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The acquisition of grammatical gender in Greek

Abstract

Greek is a language with rich gender system. Greek nouns are classified into three genders (masculine, feminine and neuter) and there are three possible clues (semantic, syntactic and morphological) that speakers can use to determine the gender of a noun and the agreement of other variable elements accompanying it. In this study 120 monolingual Greek-speaking children participated. They were tested in their ability to recognize the gender of a noun upon hearing it in a particular frame and, consequently, to establish the agreement of adjectives accompanying it. The aim of this study was to determine the relevant importance of intralinguistic (morphology and syntax) and extralinguistic (semantics) cues as evidence by the ability of Greek children to use these cues. The materials that were used in this experiment were non-words and coloured drawings of imaginary beings, animals or things. The experiment was a (3X2X2) factorial three way mixed analysis of variances. The findings indicate that Greek children pay far more attention to intralinguistic information than to extralinguistic, giving support to the theoretical view claiming that grammatical gender is based on the characteristics of the language and not on a more general understanding of the natural gender.

Introduction

Studies that have been carried out on the acquisition of gender and gender agreement in different languages oscillate two theoretical positions. According to the first position the gender differentiation is established on the basis of semantic features coming from extralinguistic information (natural gender theory). Children will primarily attribute the gender of words on the basis of information given by semantic features. Therefore, the child will first recognise the linguistic distinctions as relevant to nonlinguistic gender distinctions (semantic features) (Mulford, 1985) (Pinker, 1982) (Mills 1986). The natural gender theory is based on a more general position that language consists of establishing correspondences between forms and meanings (Mulford, 1983, 1985). The alternative position considers that gender is a phenomenon of the internal laws of language. When establishing the gender of the words, children do not rely on extralinguistic reality (semantics), but on information coming from the linguistic context (syntax/morphology) in which words appear (Karmiloff-Smith 1979). The child discovers grammatical gender as an organising principle by noting regularities in the intralinguistic properties of the linguistic system. The child comes to recognise, for example, that nouns with particular endings always co-occur with particular articles or pronouns. Such regularities serve as a basis for the child's developing gender system even before the child is able to make natural gender distinctions. This strategy almost dominates the children's gender classifications. This account has been argued by Maratsos & Chalkley (1980) and it has been supported by studies in many languages (Levy, 1980, 1983) (Perez-Pereira, 1991) (MacWhinney, 1978).

On the area of gender acquisition two types of studies have been carried out, longitudinal or cross sectional and experimental (Perez-Pereira, 1991). Longitudinal studies consist on observations of children's speech in natural situations. The strengths of those types of studies are the designation of time of acquisition and the analysis of children's errors. The main difficulty on these researches lies on the aspect of generalisation. On the other hand experimental studies consist on testing the importance of extralinguistic and intralinguistic clues on children's gender acquisition. The weaknesses on these studies lie on their methodology. Different experimental manipulations can produce different and questionable results. Levy (1988) has pointed out methodological problems in some studies.

Research on the acquisition of Modern Greek as a native language started in the early 1970s.

Children at the age of 2;6 have acquired gender identity, they are capable to identify an animate as a man or a woman, also at this age they are capable to classify themselves in one of those categories (Paraskevopoulos, 1985). Therefore they can extract information about gender from sexual dimorphism from this age (2;6) (Lopez, 1988). This ability is greater when the child acquire the knowledge that sex is a permanent condition and that does not change over time and according to the context that someone appears (Paraskevopoulos 1985). Therefore children can and do pay attention to extralinguistic gender information from very early on.

In languages with complicated morphology morphological elements can be found very early on (Stephany, 1981). Especially in Greek all of the grammatical categories inflectionally expressed begin to emerge before the end of the second year (Stephany, 1997). Due to the dependence of case inflection on gender, case marking establishes gender distinctions (Theophanopoulou-Kontou, 1973). Also, Tucker, Lambert & Rigault (1977) have demonstrated the capability of French-speaking children to identify the gender of nouns on the basis of their morphological endings. Also it has been proved that children pay attention to the distributional patterns of the words. Greek children use systematically the correspondence between noun and article gender from the age of 2;3 (Stephany, 1997). In longitudinal studies it has been observed that Greek children make the adjective agree with its referent noun (Stephany 1997). Syntactic gender cues and, specifically, gender agreement between the definite determiner and the noun appear to be the strongest factor for gender assignment to novel nouns (Mastropavlou, 2006). Other studies have showed that the lexical route may be predominant since learners have built their lexicon on the basis of gender classifications of noun stems (Tsimpli, 2011). Therefore children are able to use morphological and syntactic (intralinguistic) information from very early on. However the most interesting question is the importance of these clues and especially in Greek (concerning the issue that morphology and syntax are very important in Greek).

As the Indo-European language family is concerned, there are no entirely uniform semantic classificatory criteria, which would make it possible to predict the gender of more than a handful of lexical groups (Lyons 1968).

However studies like Mulford's (1983, 1985) provide strong support for the natural gender theory. She studied Icelandic children on the comprehension of pronouns. Mulford assumes that the availability of the cognitive notion of gender is independent of language; the prediction of the early formal learning is that differences in the time and rate at which gender is acquired should be the result of the complexity and predictability of the formal aspects of the system. Therefore children appear not to succeed in figuring out a stable formal basis for gender categorization before their non-linguistic cognitive development has led them to attend to natural gender distinctions (Mulford, 1985). However, Levy (1988) pointed out that Mulford's study has methodological problems.

There is sometimes a mismatch between formal gender and natural gender, for example in German "mouse" is feminine gender but may be male in the context of a story. Where this occurs, there is a general tendency to switch to the natural gender (Mills, 1984). It is obvious that the concept of natural gender distinctions must be acquired before the linguistic system in the cases where it directly reflects those distinctions. There is evidence that the concept of natural gender may precede the acquisition of the linguistic system but that it does not facilitate it. Also languages have different requirements as to the elements that must have syntactic gender agreement and which can have natural gender agreement.

Mac Whinney (1978) tested gender assignment in children. He found that age affects positively children's performance; also he claimed that German children made little use of semantic information and were mainly using formal features of the noun ending to determine syntactic gender. Also Bohme and Levelt (1979) in an experimental study about the acquisition of gender forms in German, found that the participants made extensive use of intralinguistic information and did not attend to the obvious sex of the proper names. For example suppose children are shown a new type of person or animal which is clearly masculine or feminine, but which is referred to by a conflicting grammatical determiner. They apparently produce other combinations with the noun on the basis of its grammatical gender, rather than its conceptual gender. Both studies (Mac Whinney and Bohme & Levelt) showed that children, even at the age of 4, tend to use intralinguistic information even when there is in conflict with semantic information (Levy, 1983 a).

In Hebrew Levy (1983 b) showed the importance of morphological information rather than semantic information, also she has pointed out that morphological regularities in Hebrew nouns may serve as the basis for the child's gender system even before the child is able to make natural gender distinctions. An experimental study with Czechoslovak children (Henzl, 1975) confirms the saliency of phonological endings in gender attribution. The children tend to assign gender to noun according to the morphological information and not according to semantic information.

In Polish while gender in inanimate is semantically arbitrary, the sex of the referents of animate nouns fully determines their linguistic gender. Therefore Polish seems to be the most sex-biased of all Indo-European languages. However, other studies have showed that the child fails to use the necessary semantic distinction, (Levy, 1983a).

Popova (1973) argued that in places where the formal marker on the noun did not correspond to the sex of referents, the children were acting predominantly on the basis of the formal properties of the noun, ignoring the natural gender of their referent.

In French, Karmiloff-Smith (1979) showed the predominance of morphological information up to the age of nine. Wherever a morphological clue is available, it tends to override both natural gender clues and clues from the gender of the article. She also found that the importance of morphological information is gradually replaced by the natural gender and by syntactic information. Furthermore, the morphological information is the last to become explicit and the last to be exploited when children create words.

Perez-Pereira (1991), found that Spanish children pay far more attention to intralinguistic information than to extralinguistic information in order to recognise the gender of a noun and to establish gender agreement with adjectives, even in cases where the information is conflicted.

Regarding the acquisition of gender in Greek morphology represent one of the language learner's major challenges. In spite of this, all of the Greek grammatical categories inflectionally expressed begin to emerge before the end of the second year (Stephany, 1997). Although Greek nominal inflection is by far less complex than verbal inflection, there is a considerable number of noun suffixes types to be mastered. Theophanopoulou-Kontou (1973) found that the adult system is not fully mastered by 6;6 years.

The reason for this low input frequency and complicated stress shift rules.

In Greek, children tend to use the definite article with at least some nouns from 2;3 years on and, a month later, there are instances of the article in all singular case forms of all genders, even in younger children (1;10 years) article gender is mostly correct, and some apparent gender errors are probably best explained by vowel harmony. Longitudinal studies showed that gender errors in articles don't necessarily mean that the child does not know the noun's gender because in other cases the use of noun's gender was correct. From the age of 2;4 years the child can use the three way gender distinction of the indefinite article in the nominative. Also longitudinal studies showed that article form might serve as a kind of rescue in the absence of case while the same children don't tend to use articles (Stephany, 1997). Theophanopoulou-Kontou (1992) found that gender inflection of the adjective occurs only at 2;4 and by the age of 2;10 the three genders of adjective are in use. Although most adjectives agree with their referents in gender this occurs systematically only after the age of 2;10.

Overall these studies in Greek indicate that children pay attention to gender suffixes and syntax agreement by early on but they are not so useful in identifying the relevant importance of extralinguistic and intralinguistic clues in the acquisition of the linguistic gender system.

The aim of this study is to determine the relative importance of intralinguistic (morphology and syntax) and extralinguistic clues (semantic), by the ability of Greek children to recognize the gender of a noun upon hearing it in a particular frame and to establish agreement adjectives accompanying it. This study examined the acquisition of grammatical gender in children and the effect of gender variation.

Method

Design

The experiment was a (3X2X2) factorial three way mixed analysis of variances, for the within groups the first factor had 3 levels (type of clue: syntactic, semantic and morphological information), the second factor had 2 levels (gender variation: masculine, feminine) and for the between groups, the factor had 2 levels (age: group of younger and group of older). Therefore each participant was examined in 6 conditions and in each

condition there were four items. The dependent variable was the number of participant's correct answers on the noun's gender; the range of the scale was 0 (none correct answer) up to 4 (all correct answers). The criteria which the children used to determine the attribution of noun gender were made apparent by the gender agreement they used on the adjectives they themselves produced in order to accompany each given noun. The first and the second group received the same material.

Participants

In this study 120 monolingual Greek-speaking children participated. All of them were students of schools in the Attica County. The 120 participants were divided into two groups. The first group was constituted by the young ones (first grade students), the mean age at this group was 6 years. The old ones constituted the second group (fifth grade students), the mean age at this group was 10 years. There were an equal number of boys and girls (60-60). The students in each group were selected randomly. None of the participant had any learning difficulties related to language (e.g. dyslexia). At the pilot study, which carried out, 10 children participated.

Apparatus and Materials

The materials that were used in this experiment were 24 non-words and 24 pairs of identical but different coloured drawings of imaginary beings, which accompanied each noun. Therefore 24 items were produced (each item was constituted by one non-word noun and a pair of drawings). Eight of the represented beings had secondary sexual features and the rest sixteen lacked natural gender. The colours of the twenty-four pairs of drawings had a clear morphological differentiation for masculine and feminine gender. The twenty-four non-word (examples of the invented nouns are presented in Table 3.) nouns obeyed the phonemic combinations in Greek, all had the same number of syllables and the children had not heard them before. The non-sense noun endings were either typically masculine, typically feminine, or had a suffix, which gave no indication of gender. For the syntactic information (provided in eight items) indefinite articles were used instead of definite articles because children are more capable to do finer gender distinctions with indefinite articles (Teophanopoulou-Kontou,

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1973). From the total number of the twenty-four items, eight of them had an indefinite article typically masculine (four of them) or feminine (four of them), they had no natural gender (the imaginary being in each picture had no sexual dimorphism information) and no typical masculine or feminine suffix. In eight of the items, each picture had a natural gender but there was not any syntactical or morphological information. At the other eight items,

Morphologically marked masculine	Morphologically marked feminine	Syntactically marked masculine	Syntactically marked feminine	Unmarked gender
gender	gender	gender	gender	
πιφάρος κατάλος	πικόβα τεράβα	ένας τενάτεν ένας κεπάκερ	μία τερέλεκ μία κοπίτερ	κεκατέμ καρατέμ

Table 3. Examples of invented nouns

Syntactical	Semantically	Morphological	Invented noun
information	information	information	
0	0	M	πιφάρος
0	0	F	πικόβα
M	0	0	ένας τενάτεν
F	0	0	μία τερέλεκ
0	M	0	καρατέμ
0	F	0	βοπολέκ

Table 4. Gender clues presented in selected items at random (M=masculine, F=feminine and O=absent)

morphology (suffix) was the only information for the noun's gender discrimination. The clues of selected items at random are described in Table 4.

Procedure

The procedure was inspired by Karmiloff-Smith (1979). The experimenter presented a picture giving syntactic, semantic or morphological information. The experimenter presented a picture with the following instruction pattern: "τι βλέπουμε εδώ;" "What's this?" "να ένας ταλάζος" "here a talazos" or "ονομάζεται ταλάζος" "his name is talazos". After that, another picture exactly the same, but in different colour, was presented, and the child was asked "να μία άλλη φωτογραφία" "here you have another picture" "τι βλέπουμε εδώ;" "What's this?" at this stage the child

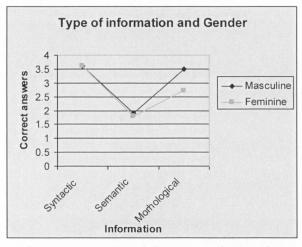
named the imaginary being specifying also its colour (e.g. "ένας κόκκινος ταλάζος" "a red talazos"). Prior to the experiment, and in order to introduce the technique, some existing nouns with their corresponding pictures were used;

Results

The analysis of the results was done on the statistical programme for social sciences (SPSS). Analysis of variances (ANOVAs) was carried out. In Table 5. the descriptive statistics are presented for all the participants performance in the six conditions: syntactic information with masculine

Correct answers (Out of four)		N	MEAN	Std Dev.
	SYN.M	120	3.6	0.6
Type of	SEM.M	120	1.9	1.2
information	MOR.M	120	3.5	0.6
and type of	SYN.F	120	3.6	0.5
gender	SEM.F	120	1.8	1.2
	MOR.F	120	2.7	1.1

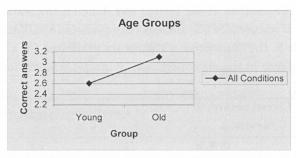
Table 5. Descriptive statistics for all the participants in the six conditions



Graph 1. Means of participants' performance in the six conditions

Correct answers (Out of four)		N	MEAN	Std Dev.
Group	Group of Young	60	2.6	0.9
	Group of Older	60	3.1	0.8

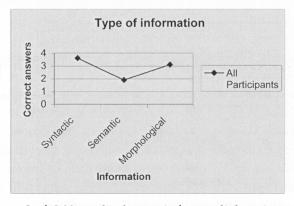
Table 6. Descriptive statistics for the average performance of the two age groups



Graph 2. Means of performance in each age group

Correct answers (Out of four)		N	MEAN	Std Dev.
Type of	SYN.	120	3.6	0.5
Type of information	SEM.	120	1.9	1.2
	MOR.	120	3.1	0.8

Table 7. Descriptive statistics for the general performance in the factor of information



Graph 3. Means of performance in the type of information

gender (SYNT.M), syntactic information with feminine gender (SYNT.F), semantic information with masculine gender (SEM.M), semantic information with feminine gender (SEM.F), morphological information with masculine gender (MOR.M) and morphological information with feminine gender (MOR.F). Also theses means are presented in Graph 1.

The descriptive statistics for the general performance of the tow age groups (young and older) are presented in Table 6 and in Graph 2.

Table 7 contains the descriptive statistics for the general performance in the factor of information (syntactic, semantic and morphological) controlling for both age groups and for both masculine and feminine gender variation. This information is presented also in Graph 3.

Because the factor of information had more than two levels, it had to be ensured that there was not violation of the assumption of sphericity (Mauchley test of sphericity was interpreted). Therefore assumptions of normality, homogeneity of variance and sphericity were met. The ANOVA revealed that the main effects due to type of information factor (F(1,118)=16.407 MSe=8.008 p<.001), age factor (F(1,118)=6.98, MSe=7.606, p<.05) and the interaction between the factor of type of information and the factor of gender variation (F(1,118)=11.824, MSe=5.208, p<.001) were unlikely to have arisen due to sampling error. The main effect of the age group suggesting that the older children perform better than the young (Means 3.1 and 2.6 respectively and partial Eta Squared=.2) this shows 20% of the overall variance was attributed to the influence of the age. The main effect of the type of information had a partial Eta Squared=.36, thus 36% of the overall variance was due to the information manipulation. Finally the interaction between gender variation and type of information had a partial Eta Squared=.29 thus it accounts for 29% of the overall variance. Also ANOVA showed that there was not a significant main effect of the factor of gender variation (F(1,118)=3.451). There was no significant interaction between the factors of gender and age group (F(1,118)= .059), also no significant interaction between the factors of information and age group (F(1,118)= .154). Finally there was not a significant interaction between the factors of gender, information and age group (F(1,118)=.473).

Because the factor of information had more than two levels a post-hoc test had to be carried out. Pairwise comparisons were carried out between all types of information (syntactic information Vs semantic) (syntactic Vs

morphological) and (semantic Vs morphological). There was a significant difference between the conditions of syntactic information Vs semantic (means 3.6 and 1.9 respectively, the effect size was (d)=1.99 p<.001) syntactic Vs morphological (means 3.6 and 3.1 respectively, the effect size was (d)=.75 p<.001) and semantic Vs morphological (means 1.9 and 3.1 respectively, the effect size was (d)=1.03 p<.001). Thus the children have a better performance when they deal with syntactic information than semantic or morphological and they perform better when they deal with morphological information than with semantic.

The interaction between gender variation and type of information was further investigated using t-tests. The simple effects analysis showed that the effect of gender variation in morphological information was unlikely to have arisen due to sampling error (t(119)=3.096 p<.05 2-tailed). Thus the children perform better when they deal with morphological information and masculine gender (mean= 3.5) than when they deal with morphological information and feminine gender (mean=2.7). There was no significant difference between masculine semantic information and feminine semantic information (t(119)=.31). Also there was no significant difference between masculine syntactic information and feminine syntactic information (t(119)=.63).

Discussion

The comparisons between studies in English (a language with very poor gender system) and German (with richer gender system) indicate that English children acquire the gender of pronouns later than German children (Mills, 1986). This seems to indicate that the more extensive and productive the system of gender marking in a language, the easier is the learning of the gender notion in language, since it furnishes more frequent and concordant information to be used by children. Therefore the nature of Greek language (language with rich gender system) must facilitate its learning.

Cross-linguistic comparisons of the stage at which children master gender-marking suffixes give support to Slobin's claim (1985). Slobin argued that the acquisition of gender marking system depends in a high degree on the nature of the language. Therefore, children who are learning systems with three genders, and with ambiguous, barely transparent and scarcely predictable morphological markings appear to learn later than

those children learning languages with two genders, and with clearly differentiated and systematic marking of gender. Greek children although acquire and use very early the gender system, they have problems with morphological markings. This is due to different categories of noun inflections and the overlapping of cases.

From the analysis of the results, it appeared that children take into account and process morphological, syntactical and semantic information but with different salient. As it was expected older children performed better than younger. The mean age at the group of young was six years old; Theophanopoulou-Kontou (1973) found that the adult system is not fully mastered by the age of 6;6, therefore it was expected and proved that the younger group will not perform as good as the older in all conditions and especially in the condition of morphological information. Similar results had all the experimental and longitudinal studies on gender acquisition in other languages and in relevant studies to Greek.

Young children face problems with articles and they do not pay much attention to semantic information, as do older children (Karmiloff-Smith, 1979). It is also important that the older children use better the language and they do less mistakes, it is always possible to consider a response as a mistake not because the child do not know the gender of the noun but because he/she cannot express properly his/her knowledge. This possibility is not impossible in Greek (Theophanopoulou-Kontou, 1973). Restricted experience with language and ensuing limits of inflectional knowledge are most likely to become evident when, in an experimental situation, learners are obliged to express a given category of a given noun. However, the strain of such situation may also cause artificial linguistic behaviour. Thus, Theophanopoulou-Kontou (1973) found that, in the picture test she administered, some children created inflectional forms by analogy or "overgeneralization," whereas the same children used standard forms in free conversation with her.

Regarding the relevant importance of clues, the results of the present study indicate that children pay far more attention to intralinguistic clues (morphology and syntax) than to extralinguistic (semantics). These findings seem to oppose the natural gender theory (Mulford, 1985). It is clear that Greek children not only make more use of intralinguistic elements but they face problems with extralinguistic clues. They do not use semantic

information as a reliable factor and because of this; they make mistakes by ignoring this type of information. Therefore the outcome of this study supports the theoretical position that considers that gender is a phenomenon of the linguistic system. Relevant results revealed studies in different languages such as Spanish, French, Hebrew, Russian, Czechoslovakian (Perez-Pereira, 1991), (Karmiloff-Smith, 1979), (Levy, 1983 b), (Popova 1973), (Henzl, 1975).

The results of this experimental study revealed that Greek children rely more on syntactic clues than to morphological ones from the age of five years old. Perez-Pereira (1991) found that this is observed also in Spanish children, even though Spanish nouns present less variety of gender suffixes for nouns and adjectives than in Greek where there are many exceptions and types of inflections. Karmiloff-Smith (1979) found that the same predominance of semantic clues exists in French; the difference only exists on earlier ages. In French children, there is a developmental trend towards an increasing importance of the determiner while that of the word ending is decreasing. This case seems to exist also in the case of Greek children but not so clearly observational data (Stephany, 1997) suggest that gender is first marked on the noun ending in the earlier stage of inflectional development; children do not rely on the determiner for distributing gender. This study has not participants from small ages, therefore it is difficult to discuss any similarities or differences with these studies, although these longitudinal studies have methodological problems and they did not clearly and experimentally examined the relevance importance between syntactic and morphological information. This tendency of Greek children toward syntactic information could easily be explained by the nature of Greek gender system. There are exceptions in noun endings and overlapping cases, therefore morphology is not an exclusive factor for the noun gender distinction as it is the syntax, also despite the frequent exceptions to the phonological rules, there are patterns in the exceptions since they co-occur with other gender marked words. Older children know that there are exceptions, they are in some extend familiar with these and because of this they tend to use more reliable factors such as syntactic information (e.g. article). Young children especially before the age of 6;5 have not fully mastered the adult inflectional system (Theophanopoulou-Kontou, 1973), also they tend to use an avoidance strategies in cases where they face problems with noun endings

(Mackridge, 1985), in other words they use survival techniques using reliable and well mastered elements of the language. The combination of those two findings can easily explain this tendency toward syntactic information.

The quantitative analysis of this study revealed that there is significance difference between the two levels of gender variation (masculine and Feminine) only in the condition of morphological information. This indicates that natural gender theory cannot explain how children recognize the gender of a noun. It is mostly a matter of the characteristics of the language.

The statistical analysis of the errors in the condition of morphological information with feminine gender revealed that when older children make a mistake concerning gender attribution, they tend to attribute masculine gender to nouns more often something that does not happen with younger children (57.7% of the wrong attributed nouns at the group of older were attributed as masculine nouns, this percentage for the young children is 18.9%). Older children tend to perceive wrongly the suffix of the feminine noun as a suffix typical for masculine. Therefore they produced adjectives, which could co-occur with the specific noun (they do not violate rules of gender agreement) but not in the specific context. On the other hand when young children make a mistake concerning gender attribution, they tend to attribute neuter gender to nouns more often than older children. The suffix "- α " of the singular nominative case of the feminine nouns is the same with the plural nominative case of the neuter. Therefore old children are aware that at any case the adjective should agree in gender and case with the noun and they do use this rule even when this conflict with syntactical rules. They follow the linguistic rules even when the sentences they produce have no meaning. On the other hand young children do not use the rule of agreement. This might happens because they do not have yet mastered the adults' inflectional system (Theophanopoulou-Kontou, 1973).

Conclusion

Generally the results of the present study indicate that Greek children rely on intralinguistic clues (syntax and morphology) than extralinguistic information (semantics) to recognize the gender of the noun and to establish gender agreement. The relevant importance of the clues is syntax > morphology > semantics (starting from the most important). This predominance of the intralinguistic information and especially the syntactic

clues seems to exist from early on and continue latter. Features such as regularities, lack of exceptions and reliable information seems to facilitate the early and correct acquisition of the Greek gender system. Natural gender theory cannot explain the results of the present experimental study. It is clear that children pay attention to and work on the linguistic information in their effort to master language. The theoretical position that is defended by Karmiloff-Smith (1983), Perez-Pereira (1991) Levy (1988) et al. seems to give a better explanation about the acquisition of the noun gender system.

The result of the present study may give a clear view of the acquisition of gender but much of the serious foundation-laying for grammatical gender must go on at younger ages, especially between two and four years old. Also it would be very useful to examine the awareness of gender problems, the children's awareness of the differences between phonological, semantic and syntactic clues.

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