUE3 corpus (New et al. 2001).

No Past Participle Agr		No Past Participle Agr			
Class I		Class II		Class III	
verbs	freq.	verbs	freq.	verbs	freq.
<i>coiffer</i>	30.43	<i>ouvrir</i>	431.13	<i>étendre</i>	59.28
<i>laver</i>	51.16	<i>couvrir</i>	134.26	<i>construire</i>	85.12
<i>pousser</i>	220.58			<i>peindre</i>	75.36
<i>manger</i>	160.73			<i>prendre</i>	1140.98

Table 1 – Elicited Verbs and frequency indexes calculated on the LEXIQUE3

Verbal lexical entries belonging to class II and III are estimated to represent about 13% of the French Verbal Lexicon (Legendre et al. in press). However, these verbs are high-frequency verbs (about 51% on the total occurrences). Therefore six high-frequency verbs were selected: the ones that children are likely to have met in their past participial forms. Eleven fillers were interspersed between the ten experimental trials. Also with fillers, sequences of two pictures were shown on a computer screen followed by a simple question. The fillers were used to prime three other types of agreement: S-V agreement, N-adj agreement and D-N agreement.

#### 2.2.4 Method

Each experimental session consisted of two phases. In the first, children were familiarized with the computer presentation and they had to pass a simple naming task. After that, if children were paying enough attention to the drawings and they correctly named the objects, they proceeded to the test phase. In the test phase, subjects watched 21 sequences of pictures: eleven fillers plus ten experimental trials. Of these, six were pictures eliciting the use of verbs with audible past-participle agreement morphology. Items were randomly presented and the fillers were interspersed between the experimental items. Subjects were randomly divided in two groups and assigned either to the +anaphoric contexts or to the -anaphoric contexts. Therefore, Referentiality was a between-subject factor while Verb Type was a within-subject factor.

#### 2.2.5 Participants

Eighty eight French-speaking children between age 2;5 and 4;11 took part to the experiment. They were divided into two age groups. Within each age group, subjects were assigned either to the – anaphoric contexts or to the + anaphoric contexts. In addition, the experiment was also run on a control group of 18 adults. Participant’s data are summarized in Table 2.



group	+ anaphoric		- anaphoric	
	N	age	N	age
3 y.o.	20	(2;6 – 3;9, mean = 3;5)	21	(2 ;5 – 3 ;8, mean = 3;5)
4 y.o.	21	(4;0- 4;9, mean = 4;4)	21	(3 ;8 – 4 ;9, mean 4;5)
adults	9	> 18	9	> 18

Table 2. Participants

### 3. Results

#### 3.1 null objects

Let us first consider the production of null objects and the impact of the context of elicitation (i.e. Referentiality) on the object omission’s rate. The experimental hypothesis was that, if null-objects are generalized across different referential contexts, the omission’s rate should be the same in the + and – anaphoric contexts. In order to establish the role of the context, subjects’ answers were classified in accordance to the object’s type: null, full DPs and clitic pronouns. Results for the three different age groups are summarized in Figures 1, 2 and 3.

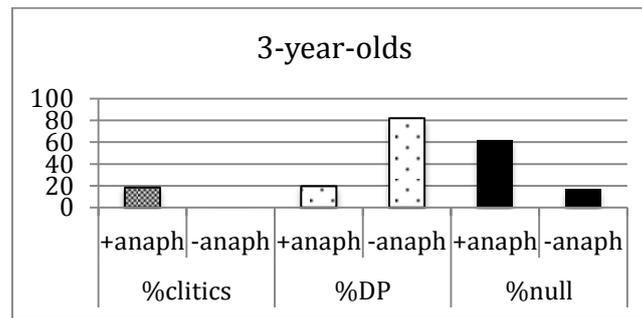


Figure 1. Proportion and type of direct objects in the two elicitation contexts for the 3-year-olds group.

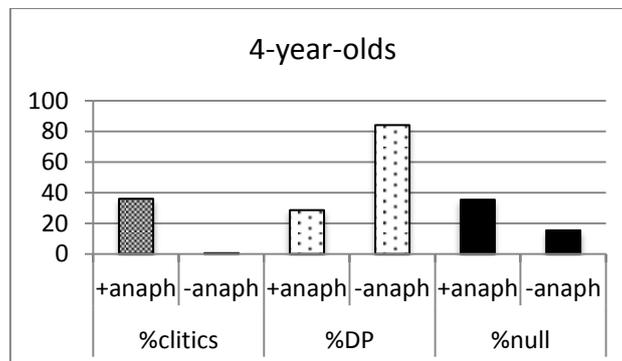


Figure 2. Proportion and type of direct objects in the two elicitation contexts for the 4-year-olds group.

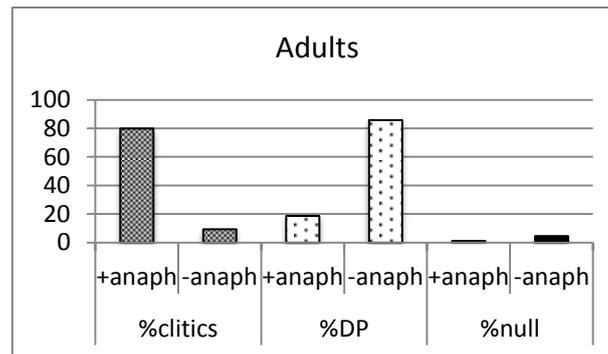


Figure 3. Proportion and type of direct objects in the two elicitation contexts for the Adult group.

Figure 1 shows that in the 3-year-old group the proportion of null objects is sensibly higher in the + *anaphoric* condition. In fact, in this elicitation context, null-objects are found in the majority of the observations and they are attested at 62.1%. Interestingly, this proportion is not the same across conditions and it drops to a lower 16.9% in the *-anaphoric* contexts. Figure 1 also shows that 3 year-olds disfavour the use of clitic pronouns, with a slightly higher rate of clitics produced in the +*anaphoric* condition, where they are attested at 11.2% on total. At age four, the difference between + *anaphoric* and *-anaphoric* contexts in the proportion of null-objects is still visible. Figure 2 shows that while null-objects are attested at 35.5% in the + *anaphoric* contexts, they decrease to 15.4% in the *-anaphoric* condition. At age 4, the production of clitics also steadily increases and it raises at 26.6% in the +*anaphoric* condition. For what concerns the adult control group, results conform to the dictates of the French grammar: null-objects are virtually unattested in the adults' productions (always below 5%) and the distribution of clitics and full DPs varies in function of the elicitation context. Children data were analysed in R using linear-mixed-effects-models. The proportion of null-object was contrasted with the other types of objects and Referentiality and Verb Type were used as predictors, with Subjects and Items as random effects (Bates 2007, Baayen 2008). Results of the analysis are summarized in Table 3.

	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	-0.1153	0.3835	-0.301	0.764
4 y.o.	-0.7910	0.4054	-1.951	0.051 .
Non_Anaphoric	-2.0264	0.4446	-4.557	5.18e-06 ***
Verbs (-Agr)	0.5937	0.5132	1.157	0.247
4y.o.-Non_Anaphoric	0.7042	0.6282	1.121	0.262
4y.o.- Verbs (-Agr)	-0.6226	0.4516	-1.379	0.168
Non_Anaphoric-Verbs (-Agr)	-0.7084	0.5404	-1.311	0.190
4y.o.- Non_Anphrc; Verbs (-Agr)	0.8985	0.7597	1.183	0.237

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1.

Formula in R: Null\_objects ~ Groups \* Condition \* Verb\_Type + (1 | Subjects) + (1 | Items)

AIC 845.5 ; BIC 892.8 ; logLik -412.8 deviance 825.5. Random effects: Subjects SD. 0.9; Items SD 0.6. Number of obs: 830, groups: Subjects, 83; Items, 10

Table 3. Best-fitting logistic regression of probability of correct answers for Groups, Referentiality and Verb-Type.



The analysis revealed a significant main effect of Referentiality and a marginal effect of Group, with the proportion of null-objects significantly lower in the *-anaphoric* condition and in the 4 years-old group. Interestingly, the Verb Type did not play any role in predicting the probability of null-objects. This is visible in Figure 4, 5, and 6, where the three different object's types are plotted separately for +agreement and – agreement verbs. The figures show that, for each age group, the proportions are substantially the same.

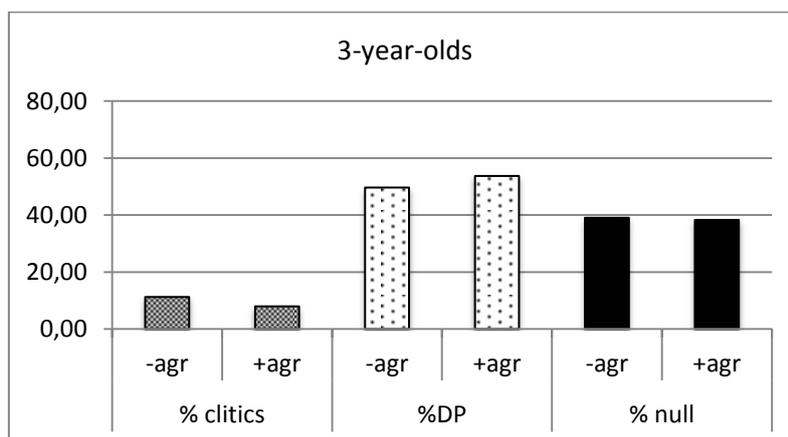


Figure 4. Proportion and type of direct objects for the two types of verbs for the 3-year-olds group

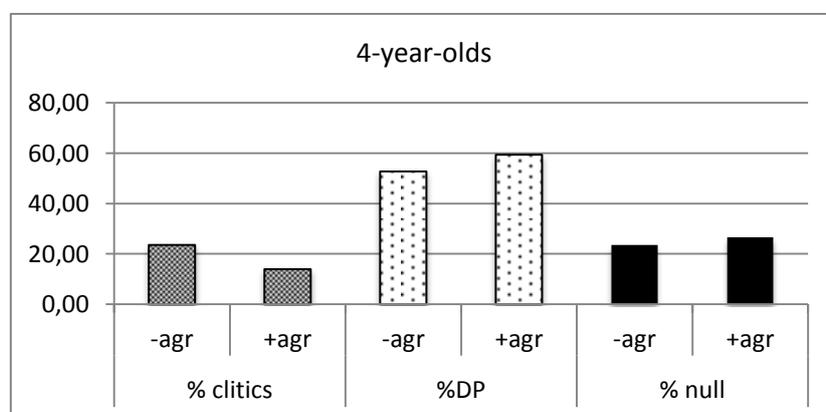


Figure 5. Proportion and type of direct objects for the two types of verbs for the 4-year-olds group.

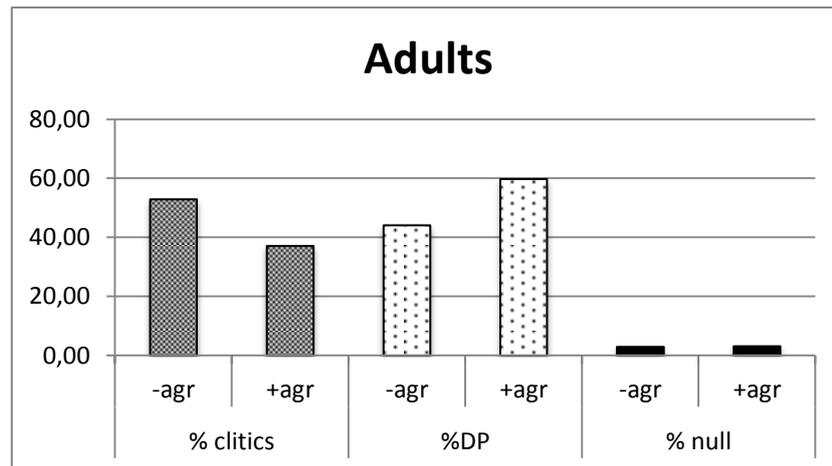


Figure 6. Proportion and type of direct objects for the two types of verbs for the Adult group

### 3.2 Past participle agreement

Children's production was recorded and their utterances were classified in accordance to the verbal morphology. Unsurprisingly, the majority of children's utterances were in the simple present tense. Moreover, many sentences produced by children involved the use of verbs where past participle agreement was not audible. This is not unexpected, since 40% of our experimental trials were designed to elicitate the use of verbs that do not carry overt past-participle agreement. Overall, children produced 28 past tense sentences with Class II and Class III verbs. These sentences were further classified in accordance to the object's type: null, clitic or full DP. For each of these types of object, figure 7 reports the overall rate of past participle agreement. Adults produced past participle agreement with clitics in the 88.4% of the cases and never with full DPs and null objects. Children, instead, up to the age of four, did not consistently produced agreement on the past participle: children in the 3-year-old group used past participle agreement only in 33.3 % of the cases and also 4-year-old children did not go over the 9%. Although numbers are low, only 28 utterances over the two groups, these results suggest that this agreement relation is still not mastered at age 4.

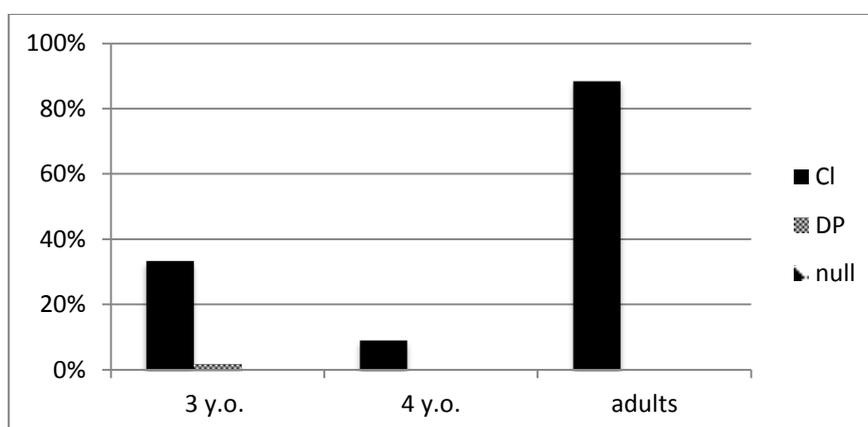


Figure 7. Past Participle agreement for three- and four-year-olds with verbs of Class II and III.



Remember that in the experiment, we also elicited other types of agreement. We then classified this small corpus in accordance to the agreement's type. It is possible to compare then the proportion of past participle agreement with other types of agreement configurations. Results are reported in Table 4.

Age	N	N-Adj	D-N	Cl-part
3 (MA 3;5)	41	77% (113/146)	97% (173/179)	33.3%(2/6)
4 (MA 4 ;5)	42	95% (163/171)	>99% (204/205)	9%(2/22)
Adults	18	100% (84/84)	100% (85/85)	88.4%(23/26)

Table 4. Agreement's Types

The table shows that, while children do not have problems with D-N agreement and their proportion of N-Adj agreement in predicative constructions is already adult-like at age 4, past participle agreement is the only agreement configuration that is not acquired yet.

#### 4. Discussion

The major finding of the experiment was that the contextual manipulation associated with the elicitation procedure has an effect on the rate of null objects produced by French-speaking children. Our experiment revealed that the proportion of null objects was significantly higher in the *+anaphoric* conditions, regardless of the verbal class. This result is similar to the one reported in Tedeschi (2009) for Italian-speaking children and it is consistent with the idea that null-objects are anaphoric expressions whose distribution alternates with overt clitics. This result is apparently in contrast with the one reported in Pérez-Leroux et al. (2008). However, the difference in the object omission's rate can be due to the slightly different elicitation procedure. This would also explain the high rate of object omissions found in the adult's population by Pérez-Leroux et al. (2008).

The significant difference between the two elicitation contexts is directly relevant to evaluate the tentative hypothesis, put forth in Pérez-Leroux et al. (2008), according to which children's omissions are generalized across different contexts. This does not seem to be the case, for they avoid object omissions when the referent was not salient and overtly mentioned in the previous linguistic context.

A concluding remark concerns the realization of object-verb agreement in Early French. Previous studies suggested that this agreement configuration is quite problematic for young children and that it might be acquired later with respect to other types of agreement, including D-N, S-V and N-Adj agreement. A forced-choice task reported in Moscati & Rizzi (2014) showed that in Italian, a Romance variety in which past participle agreement is obligatory with 3<sup>rd</sup> person clitic pronouns, children at age 3 are not able to select the grammatical alternative when presented with sentence pairs like in (8):

- (8) a. (la candela) la nonna la ha spenta  
 (the candle) the<sub>f,sing</sub> grandmother<sub>f,sing</sub> cl<sub>f,sing</sub> aux<sub>3p, sing</sub> put out<sub>f,sing</sub>  
 b. \*(la candela) la nonna la ha spente  
 (the candle) the<sub>f,plur</sub> grandmother<sub>f,sing</sub> cl<sub>f,sing</sub> aux<sub>3p, sing</sub> put out<sub>f,sing</sub>  
 “the candle, the grandmother put it out”

While the totality of the adults tested in the study was able to correctly choose the alternative in (8a), children were not able to do so consistently until the age of five. The same has also been found in Quebecois-French (Pirvulescu & Belzil, 2008). The results on past-participle agreement reported in this paper are in line with these previous findings and they confirm that this type of object-verb agreement is still problematic at age four.

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## **A Comparison of Multiple and Single Exemplar in Verb Learning and Extension**

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### **Abstract**

Abstracting the relation between an object and its action is required in verb learning. Two hypotheses have been propounded about the impact of the number of exemplars on verb learning and extension: one of the two hypotheses asserts that less is more effective, the other one maintains the view that seeing multiple exemplars contributes more to learning and extending verbs to new contexts. This study was conducted with three-year-old-Turkish speaking children (N= 12). Two novel verbs were taught to participants through the medium of applying different methods in two groups: one group was exposed to only one video which was repeated three times and in which the novel verb was performed by a single agent; the other group saw three different videos whose agents were disparate. The findings revealed that multiple exemplars aided participants more in learning and extending novel verbs compared to a single exemplar.

**Keywords** verb learning, extension, Turkish, multiple exemplar, language acquisition

### **1. Introduction**

Young children are excellent word learners and a considerable amount of studies have been devoted to the understanding of how such an accomplishment in word learning is achieved (Booth, 2009). Expanding the knowledge of how children learn nouns and verbs is pivotal for the purpose of comprehending lexical development (Imai, Li, Haryu, Hirsh-Pasek, Okada, Golinkoff & Shigematsu, 2008). Young children learn some words before others and determiners such as the frequency and exposure schedule might exert impact on the order of acquisition (Childers & Tomasello, 2002).

Any theory of word learning is to refer to how children learn to express the relation between objects as well as how they learn the labels for objects (Maguire, Hirsh-Pasek, Golinkoff & Brandone, 2008). The focus of an indispensable amount of studies carried out heretofore on word learning has been centred upon the sequential acquisition of verbs and nouns. The findings obtained by those studies have shown that verbs are acquired later than nouns (Benedict, 1979; Gentner, 1982; Gentner, Boroditsky, 2001; Hirsh-Pasek & Golinkoff, 2006; Imai, Haryu & Okada, 2005; Kuczaj, 2001; Nelson 1973; Tardif, 2006). One well- accepted explanation for the late acquisition of verbs compared to nouns is Gentner's (1982) natural partitions hypothesis. According to this hypothesis, salient concepts, objects,

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are easy to separate from the world stream and thereby initial words produced by children are to be substantially nouns. Stated in other words, the abstraction of relations between an object and its action is appraised as one of the most prominent reasons for why verb learning is forcible for children (Gentner, 2003). Another evidencing for why nouns are learned before verbs is grounded on the assumption that knowledge of objects is a prerequisite for verb learning. Bloom (cited in Gentner, 1982) claims that while children produce nouns at one word stage, they don't start to use verbs till they can produce multiword utterances. Depending on her observations, she proposed that verb learning is bound to knowledge of objects.

What children attend to during verb learning could have an effect upon the success of learning procedure. On the basis of the studies conducted to receive an answer to the question of where children draw their attention in the course of verb learning, it has been observed that children attend to novel objects and agent (Maguire, Hirsh-Pasek, Golinkoff & Brandone, 2008). Kersten & Smith (2002) conducted three experiments which provided evidence that 3.5 to 4- year- old-English speaking children attended to the appearance of novel objects both when they hear a novel noun and novel verb. The findings gathered through the experiments were indications of the assumptions that children are driven by the visual stimulus characteristics thereby may not be concerned sufficiently with the most novel and interesting characteristics of verbs. Bearing in mind the results of the study, the researchers assert that attention directed to novel objects can function as a hinderer in the process of verb learning, in that it might place constraints on what a verb means in the context of the that object.

The studies carried out prior to the study of Kersten & Smith (2002) such as the ones conducted by Behrend (1990) and Forbes & Farrar (1993) report similar results. Though these studies corroborate each other regarding their findings, it is worth underlining that the objects used in these studies and in the study conducted by Kersten & Smith (2002) were instruments and agents respectively. In Behrend's (1990) study, 3 and 4-year olds were less inclined than adults in extending the label for a verb to different situations on the condition that there emerges a change in the instrument. Similar findings were attained in the study carried out by Forbes & Farrar (1993) in which 3 and 5- year- olds attended to the instrument modification in verb learning. The findings of the studies mentioned above corroborate the claim that children are biased to attend to objects and agents, even in verb learning situations. Two disparate theories propose ways to eliminate the bias while learning and extending verbs to novel situations.

One theory assumes that children should be exposed to multiple exemplars to learn action verbs and asserts the dependency of children's initial words on objects and actors (Gentner, 2003). Hearing a relational term applied to address a situation establishes the environment for children so as to store the situation and its label irrespective of the probability of not being capable of assigning an exact meaning to the term. In pursuit of encountering further exemplars, children may compare those instances with the prior ones; for by doing so, a relational meaning could be construed. As children realize the relational meaning across contexts in which the same label is



used, they are supposed to abstract the label's meaning (Gentner, 2003, p. 208).

Ample evidence pertaining to object categories supports the view that being exposed to various contexts in which the same label is applied to address the same object can help children learn and extend the label and form an abstract object category (Graham, Kilbreath & Welder, 2004; Liu, Golinkoff & Sak, 2001). The findings obtained through natural speech samples demonstrate that providing children with multiple exemplars are more significant for acquiring verbs than nouns (Gallivan, 1987; Hoff & Naigles, 2002). A distinction between a noun and verb is the relational nature of verbs for instance, some agent must perform the action or an action is performed on an object. Hoff & Naigles (2002, p. 422) assert that hearing words, particularly verbs, in a variety of environments can be useful as each environment in which the verb appears supports conjectures about the semantics of the verb. The study carried out by Gallivan (1987) presents similar results in that a positive correlation between the parents' use and their children's production of motion verbs is observed.

The second theory suggests that in virtue of the repetition of a limited number of exemplars, children can constitute the relational categories in their minds. Cassasola (2005), Cassasola & Cohen (2002), Kersten & Smith (2002) argue that before children attend to a relation between objects, they draw their attention merely to the objects contributing to the emergence of the relation. Nonetheless, with the help of the repeated exposure to the same objects, children direct their attention to the relation between the objects, in other words, they start to be desensitized towards objects seen in different instances and this shift concerning attention could be a medium in abstracting the relation between objects.

Following the presentation of the stances of the researchers supporting two distinct theories, it is of high importance to emphasize the fact that whether the repetition of few exemplars or making use of multiple exemplars aids verb learning remains unresolved. On the purpose of comparing and examining the probable influence of two contradicting viewpoints, this study was conducted with 3 year olds.

## **2. Methodology**

### *2.1. Participants*

Twelve three-year-old Turkish speaking children (6 male; 6 female) participated this study. Special permission was taken from the principal of the nursery school by making satisfactory explanations about the aim of the study. The participants were from middle socio-economic class. 3 male and 3 female randomly chosen children were assigned to single exemplar condition and the remaining participants, 3 female and 3 male children, were assigned to the multiple exemplar condition.

### *2.2. Apparatus and Coding*

Two laptops and one digital camera were utilized in the study. The laptops were the mediums to show the videos to children and the digital camera was used to record the pointing responses of the participants. The laptop was placed on a small table specifically designed for children and the

participants were asked to sit on their small chair in front of the laptops. All of the participants' responses were recorded and coded as true or false pointing.

### 2.3. Materials and Procedure

The stimuli used in the study were videos including two different novel actions performed by female actresses. Children were randomly assigned to either single or multiple exemplar condition. The conditions in both circumstances were identical apart from the number of exemplars used in training phases. The experiment contained five different phases: pointing phase, training A, test phase A, training B and test phase B. The rationale behind following such a procedure was teaching a novel verb to the children and expecting them to extend the novel verb to new contexts. The auditory input existing in the study was provided by the experimenter.

Each video used in the training and testing phases lasted 6 seconds. The main goal of inserting pointing phase into the study was to train the participants to point in response to the experimenter's questions. The actions used in the pointing phase were familiar actions for the participants like 'yüzmek' and 'dans etmek'. The characters in the videos used in the pointing phase were lovely children to be able to attract participants' attention. After each successful pointing, children were given a sweet, which made them happy and definitely more motivated to listen to and implement what is said by the experimenter.

In training phase A, participants in the single exemplar group watched individually 3 videos in which the chosen novel verb 'belmek' was performed by the same actress in each of the three videos. These videos lasted 6 seconds and each video watching was accompanied with the labelling pronounced by the experimenter, 'Bak, abla beliyor.' The key alteration made in multiple exemplar group was the number of exemplars. Novel verb, 'belmek', was demonstrated through three videos in which there were three different novel actresses and while children were watching the videos, the experimenter told the participants in the multiple exemplar group, 'Bak, abla beliyor'.

Test phase A was the same in two groups regardless of the conditions in training. The goal behind the test was determining whether the children had learned the label of the novel verb and could extend the novel verb to a novel actress. The video display was a split depicting two novel actresses performing different tasks. One of the actresses was performing the target action taught in the training on the one side of the screen, and on the other, another actress was performing a different action. The two videos sharing the same screen and progressing at the same time were accompanied by the question of the experimenter, 'Hangi abla beliyor, parmağınla gösterebilir misin?' The training and test phase were all recorded by the experimenter. The participants were trained and tested individually.

Training and test phases B were identical to the training and test phases A except for the novel verb chosen and taught to the children, 'patmak'. The training phase in the single exemplar group was carried out with the video repeated three times and involving one novel actress performing the action whereas in the multiple exemplar group, three videos involving three distinct



actresses performing the target novel verb were shown to the participants. In the test phase two videos in which two novel actresses, one displaying the verb ‘patmak’, the other performing a different action, were played at the same time and they were asked in pursuit of watching 6-second-videos, ‘Hangi abla patıyor, parmağınla gösterebilir misin?’ Similar to training and test phase A, the participants were trained and then tested individually. All training and test phases were video recorded. The participants were rewarded with sweets after each pointing.

### 3. Findings

In order to investigate whether or not the number of exemplars does have any effect on learning new verbs and extending them to novel contexts, the responses participants gave via pointing in test phases A and B in single and multiple exemplar groups were analysed by SPSS statistics. Table 1 demonstrates the percentage of the correct pointing given by the participants.

	Percent Correct Single Exemplar	Percent Correct Multiple Exemplar
Belmek	16,7	50,0
Patmak	66,7	83,3

Table 1. Percentage of participants extending the target action correctly

As can be seen from Table 1, the percentages indicating the correct pointing of the participants provide evidence that the ability to learn and extend the novel verbs is enhanced through the medium of seeing three different exemplars rather than showing a single exemplar three times.

Independent samples t-test was used to compare the mean values of both groups obtained from tests and Table 2 and Table 3 displaying differences in the mean values are given below.

Group	N	$\bar{X}$	S	sd	p
Single	6	,33	,516	10	,448
Multiple	6	,50	,548		

Table 2. Results for ‘belmek’ in single and multiple exemplar groups

Table 1 demonstrates the comparison of the single and multiple exemplar groups for the verb ‘belmek’ in test A. P value .260 (.260 > .05) is an indication of the absence of a meaningful difference between two groups in Test A for the verb, ‘belmek’. Nonetheless, when the mean values, .17 for single exemplar and .50 for multiple exemplar group are examined, the difference between two groups might show the difference that occurred between these groups in this study; however this difference cannot be generalized since p value (.260 > .05) does not signify a significant difference. Provided that mean values are focused upon, it is observed that correct pointing of the participants in the multiple exemplar group outnumbers that of the participants in the single exemplar group.

Group	N	$\bar{X}$	S	sd	p
Single	6	,67	,516	10	,234
Multiple	6	,83	,408		

Table 3. Results for ‘patmak’ in single and multiple exemplar groups

Table 2 illustrates the analysis of the correct and incorrect pointing of the two groups for the verb, ‘patmak’ in test B. Similar to the results attained from test A, for ‘belmek’, p value, .260 (.260 > .05) is an indication of the absence of a significant difference between two groups in Test B. Nonetheless, when the mean values, .50 for the single exemplar and .83 for multiple exemplar group are examined, the difference is seen between these groups in this study; however this difference cannot be generalized since p value (.260 > .05) does not indicate a meaningful difference. Provided that mean values are focused upon, it is observed that correct pointing of the participants in the multiple exemplar group outnumbers that of the participants in the single exemplar group.

#### 4. Conclusions

The results of this study indicate that there is a difference in verb learning and extension resulting from the different number of exemplars used in verb teaching. Teaching a novel verb with three different novel agents was more effective than teaching it with a single novel agent. This was a manifestation of how children understood the unchanging relation between actions performed by different agents. The findings contradict with the studies revealing that providing children are taught verbs by using different agents and object, such a variation leads to losing attention among children for they direct their attention to agents and objects rather than comprehending the relational nature of verbs under multiple exemplar condition. Further studies in which the number of the children will be increased are required in



order to gather more comprehensive data possessing the power to enlighten the unresolved question of which one is better, less or more exemplars.

## **5. Discussion**

The purpose of the study was to investigate the influence of the few and multiple exemplars in abstracting the meanings of the labels for the verbs and liberating the labels from their initial context, which leads to verb extension. The findings regarding the mean values in both tests are in line with the hypothesis advocated by Gentner (2003). As long as children are exposed to many exemplars, detecting the unvarying relation between actions in different contexts could facilitate verb learning and extension. The children in the multiple exemplar group outperformed the participants in the single exemplar group in terms of the number of correct pointing of the novel verbs on which all the participants were trained in the course of training phase. Novel verbs were presented by three different actresses during training and the change in the actresses helped children comprehend the invariant relation between the action and its label.

Contrary to the study carried out by Kersten and Smith (2002), the children in the single exemplar group for whom the novel verb was performed and repeated three times by a single actress, were less successful than the other group as to the frequency of their correct pointing in test phases A and B. In both tests, *p* value (.260) does not indicate a significant difference between the groups whereas it is possible to observe the variation in the mean values of the groups. Such a differentiation in the *p* and mean values may be tied to the number of the students. In order to be able to generalize the findings, a more comprehensive study including more participants can be conducted. Gender was not determined as a variable in this study and for this reason; the number of male and female participants was equal to each other in both groups.

The performance of the participants can be explained by the age of the participants. As Maguire et al. (2008) claim children may need to see many exemplars to acquire an adult like concept of verb learning; however, they assert that young children seeing various agents performing the same action are distracted with the changing agents in substitution for centring their attention upon the action, which might be a retarding effect on verb learning and as a consequence, on extending verbs. Gentner (2003) maintains that relational concepts are not always obvious; hence, they are harder to learn than concrete nominals whose relations are more transparent. Considering the hardships in learning verbs, seeing multiple exemplars; in other words, seeing the same action performed in different contexts with different agents can facilitate the verb learning process by means of abstracting the relation between actions and objects. Further studies carried out with younger children can yield different results and as in the study administered by Kersten & Smith (2002), repetition of single exemplar could aid verb learning and extension.

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## **Language, literacy and cognition issues for research in bilingual-biliterate context<sup>1</sup>**

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### **Abstract**

Literacy, traditionally defined as the ability to read and write is a secondary linguistic skill comprising characteristics of language and therefore, considered as a cognitive activity. Literacy implies the ability to read and write using a writing system (s) that requires the reader to map on to the particular language system with the help of cognitive skills. Cognition that is defined as the process by which we transform, condense, elaborate, store, retrieve and exploit sensory information (Guliford and Hoepfner, 1971) is an essential component for literacy acquisition. It is well known that written text despite being decontextualized is understood which as noted by Ong (2002) that literacy itself leads to cognitive changes since "writing restructures consciousness" (p. 78). The notion that writing restructures one's cognitive system suggests that the writing system that a language uses influences children's acquisition of literacy. When an individual is literate in one language or more than one language, s(h)e develops competencies in two written languages (biliterate) either simultaneously or successively (Dworin, 2003). The specific cognitive and language skills that develop in biliterate<sup>3</sup> children owing to the differences in the nature and structure of languages and scripts suggests that there could be differential cognitive processing mechanisms in biliterate children compared to those in monoliterate children. This review paper has two sections. Section I discusses the significance of cognitive skills to early and conventional literacy skills in languages and scripts that are diverse in nature. Section II reviews a few studies from the Indian context on the above issues in order to provide an understanding of the cognitive processes and literacy skills of bilingual/biliterate children.

**Keywords** Cognition, Language, Literacy, Bilingualism, Biliteracy, Early Literacy

### **1. Introduction**

Over the past four decades, a large body of evidence has indicated that acquisition of reading and writing is strongly associated with a child's oral language, listening and awareness to written language. While the oral language is necessary to comprehend reading (decoding text) by extracting the meaning (semantics) and structure (syntax), the listening skills are

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<sup>3</sup> The terms 'biliterate' (knowledge of two written languages) and multiliterate (knowledge of more than two written languages) are used interchangeably in the paper keeping in view the multilingual nature of society.

necessary to strengthen child's sensitivity to phonological structures of spoken language. The written language awareness (which facilitates the development of coherent, effective links among visual symbols, phonology, and semantics) is mediated by the establishment of motor programs leading to the formation of long-term motor memories. Oral language, listening, reading and writing skills together offer a unique insight into the cognitive systems responsible for development of literacy. Hence, the state of reading research in the recent years brings us closer to an understanding of the cognitive processes that underlie learning to read (Snowling & Hulme, 2005).

## **2. Section I**

The terms reading and writing, collectively known as literacy, has several connotations. It is more than simply decoding and encoding print; they are ways of constructing and conveying meaning with written language. Becoming literate, is a multifaceted phenomenon that involves more than learning a set of technical skills such as, learning the alphabet, learning how to form letters and spell words, and learning how to decode print that are typically taught in elementary school. Becoming literate includes mastering specific skills related to written language as well as a 'complex set of understandings, attitudes, expectations and behaviors' (Erickson, 1984). Although literacy is traditionally defined as the ability to read and write, the definition of literacy has expanded over the past few years. Literacy is no longer perceived as simply a cognitive skill but as a complex and active process with cognitive, social, linguistic and psychological aspects (Teale & Sulzby, 1989). Alternatively, it can be stated that literacy involves a complex set of skills such as the ability to focus one's attention, knowledge of word meanings, to recognize language patterns, holding information in working memory, retrieving and storing information in long-term memory in addition to knowledge about the world, one's culture, and emotional expression. Given the interaction of complex processes, it may be stated that such interactions must begin at the early stages of reading so that a child learns to employ multiple processes right from pre-literacy stage to adult-like literacy stage in later years.

### *2.1 Emergent and Early Literacy*

The onset of literacy is often said to begin in the early years of a child, long before formal school instruction in reading and writing. The term 'emergent' denotes the developmental process of literacy acquisition and recognizes numerous forms of early literacy behaviors. 'Emergent literacy' encompasses the developmental and interactional relationship between spoken and written language forms (Goldsworthy, 2003). Between the ages of three and six years, the rapid development of language particularly the development of more advanced language abilities, may play a pivotal role in the initial organization and subsequent functioning of varied linguistic-cognitive-affective systems that underpin literacy (Tomasello, 2000). Oral language (Snow, Tabors, Nicholson, & Kurland, 1995; Roth, Speece, & Cooper, 2002), phonological awareness (Shankweiler and Libermann, 1972) and print awareness or written language awareness (Victoria Purcell-Gates, 2001) that



are considered as the most crucial skills for development of emergent literacy are intertwined with linguistic-cognitive-social-affective systems. Snow, Burns & Griffin (1998) were of the opinion that monolingual children require emergent literacy skills such as oral language, print knowledge and phonological processing skills for successful literacy acquisition (NRP, 2000). According to Pang and Kamil (2004) these literacy skills are also necessary for L2 reading acquisition but with added complexities of a second language learner's knowledge of two languages. First, there is the complexity of teaching reading when the learner is not proficient in the native language. Since the language of written text maps onto oral language, L2 learners need to develop some proficiency in the target language (Alderson, 1984). Second, the L2 learners have access to knowledge and skills unavailable to the monolingual speakers, including enhanced metalinguistic awareness, code-switching, translation and if the first language (L1) and the second (L2) are linguistically related languages, the advantage is with the additional knowledge of cognates. Third, for learners who are already literate, some skills can transfer to reading in L2. Finally, sociocultural and sociopolitical factors often play a mediating role in the education of L2 learners and their reading development. In the year 2009, the National Early Literacy Panel (NELP, 2009) report listed Alphabet Knowledge, Phonological Awareness, Rapid Automatic Naming (RAN) (Letters, Digits, Objects and /or colors), Writing name and Phonological memory as the precursors to literacy skills. These skills necessitate mapping speech to print, sequencing, memory, retrieval in addition to attention suggesting an intricate relationship between literacy and cognition much before a child steps into conventional literacy environment.

### *2.2 Language Structure and Literacy*

Given the consensus on the relationship between language and cognition for emergent literacy skills, it is plausible to state that the nature of language and script structure would place differential demands on cognitive processes for acquisition of formal reading and writing. For example, while phonological awareness is deemed to be crucial for reading English language by virtue of its script structure (alphabetic), for languages with syllabic scripts, a child would be required to decode at the syllabary level that perhaps would place lesser demands on cognitive processing (for more details, refer Vaid & Gupta, 2002). Further, it is also well known that the speech sound structure of a given language influences the ability to perform certain linguistic operations necessary for reading and writing (Hatano, 1986; Karanth and Prakash, 1996; Prema, 1997). Since processing of language for literacy purposes is said to depend on the finer constituents of language, ability to be sensitive to, to be aware of and to manipulate smaller units such as phonemes (English), syllables (Kannada), morphemes (Chinese and Japanese Kanji) as the case may be, requires not only linguistic knowledge but also cognitive skills such as awareness, identification,

discrimination, manipulation and such other skills necessary to process these units.

However, with reference to English language, terms such as phonological processing, phonological sensitivity, phonological naming and phonological memory skills are addressed in research in the context of literacy (Wagner and Torgesen, 1987). While phonological processing refers to the activities that require sensitivity to, manipulation of, or use of the sounds in words, phonological awareness is the conscious awareness of the sound structure of language. Phonological sensitivity on the other hand refers to the ability of a child to detect and manipulate the sound structure of oral language (For example, ability to identify words that rhyme, blend spoken syllables or phonemes together to form a word, delete syllables or phonemes from spoken words to form a new word, or count the number of phonemes in a spoken word). In alphabetic languages, since the graphemes in its written language correspond to speech sounds at the level of phonemes, progression from sensitivity to large and concrete units of sound (words and syllables) to subsyllabic units of onset (initial consonant or consonant cluster in a syllable) and rime (vowel and final consonant or consonant cluster in a syllable) to small and abstract units of speech sounds (phonemes) promotes the development of decoding skills. The other cognitive processes such as Phonological memory (short term memory for sound-based information), Phonological naming (efficiency of retrieval of phonological information from permanent memory), Rapid verbal naming skills (the speed with which an individual performs on a phonological task) enables children to maintain an accurate representation of the phonemes associated with the letters of a word while decoding and therefore, those require more cognitive resources to decoding and comprehension processes. In the recent years, the significance of the above is being investigated in non-alphabetic languages to explore the cognitive demands posed by such languages and is presented and discussed in Section II.

### *2.3 Script Structure and Literacy*

Until research on non-alphabetic script began, a general notion among the investigators was that the phonological principles that apply to alphabetic orthography apply to other orthographies as well. In the past few decades however, researchers have shown interest and concerns about processing of non-alphabetic scripts with a consensus that the nature of language and script structure places differential load on cognitive processes related to literacy skills. Studies on non-alphabetic orthographies such as Chinese, Japanese and Indian languages (for details see Rao, Shanbal and Khurana, 2010) have suggested that the specific phonological skills develop as a consequence of exposure to the alphabetic scripts in the course of learning to read English (alphabetic script) in schools. These differences are also



attributed to the orthographic depth hypothesis i.e., transparency of letter to phonology correspondence that is reported to play a major role in deciphering the script (Katz and Feldman, 1983).

Orthography is a writing system designed for a specific language. The written English does not have a distinct writing system but has a distinctive orthography, differing from other orthographies within the alphabetic writing system (for example, Italian and Korean). Besides this, within the alphabetic writing system, orthographies vary in their transparency of mappings between letters and phonemes that defines very transparent, relatively nontransparent or being in-between the two systems. The writing system that a language uses is found to affect children's acquisition of literacy because each system is based on a different set of symbolic relations and requires different cognitive skills (Coulmas, 1991). These relations place different demands on children's analysis of spoken language and their recording of the language in print. The task of learning to read in each of these writing systems depends on the nature of target language (Bialystok, Luk & Kuwan, 2005).

Ziegler and Goswami (2005) also stated that since languages vary in the consistency with which phonology is represented in their orthography, the degree of inconsistency between languages and orthographic units can result in developmental differences in the grain size of lexical representations. Difficulty at the granularity level would reflect that there are many more orthographic units to learn when access to the phonological system is based on bigger grain sizes as opposed to smaller grain sizes. That is, there are more words than there are syllables, more syllables than there are rimes, more rimes than there are graphemes, and more graphemes than there are letters. Therefore, it leads to differences in development of reading strategies in children across orthographies. Apart from developmental differences in reading, the degree of inconsistency between languages and orthographic units would also demand differential cognitive resources for acquisition and development of reading and writing.

#### *2.4 Biliteracy*

Children learn to read and write in a second language in many countries, but more so in India. The extensive research on the acquisition of literacy by monolingual children (Clay, 1975; Teale and Sulzby, 1986 among others) has provided an important framework from which the special circumstances of bilingual children are examined. Research on literacy development among bilinguals (for example, Bialystok, 2001) has pointed out that children learning to read and write in two different languages need to make complex connections between the languages. There is, however, an equivocal thought on the influence of one language/script over the other in a bilingual-

biliterate child learning to read and write two different types of languages and scripts.

Bialystok (2001) reported that literacy itself changes with languages and contexts. Since two languages may be written in either the same script or in different scripts a child learning to be literate in two languages need to employ the necessary cognitive processes as required for the target language(s) to decipher the scripts. Under these circumstances, there will be a cost to literacy (Bialystok, 2001). To cite examples from Indian languages, Kannada script for Kannada, Kodagu, Tulu, Banjari, Konkani and Sanskrit. Sanskrit is written using the Devanagari, Kannada, Telugu, Tamil, Malayalam and many other scripts. Kashmiri is written using the Perso-Arabic, Sharada and Devanagari scripts. Sindhi in India is written both in the Perso-Arabic and Devanagari scripts. In Nagaland and Meghalaya, Roman script is used to write some tribal languages. Rabha language uses Assamese script in Assam, Bengali script in West Bengal (Prema Rao et al.2010).

Since the cognitive skills associated with literacy are learnt at the same time as the linguistic system that is facilitating reading and writing, children might find it difficult to acquire reading and writing skills necessary for the language without its own script (as in Kodava) or with contrasting scripts (as in Kashmiri, Navayath and Tulu) and hence are restricted in their achievement levels particularly when the language structure is not uniform. The linguistic insights of a given language for a child are crucially dependent on factors such as the structure of language and one's proficiency with it; the cognitive implications of using language are however, tied to the purposes for which the language is used. Therefore, not only would bilingual children develop the background concepts for learning to read differently from monolingual children, but they also develop these concepts separately for their two languages, depending on their experience with each. In view of the differential findings reported across different languages, it is debated as to whether literacy enhances one's cognitive potential or vice versa. However, bilingual children are not inferior in their literacy skills but might have potential difficulty in achieving high levels of competence. Therefore, in order to understand the relationship between literacy and cognition, there is a need to explore the nature of language and script structures that a child learns to read and write. This is all the more necessary to understand the mechanism in biliterate children particularly those who learn to read and write languages with diverse script structures such as those prevalent in Indian languages.

### **3. Section II**

#### *3.1 Overview of Scripts in India*

Traditionally India was known for oral transmission of knowledge. Hence, the spread of literacy was rather sporadic in the past, and the need to reduce



the emerging languages to writing was not achieved in several languages. As a result, many potential languages remained as oral languages without developing scripts of their own. Normal convention regarding any script is that a language often uses the same single and specific script to render itself in the visual medium wherever it is spoken. The pluralistic tradition of India introduced the practice of using the same script to write different languages or different scripts to write the same language. For example, Kannada script is used to write Kannada, Kodagu, Tulu, Banjari, Konkani, Sanskrit, etc. Sanskrit is written using the Devanagari, Kannada, Telugu, Tamil, Malayalam and many other scripts. Similarly Kashmiri is written using the Perso-Arabic, Sharada and Devanagari scripts. Sindhi in India is written both in the Perso-Arabic and Devanagari scripts. At times, scripts of Indian as well as non-Indian languages are also adopted. In Nagaland and Meghalaya, Roman script is used to write some tribal languages. If this were not acceptable or possible, the script of the dominant regional language of the state or union territory where the unwritten language was spoken is also in practice such as that of Rabha language which uses Assamese script in Assam, but Bengali script in West Bengal. So, by tradition, script may not be a boundary between Indian languages. In order to understand the processing mechanisms of different aspects of literacy in bilingual-biliterate children and the process of learning to read and write with a written language system that is discussed above, a few theories have been proposed that are discussed in the following paragraphs.

### *3.2 Script Processing*

Script systems across the world have posed challenges for researchers more than the for learners of the script. Geva, Wade-Wooley and Shany (1997) assumed that the cognitive processes that underlie first language reading development also apply to the development of an individual's second language. Not all researchers are in consensus of such a common cognitive process for learning all the languages in the world since languages differ in terms of the regularity between written symbols (letters/graphemes) and sounds/phoneme (transparency vs. opaqueness of orthography) thus necessitating specific cognitive process (es). Snowling (2000) states that component processes utilized during the acquisition of literacy in different languages cannot be assumed to be the same, and theories that make this assumption require empirical assessment. In order to understand the processing mechanisms of different aspects of literacy in bilingual children, Geva and Wang (2001) reviewed the evidence for underlying universal principles which facilitate children's use of processing strategies in second language and bilingual literacy learning and noted that in the L2, the rapid and automatized processing of orthographic-phonological correspondences sustains skillful decoding and comprehension just as it does in L1 reading while Stanovich (2000) reported that L2 readers' phonological representation of words during decoding need not be native-like or complete for the purpose of processing for meaning.

### 3.2.1 Script Processing Hypotheses

Geva and Wang (2001) propose that the cognitive processes that underlie development of literacy in first language also apply to the development of literacy in an individual's second language. Geva and colleagues (Geva and Siegel, 2000; Gholamain and Geva, 1999) proposed that the main theoretical positions can be reduced to two competing perspectives as the script dependent hypothesis and central processing hypothesis. The script dependent hypothesis posits that reading development should vary with the transparency of a particular orthography. Therefore, accurate word recognition skills develop more slowly in less transparent orthographies than they do in more transparent orthographies (Everatt, Smythe, Ocampo & Gyarmathy, 2004; Karanth, 1992; Rickard Liow, 1999; Smythe, Everatt, Gyarmathy, Ho & Groerger, 2003; Wang, Koda and Perfetti, 2003; Vei and Everatt, 2005).

The central processing hypothesis, on the other hand, assumes a universal approach to literacy acquisition. It proposes that reading development is not contingent upon the type and the nature of the orthography. Rather, common underlying linguistic and cognitive processes (such as working memory, verbal ability, naming and phonological skills) influence the development of reading across all languages (Cummins, 2000; Gholamain and Geva, 1999; Leong, Cheng & Mulcahy, 1987; Obler, 1989; Perfetti & Zhang, 1991; Seidenberg, Waters, Barnes & Tanenhaus, 1984; Stevenson, Stigler, Lucker, Hsu and Kitamura, 1982; Wiss, 1987). However, considering that the languages differ in terms of the regularity between written symbols (letters/graphemes) and sounds/phoneme i.e., the transparency of orthography is different for different languages, an individual may require specific cognitive processes for learning the scripts of different languages. In general, it can be said that the central processing hypothesis does embrace the script dependent hypothesis to explain the underlying cognitive processes that are required to learn to be literate in a given language/script. There is, however, an equivocal thought on the influence of one language/script over the other in a bilingual-biliterate child learning to read and write two different types of languages and scripts (Cossu, Shankweiler, Liberman, Katz & Tola, 1988 in Hispanic-English), (Stuart-Smith & Martin, 1999 in Punjabi-English; Geva & Wang, 2001 in Turkish-English). As a result, the issue of cross-language transfer of literacy skills has also been investigated in bilingual-biliterate population.

Studies carried out on bilingual-biliterate children in India offer support for the above premise. Since majority of children in India are, by virtue of their linguistic and cultural diversity bilingual or multilingual before their entry into school, considerable number of studies on acquisition of literacy in a few Indian languages and scripts are reported since 1990's (Karanth, 1992; Karanth and Prakash, 1996; Prema, 1997; Prema, 2006; Prema et al., 2010 among others). The studies in general, offer evidence for the premise that the children who learn literacy in shallow as well as deep orthography (for example, Indian children who learn two different types of scripts - English which is alphabetic; Indian languages that are syllabic/semi-syllabic), are likely to use differential processing strategies in learning to read besides exercising differential cognitive skills in order to be good readers. This has



been verified by employing different types of stimuli and tasks in several studies conducted with the purpose of examining processing strategies by bilingual-biliterate children. A few of those studies are presented and discussed in the following sections.

### *3.3 Phonological Awareness*

Studies related to phonological awareness and reading have examined various phonological awareness skills in children learning two different languages in the school system. Phonological awareness skills in relation to orthographic factors in reading in children from both English medium and Gujarati medium was examined by Gokani (1992). She reported a significant difference in phoneme deletion task between English and Gujarati medium children in favor of English medium children. Prema and Karanth (2003) examined the performance of certain linguistic operations that make use of information about the speech sound structure of a given language in Kannada speaking children studying in Kannada medium with English as a second language. They reported that phonological awareness appeared to emerge with exposure to alphabetic script in the later grades of upper primary level. A series of studies were conducted by Prema (1997-Kannada language), Akhila and Prema (2000-Tamil language), Swaroopa and Prema (2001) and Seetha and Prema (2002) (Malayalam language) to examine the influence of script specific features of alphabetic languages such as those of English on Kannada, Tamil and Malayalam – the three south Indian Dravidian languages with semi-syllabic script. Akhila and Prema (2000) reported that the development of rhyming skills in Tamil was not found to parallel with syllable deletion as seen for Kannada language (Prema, 1997). On the other hand, Swaroopa and Prema (2001), and Seetha and Prema (2002) found that rhyming and alliteration were potential indicators for adequate reading skills in Malayalam language. The results of the three studies conducted in series indicate that the literacy related factors are influenced by the underlying script system. On the basis of the three studies Prema (2006) proposed that the sub-classification of languages should take into consideration not only the linguistic features but also the script specific features.

The above studies indicate that the phonemic awareness emerges as a consequence of learning alphabetic script (say, English) and not a necessary skill for literacy acquisition in semi-syllabic script. Alternatively stated, literacy in a semi-syllabic system does not, by itself, lead to development of phonemic awareness. Hence, children undertaking bilingual education, particularly in languages with widely differing features are likely to exercise differential skills depending on the linguistic and script features because of which it is extremely important to sensitize language teachers to the possibility of differential underlying skills as well as the need to focus on training/enhancing the cognitive resources that are necessary for children learning two or three languages/scripts. This, however, calls for intensive efforts to empower teachers to meet the needs of bilingual children.

### 3.4 Naming

The differential phonological processing operations exercised by monolingual and bilingual children have also been investigated in the Indian context. Savithri, Prema and Shilpashree (2004) investigated ability of monolingual (Kannada) and bilingual (Kannada-English, with native language being Kannada) children to identify and name time-warped phoneme/syllable. Their results indicated significant difference between Kannada-English bilingual-biliterate children studying in English medium and monolingual children from Kannada medium with the former faring better than the latter in the identification and naming of both the time-warped deleted phonemes and syllables suggesting that the ability to identify and name phonemes was better in the bilingual than in the monolingual children. The results suggest that the sensitivity of bilinguals to time-warped phonemes and syllables is better than those of monolinguals.

#### 3.4.1 Rapid verbal naming skills

Apart from awareness to the phonological constituents of speech sounds or the characteristics of a writing system, the speed with which an individual performs on a phonological task serves as a measure of one's phonological processing abilities. Such a skill termed as Rapid Verbal Naming (RVN) skill, generally measured through naming speed indicates phonological processing ability. Rapid verbal naming refers to the ability to rapidly name a small number of items as quickly as possible. Rapid naming ability is linked with phonological processing ability—namely, the ability to retrieve phonological codes from long-term memory (Wagner & Torgesen, 1987). Rapid verbal naming is otherwise also referred to as verbal fluency (Cohen, Morgan, Vaughn, Riccio & Hall, 1999). The most common verbal fluency tasks used in research are letter fluency, phonological fluency and semantic fluency. The term rapid naming is viewed by investigators as either rapid verbal naming, verbal fluency for letter, phonological, and/or semantic units and rapid automatized naming (RAN) (Jayashree, 2011). Developmentally it is found that naming through the RAN task is more crucial and a better predictor of reading in younger children than older children (McBride-Chang & Manis, 1996; Torgesen et al., 1997). Research shows that rapid naming skill could be different in languages with different script structures.

### 3.5 Processing of Statement vs. Digit Problems

The differential skills of monolingual and bilingual children in number word processing also have its impact on higher level mathematical problem solving such as that of statement problems (word problems). Sumitha, Prakash and Prema (2005) examined comprehension of statement problems in bilingual children (with mother tongue being one of the Indian languages) from grade IV and V studying in English medium. Statement problems were prepared using homophonous words and non-homophonous words keeping as reference the curriculum of language and mathematics of IV and V grade. The selected words were incorporated in the statement problems. (For example, 'some' and 'sum'; 'tense' and 'tens'). The bilingual children fared poorly on the homophonous words compared to non-homophonous words. The bilingual children found it difficult to extract the right sense of the



homophonous words suggesting a high possibility of interaction between the language vocabulary and math vocabulary an important factor to be considered by both language teachers and teachers of cognitive subjects.

### *3.6 Memory Span for Digits and Number Words*

Processing digits and number words have always posed challenges for bilingual children. Studies on digits and number word processing indicate that the differences in processing are not only at the feature level but also seen at the higher level of language. For example, majority of the studies have reported differences in cognitive linguistic abilities for processing digits and number words (Ellis and Hennelly, 1980; Stigler, Lee and Stenvenson, 1986; Neath, 1998; Bernado, 2001). These studies suggest that there are differences in the processing at the semantic level between the monolingual and the bilingual children. Such differences have their impact on learning the cognitive subjects such as science and mathematics. A few small scale studies employing digits and number words examined reaction time (Dheepa, Sreedevi and Prema, 2005), digit span, (Anjali, Savitha and Prema, 2006) and semantic aspects in statement problems (Sumitha, Shwetha and Prema, 2005) involved in processing by Kannada-English bilingual children. In the above studies the Kannada-English bilingual children showed better memory span for digits compared to number words. However, there was a significant difference in the reaction time for processing digits and number words in each of the languages i.e., Kannada and English with the performance of bilingual children being better for number words in English than for Kannada number words. Although the bilinguals are second language learners of English, they performed better on number words in English (L2) that could be explained based on the linguistic complexity of Kannada language (L1). Since some of the Kannada number words have longer syllable length than English (number 'nine' in English is a monosyllabic word, while /ombattu/ in Kannada meaning 'nine' is a trisyllabic word), the processing of number words by way of language dependent route takes a few milliseconds more than the processing of digits by way of direct route (Campbell, 1994; Dheepa, Sreedevi and Prema, 2005; French-Mestre and Vaid, 1993; Marsh and Maki, 1976; McClain and Huang, 1982). The Kannada number words appear to impose a greater load on working memory (Baddeley and Hitch, 1974; Baddeley, 2000; Anjali, Savitha and Prema, 2006). Bilingual children who use more than one verbal code for number processing are likely to have a differential load on their working memory. While the numerical notation for digits is trans-linguistic and is independent of language, the number words seem to be language dependent thus placing uneven demands for the two types of stimuli. This premise was further examined in the study carried out by Sumitha, Prakash and Prema (2005).

To summarize, studies on the phonological awareness and phonological processing, cross language transfer of phonological and semantic skills, processing of numbers and digits by monolingual and bilingual-biliterate children suggest that it is necessary to give due considerations to the structural differences of the language(s) of instruction as well as the proficiency of children in L2 in designing teaching strategies for classroom practice with bilingual children. The prevailing educational policy in majority

of states of India is Three Language Formula (TLF, see <http://www.ncert.nic.in> for details) where children learn to read and write three languages in school. Therefore, school-going children in India are immersed in bilingualism/multilingualism and biliteracy /multiliteracy in a formal context besides the socio-cultural and linguistic atmosphere that is potential enough for its promotion. Imposition of such policy in schools in India is inevitable due to the globalization and other related factors. However, the impact of these policies on children developing literacy skills and the influence of two or more languages need to be studied extensively in order to derive a consensus on teaching biliterate children in India. Literacy skills in biliterates that is compounded with diverse script structures are less investigated in India. Further studies of the nature described in this paper in all the languages of India would enlighten our understanding of the intricate relationships that exist between cognition and literacy to sensitize educators to re-frame their teaching practices. There is an urgent need for such empirical evidence in India to sensitize the educational policy makers as well as teachers and parents before framing policies for biliterate children. Research in this direction is bound to make an impact on our understanding of the role of cognitive skills in the acquisition of biliteracy, a potential area of study to be considered as an initiative of cognitive science.

#### **4. Conclusion**

In this article, an attempt has been made to review studies on early literacy and biliteracy acquisition with reference to language and script structure in the bilingual-biliterate context of India. India is well known for diversity in languages, scripts and culture and therefore, offers a potential platform to examine majority of aspects related to literacy acquisition including phonological awareness, rapid verbal naming, script processing by monolinguals as well as bi/multilinguals who, invariably, are also bi/multiscriptals. The studies carried out in the Indian context in relation to various parameters for literacy acquisition on monolingual and bilingual-biliterate children suggest that the strategies for teaching practice with bilingual children should be carefully crafted keeping the structural differences of the language(s) of instruction as well as the proficiency of children in L2. . The prevailing educational policy in majority of states of India is Three Language Formula (TLF, see <http://www.ncert.nic.in> for details) where children learn to read and write three languages in school. Therefore, school-going children in India are immersed in bilingualism/multilingualism and biliteracy /multiliteracy in a formal context besides the potential socio-cultural and linguistic atmosphere that is quite adequate for its promotion. Consequent to globalization and migration of the Indian population within and across the countries, although the imposition of TLF policy in schools is welcome, there is a strong need to evaluate the impact of the policy on children developing literacy skills. The influence of two or more languages in language and literacy acquisition besides the advantages that are likely to accrue for cognitive development, need to be extensively studied to evolve methods for teaching biliterate children in India.

Further, studies of the nature described in this paper in various languages of India as well as the world's languages, would enlighten our



understanding of the intricate relationships that exist among cognition, language, script and literacy. There is an urgent need for such empirical studies to sensitize the professionals including speech-language pathologists, educators, educational psychologists besides the educational policy makers and parents before framing policies for biliterate children. Research in this direction is bound to make an impact on our understanding of the role of cognitive skills in the acquisition of literacy in a bilingual-biliterate context.

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