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Publisher: Routledge

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Language Acquisition

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/hlac20>

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Accepted author version posted online: 03 Jun 2014. Published online: 17 Oct 2014.

To cite this article: Eirini Sanoudaki & Spyridoula Varlokosta (2014): Task Effects in the Interpretation of Pronouns, *Language Acquisition*, DOI: [10.1080/10489223.2014.928297](https://doi.org/10.1080/10489223.2014.928297)

To link to this article: <http://dx.doi.org/10.1080/10489223.2014.928297>

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Task Effects in the Interpretation of Pronouns

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Children acquiring a range of languages have difficulties in the interpretation of personal pronouns. Ongoing debates in the relevant literature concern the extent to which different pronoun types are subject to this phenomenon, as well as the role of methodology in relevant research. In this study, we use two different experimental tasks to examine the interpretation of pronominal elements in Greek, a language that has both strong pronouns and pronominal clitics. Results reveal a complete absence of problems in the interpretation of clitics irrespective of task. However, there were task effects in the comprehension of strong pronouns in both children and adults. Findings indicate that the phenomenon is intrinsically linked to the properties of the elements in question. Analysis of the task effects highlights how different methodological manipulations can shed light on different properties of the elements studied.

1. INTRODUCTION

The interpretation of pronouns in typical and atypical populations has been the subject of extensive experimentation and intense debate in the last few decades, starting as early as the eighties (e.g., Jakubowicz 1984; Solan 1987; Wexler & Chien 1985) and continuing up to now (e.g., Baauw et al. 2011; Conroy et al. 2009; Elbourne, 2005, 2008). The crux of the matter has been the observed cross-linguistic difficulties in the interpretation of personal pronouns by typically developing children. Specifically, typically developing children up to around the age of 6 sometimes interpret personal pronouns reflexively in a variety of languages (Avrutin & Wexler 1992; Baauw 1999; Chien & Wexler 1990; McDaniel, Cairns & Hsu 1990; Philip & Coopmans 1996; Thornton 1990, among others). For example, children sometimes interpret a sentence such as (1) as *The princess is painting herself*. The phenomenon has been called the Delay of Principle B Effect (DPBE), and more recently, the Pronoun Interpretation Problem (PIP; Baauw et al. 2011).

(1) PIP context:

The princess is painting her.

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However, numerous studies on the acquisition of pronouns have provided results that appear to be inconsistent with each other (for detailed listings of studies and results see Conroy et al. 2009). Following decades of research and dozens of relevant studies, the possibility that experimental design and choice of experimental materials and tasks may radically affect the results has become prominent, and methodology in the study of pronouns is now the subject of fierce debate (e.g., Baauw et al. 2011; Conroy et al. 2009; Elbourne 2008; Hartman, Sudo & Wexler 2012). In this disagreement, two factors affecting children's performance in relevant tasks emerge: (a) pragmatic/task considerations (Conroy et al. 2009); and (b) the type of elements tested, with pronominal clitics possibly being exempt from the PIP (Hartman, Sudo & Wexler 2012).

In this study, we aim to explore the interplay of these factors by examining the interpretation of pronominal elements by Greek-speaking children and adults. The choice of language is based on the fact that the few published studies examining the acquisition of Greek pronominal elements have revealed unexpected patterns in the interpretation of these elements (Varlokosta, 2000, 2001a, 2002). We will argue that some of these patterns are linked to the categorical status and properties of the pronominal elements tested. By performing different methodological manipulations, we seek to unravel these patterns, while contributing to the ongoing debate on pronoun interpretation.

1.1. The PIP

The PIP, whereby children interpret object pronouns reflexively, has been shown to be active in a variety of languages, including English (Chien & Wexler 1990), Russian (Avrutin & Wexler 1992), Dutch (Philip & Coopmans 1996), Icelandic (Sigurjónsdóttir & Hyams 1992), etc. Even though the phenomenon was widely known for a long period of time as the Delay of Principle B Effect, it has not been attributed to children's lack of knowledge of Principle B of Binding Theory (Chomsky 1981, 1986), the identification of object pronouns with local c-commanding antecedents constituting only an apparent violation of the Principle.

However, results provided by different experimental studies testing pronoun interpretation in typically developing children show considerable inconsistency, with the acceptance rate of the anaphoric interpretation differing greatly across studies (for a detailed list of studies and corresponding percentages see Conroy et al. 2009).

The acceptance of the anaphoric interpretation in children has been linked to the fact that local coreference is possible in adult language, in specific contexts, such as (2).

- (2) Everyone loves Christopher. John loves him, Mary loves him, even Christopher loves him.

The link between cases of local coreference in adult language and PIP is in line with the theoretical approach that distinguishes pragmatic coreference from syntactic binding: According to Grodzinsky & Reinhart (1993), a pronoun can corefer with a local antecedent if and only if the resulting interpretation would be distinguishable from a structure involving binding (Rule I, Grodzinsky & Reinhart 1993). This is the case in (2) but not in (1), where adults reject the anaphoric reading. The coreference exemplified in (2) is often called local accidental coreference: The pronoun *him* and the noun *Christopher* are not co-indexed in a bound-variable reading, where

the pronoun receives its interpretation from its antecedent (3a), as this would have been ruled out by Principle B. Instead, the pronoun and noun have different indices (3b), and they happen to refer to the same entity.

(3a) Christopher_i loves him_i (bound variable, ruled out by Principle B)

(3b) Christopher_i loves him_k (local accidental coreference)

According to this view, the high percentages of anaphoric interpretations are a consequence of children's problems with the pragmatic rule that regulates coreference.¹

The theoretical account is in line with findings showing that children do not allow anaphoric interpretations of pronouns when the preceding noun is replaced with a quantificational antecedent as in (4) (Chien & Wexler 1990).

(4) Every princess is painting her.

In what has been called "quantificational asymmetry" (Elbourne 2005), while children have difficulties interpreting sentences such as (1), they have no difficulties understanding examples with quantificational antecedents such as (4). The relevance of this finding lies in that local accidental coreference is impossible with quantificational subjects, as quantifiers are not referential, thus supporting the view that children have no difficulties with binding (Principle B) and struggle instead with local accidental coreference.

The link of PIP to local accidental coreference is also supported by findings on children's interpretation of pronominal clitics; relevant studies have shown high percentages of target responses, unlike studies examining stronger types of pronouns. For example, McKee (1992) examined 30 Italian-speaking children on the interpretation of Italian clitics using a TVJ task and reports 85% target responses, in sharp contrast with 18% target responses on the interpretation of strong pronouns by 60 English-speaking children examined in the same study. Similar low percentages of anaphoric interpretations are reported for Spanish (Baauw, Escobar & Philip 1997), French (Hamann, Kowalski & Philip 1997), and Greek clitics (Varlokosta 2000, see section 1.3). This effect has been linked to the fact that local coreference, as in (3b), is impossible for clitics (5b) (Avrutin & Wexler 1992; Conroy et al. 2009). In the following Greek examples, the clitic and noun cannot refer to the same entity—example in (5a) after Varlokosta (2001b).

(5) Local accidental coreference disallowed

- a. O Yanis_i ton_j ide.
the John him_{CL} saw
'John saw him.'

¹Note that there are different views on the type of problems children may have with coreference. An early attempt toward the interpretation of the phenomenon has been the suggestion that children lack a pragmatic principle that regulates local coreference, called Principle P (Chien & Wexler 1990). A related account has attributed the phenomenon to children's processing limitations, which prevent them from applying Rule I (Grodzinsky & Reinhart 1993). According to the latter view, Rule I places a burden on working memory, as it requires the simultaneous examination of two alternative interpretations. For populations with processing limitations, including typically developing children, this results in failure to apply the rule.

- b. Oli agapane ton Petro. O Yanis ton agapai, i Maria ton agapai, akoma ki o Petros ton agapai.
 everyone loves the Peter. John himCL loves, the Mary himCL loves, even the Peter himCL loves
 ‘Everyone loves Peter. John loves him, Mary loves him, even Peter loves him.’

Several related theoretical accounts of this observation have been proposed (e.g., clitics need to establish a dependency with an antecedent through coindexation, as they are referentially dependent, i.e., they cannot refer deictically, Avrutin & Wexler 1992; or that they need to be bound in order to achieve specification for the feature [human], Baauw et al. 1997), but most accounts have in common the position that the asymmetry between pronouns and clitics is linked to clitics being subject to binding² and not to coreference (compare to McKee 1992).

Another factor that can be seen to affect results in experimental studies on pronoun acquisition is experimental task and design. Already in early studies on the subject in the nineties, the importance of experimental design was detected, and a number of conditions relevant studies should meet were suggested (Crain & Thornton 1998). This was later systematically examined, with relevant controlled studies eliciting different percentages of target responses depending on the task employed (Baauw et al. 2011) or on the methodological manipulations within the same task (Conroy et al. 2009). For example, Baauw et al. (2011) examined 20 Dutch-speaking children aged 4;11 to 6;0 on their interpretation of pronouns using two different tasks (Truth Value Judgment [TVJ] task and Picture Selection [PS] task) and found a significant effect of task, such that children performed better when a PS task was used. Conroy et al. (2009) tested three groups of English-speaking children in three separate experiments using different versions of a TVJ task with stories; even though results of the three experiments are not directly comparable, findings indicate that changes in the story may affect children’s performance, as the quantificational asymmetry appeared in only one of the three experiments.

1.2. Greek Pronouns

Greek is one of the languages that display two types of pronouns, one being strong—example 6—and one being deficient—pronominal clitic, example 7.

- (6) O Gufi skepase afton.³
 the Goofy covered himPRON
 ‘Goofy covered him.’
- (7) O Gufi ton skepase.
 the Goofy himCL covered
 ‘Goofy covered him.’
 (examples after Varlokosta, 2000).

The two pronoun types differ in a number of ways (see Mavrogiorgos 2010; Varlokosta 2002), which fit the cross-linguistically observed strong/deficient pronoun distinction (Cardinaletti &

²Note that clitics can also be bound in discourse (not only in syntax; see Baauw et al. 1997).

³Greek examples are not given in strict phonetic or phonemic transcription; they are loosely transcribed to the extent that serves the purposes of the present study.

Starke 1999a). For example, morphologically, deficient pronouns are reduced forms of strong pronouns (*ton* versus *afton*). Moreover, of the two, only strong pronouns can occupy peripheral positions (8, 9) (examples after Varlokosta 2002):

- (8) Ine *ton/ afton/ ton Yani pu thavmazo. (cleft)
 is himCL/himPRON/the John that admire-1Sg
 'It is him/John I admire.'
- (9) *Tin/ aftin/ ti Maria, tha tin do. (left dislocation)
 herCL/herPRON/the Mary will herCL see-1Sg
 'I will see her/Mary.'

In terms of coreference, Greek clitics follow the cross-linguistic pattern of disallowing coreference of the type discussed in section 1.1 (see example 5) (Varlokosta 2001b, 2002). Interestingly, Greek strong pronouns, like clitics cross-linguistically, and unlike pronouns in other languages, also disallow local accidental coreference.⁴ In the example (10), the pronoun and noun cannot refer to the same entity (example after Varlokosta 2001b).

- (10) Local accidental coreference disallowed
 O Yanis_i ide afton_j.
 the John saw himPRON
 'John saw him.'

Moreover, whenever a clitic is possible, a strong pronoun cannot be selected in the same context, as is cross-linguistically the case (Cardinaletti & Starke 1999a). For instance, the use of the strong pronoun in (6) would not be felicitous in the same context as (7), which allows the use of a pronominal clitic. For (6) to be felicitous, a different context would be required (e.g., discourse requiring contrastive use of pronoun). This observation has been formalized in Cardinaletti and Starke's (1999a) pronoun minimality principle: If a language has stronger and weaker types of pronouns, then the most deficient form must be chosen if it can be chosen.

1.3. The (Absence of) PIP in Greek

Existing studies on the acquisition of Greek pronominal elements indicate that Greek does not participate in the PIP (Varlokosta 2000, 2001a, 2002). Greek-speaking typically developing

⁴This observation has been linked to an important additional property that sets Greek strong pronouns apart from typical strong pronouns (in addition to resistance to local accidental coreference). Greek strong pronouns can refer to nonhuman entities (Varlokosta 2000), despite a robust cross-linguistic generalization (Cardinaletti & Starke 1999b) that strong pronouns cannot have nonhuman referents. The only exceptions to this cross-linguistic generalization, including Greek *afton*, have demonstrative morphology (Cardinaletti & Starke 1999b). These properties give Greek *afton* membership to a special pronoun category, which consists of demonstrative pronouns that follow Principle B (B-demonstratives; Cardinaletti & Starke 1999b). According to Cardinaletti & Starke (1999b), a language may have a demonstrative pronoun following Principle B instead of Principle C, if there is no corresponding personal pronoun in the language in question. These elements are used as strong pronouns (i.e., in contexts requiring strong pronouns), can take nonhuman referents, and resist local accidental coreference. (Note that we continue referring to the element *afton* as a strong pronoun throughout the article, to avoid confusion.)

children do not allow an anaphoric interpretation of pronominal clitics, thus, following the cross-linguistically observed pattern.⁵ Moreover, children do not appear to have problems in the interpretation of Greek strong pronouns either (Varlokosta 2000, 2002). Results similar to those reported in Varlokosta (2000, 2002) are reported in other studies of (bilingual) typically developing Greek-speaking children (Sanoudaki 2004; Varlokosta & Dullaart 2001).

The absence of PIP in Greek clitics and strong pronouns has been linked to the ban on local accidental coreference with these elements, presented in section 1.2. (Varlokosta 2001b, 2002).

It has also been suggested that the fact that the experimental design in Varlokosta (2000) is one that better satisfies crucial experimental assumptions may have contributed to higher percentages of target responses in this study (Conroy et al. 2009). Varlokosta (2000) used a dynamic TVJ task, where the experimenter uses toys to act out a story before the child is invited to judge the truth value of a target sentence. As demonstrated by Conroy et al. (2009), the storyline is crucial in designing felicitous contexts for truth value judgments: Both interpretations (anaphoric and deictic) must be considered at some point in the story, and context must ensure the accessibility of antecedents/referents. Failure to meet these requirements may be the reason behind PIP-type findings (Conroy et al. 2009). As Varlokosta (2000) is one of the studies that satisfied these assumptions, Conroy and colleagues suggest that children's improved performance in Greek elements may be due to the design of the study in question (although they also note that clitics may be immune to the PIP cross-linguistically).

Experimental findings regarding Greek strong pronouns are unexpected for a further reason: Strong pronouns were tested and accepted by children in contexts where they were infelicitous. Recall that strong pronoun cannot be used if a clitic can be used in the same context (section 2.1.). The contexts where the Greek strong pronoun was used in Varlokosta (2000) and other similar studies (Sanoudaki 2004; Varlokosta & Dullaart 2001), were contexts where a pronominal clitic would have been possible (see examples 6 and 7). Note that in Varlokosta (2000) strong pronouns were also tested and accepted by children as appropriate in contexts where a clitic would not be allowed, as in (11) (strong pronoun as complement of a preposition).

- (11) O Gufi agorase se afton ena vivlio.
 the Goofy bought to himPRON a book
 'Goofy bought him a book.'
 (example after Varlokosta, 2000)

However, for examples 6 and 7, in all the previous studies, the context against which test sentences were judged was identical for the strong pronoun condition and the clitic condition. Consequently, results reveal that children accepted as true sentences containing strong pronouns in positions where a clitic should have been selected instead.

⁵It is worth pointing out that several studies examining atypical Greek-speaking populations, such as children with Specific Language Impairment, have shown that the comprehension and production of these elements tend to pose difficulties to these populations (e.g., Chondrogianni, Marinis & Edwards 2010; Stavrakaki & van der Lely 2010; Tsimpli & Stavrakaki 1999; but see Manika, Varlokosta & Wexler 2011; Varlokosta 2002; Varlokosta, Konstantzou & Nerantzini 2014; Varlokosta & Nerantzini 2012, for opposite findings). This is in contrast with findings in other languages showing that although the production of these items in children with Specific Language Impairment is problematic, their comprehension is well preserved (e.g., French: Jakubowicz et al. 1998).

These results are in line with the concept of “pragmatic tolerance” in language acquisition. A range of studies examining informativeness and implicature using versions of the TVJ task (e.g., Guasti et al. 2005; Katsos & Bishop 2011) have shown that children are tolerant of pragmatic infelicity, accepting as correct sentences that are not felicitous. For example, children tend to accept underinformative sentences as correct: e.g., “He picked up some carrots” when the protagonist had picked up all of the carrots (Katsos & Bishop 2011).

A question that arises then is whether children in Varlokosta (2000) accepted the infelicitous sentences as true because they do not detect the pragmatic infelicity or whether they detect the infelicity but, for some reason, choose to treat infelicitous sentences as “true.” One way to examine this is the use of a different task to examine the interpretation of these infelicitous sentences, such as the PS task. In this task, children are presented with a sentence and asked to make a choice between two pictures, in this case one consistent with a deictic interpretation and one consistent with an anaphoric interpretation. If children cannot detect the pragmatic violation, then they would consistently choose a picture involving a deictic interpretation for the infelicitous strong pronoun sentences. If, on the other hand, children are able to detect the pragmatic violation, we may find inconsistency in the responses, as children would be forced to make a choice when neither picture would be optimal as a response.

The present study aims at addressing these questions by examining the interpretation of pronominal elements in Greek-speaking children and adults. Two experiments are reported here: First, a picture TVJ task is administered to children and adults. Second, a different group of children and adults are tested using a PS task.

The version of the TVJ task used in this study will be a picture-based paradigm, unlike Varlokosta’s (2000) dynamic story-based TVJ task. This will allow us to better address the question of whether clitics are indeed immune to the PIP, or the results in Varlokosta (2000) are partly due to the storyline better satisfying experimental assumptions, a suggestion made in passing by Conroy et al. (2009). Unlike the dynamic TVJ task, where the context against which sentences will be judged is actively manipulated by the researcher, the picture TVJ task creates minimal context, as the only context provided are the pictures.

The two experiments serve a dual purpose: first, to examine the acquisition of pronouns by Greek-speaking children, and second, to investigate the processing of the pragmatic infelicity in Greek-speaking children and adults when different tasks are employed. By employing two different tasks in the examination of pronouns and clitics in Greek child language, we seek to examine if both Greek clitics and pronouns will elicit high percentages of target responses, as has been the case with familiar tasks, or, alternatively, whether the cross-linguistic asymmetry between clitics and strong pronouns in child language will be detected. Specifically, if Greek strong pronouns indeed pattern with clitics in that they are both resistant to the PIP, then there should be no asymmetry between clitics and strong pronouns in Greek child language irrespective of task—we will be referring to this as the *no-asymmetry hypothesis*. Alternatively, if children performed well with Greek pronouns in Varlokosta (2000) only because experimental assumptions of the (TVJ) task were met, then the cross-linguistically familiar asymmetry between clitics and strong pronouns in child language (i.e., children experiencing problems with strong pronouns but not clitics) may appear—this will be called the *asymmetry hypothesis*. Moreover, the infelicity in strong pronoun conditions is explored by examining adult and child participants in both tasks (TVJ and PS task). As outlined earlier, the use of two separate tasks may allow us to establish whether children are able to detect the pragmatic violation or not, and if so, to detect

different strategies in the processing of infelicity. The two tasks will be described in detail in the methodology sections. Adult performance will serve as the basis for the interpretation of child performance.

2. EXPERIMENT 1

2.1. Participants

Twenty monolingual Greek children (eight boys, 12 girls; age range 4;02–6;01, mean age 5;03) were tested in two nurseries in Athens. All children were reported by school staff as having normal linguistic and cognitive development and no hearing difficulties or learning disabilities.

Ten Greek-speaking adults (six male, four female; age range 22–65) were also tested in this experiment. Adult participants had been brought up in a monolingual Greek environment in the island of Crete and had no symptoms or history of language impairment or learning disabilities.

2.2. Design and Materials

A picture TVJ task (Wexler & Chien 1985) was used in this study. In this task, participants are asked to judge whether a statement is true, based on accompanying picture stimuli.⁶ Conditions and number of trials in the present experiment were based on Varlokosta (2000), which employed a dynamic TVJ task to test typically developing Greek-speaking children. Visual stimulus consisted of a picture depicting a person performing an action on oneself in the presence of another person (Figure 1) or on the other person (Figure 2). The stimuli were based on materials developed within COST (European Cooperation in Science and Technology) Action A33

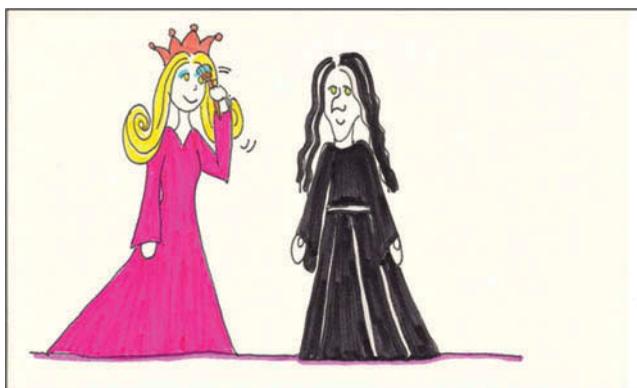


FIGURE 1 Example of the picture stimuli (pictures developed within COST A33).

⁶This experimental paradigm is also known as *picture verification task* (Conroy et al. 2009).



FIGURE 2 Example of the picture stimuli (pictures developed within COST A33).

“Cross-linguistically Robust Stages of Children’s Linguistic Performance” (COST Action A33; Zentrum für Allgemeine Sprachwissenschaft n.d.).

There were two test conditions (i.e., target answer *no*): one for clitics, and one for strong pronouns. For every test condition there was a corresponding control condition (target answer *yes*). An additional condition involving reflexive pronouns was included but is not reported here. There were four trials for each test and control condition. Four verbs were used: *pleno* ‘wash,’ *chtenizo* ‘comb,’ *vafo* ‘paint,’ and *ylifo* ‘lick.’ Each of the four verbs was presented in all experimental conditions. In addition, a filler condition involving nouns only was included (target answer *no*, six trials; target answer *yes*, six trials). Sentences were arranged in two different orders. The first order was randomized, while the second one was the reverse. Presentation order was counterbalanced between participants. Two warm-up items were also included to familiarize participants with the procedure. Examples of the test and control conditions are given in Tables 1 and 2 respectively. The complete list of stimuli can be found in Appendix 1.

Each test sentence was preceded by an introductory sentence, presenting the two characters. The first character in the introductory sentence was the one performing the action shown in the picture stimuli and described in the test sentence. For example:

TABLE 1
Test Conditions (Target Answer *no*)

Condition	No. of Trials	Example
CL	4	I prigipisa ti vafi. the princess herCL is painting ‘The princess is painting her.’
PRON	4	O skilos ylifi afton. the dog is licking himPRON ‘The dog is licking it/him.’

TABLE 2
Control Conditions (Target Answer *yes*)

<i>Condition</i>	<i>No. of Trials</i>	<i>Example</i>
CL	4	I mama tin pleni. the mom herCL is washing 'Mom is washing her.'
PRON	4	O nanos chtenizi afton. the dwarf is combing himPRON 'The dwarf is combing him.'

(12a) Introductory sentence

Edo vlepume mia kamilopardali ke mia ajelada.
here we see a giraffe and a cow
'Here we see a giraffe and a cow.'

(12b) Test sentence

I kamilopardali ti ylifi.
the giraffe herCL is licking
'The giraffe is licking it/her.'

2.3. Procedure

The experimenter first spent some time with the children in their classroom or in the schoolyard, so as to become familiar to them. Then each child was tested individually in a quiet room. Children were then presented with the experimental task. The linguistic and the picture stimuli were presented simultaneously.

During practice, participants were encouraged to look at the picture while listening to the sentence and answer *yes* or *no*. Following practice, instructions were not repeated unless the child did not point to either picture. In such cases, the same trial, including instructions, was repeated. The picture stimuli were presented on a 15.6" computer screen, and the sentences were read aloud with neutral prosody by the experimenter. The task was completed in one session, with short breaks of spontaneous discussion and playing in between, as and when needed. Child participants were tested in a quiet room in their school and adults in their home.

2.4. Results

Percentages of target responses for the child group are given in Figure 3, and for adults in Figure 4. As can be seen, performance was generally high in all conditions. In the child group, percentages of target responses on the clitic conditions were 100% (control) and 90% (test), and on the pronoun conditions 91% (control) and 79% (test). In the adult group, percentages of target responses

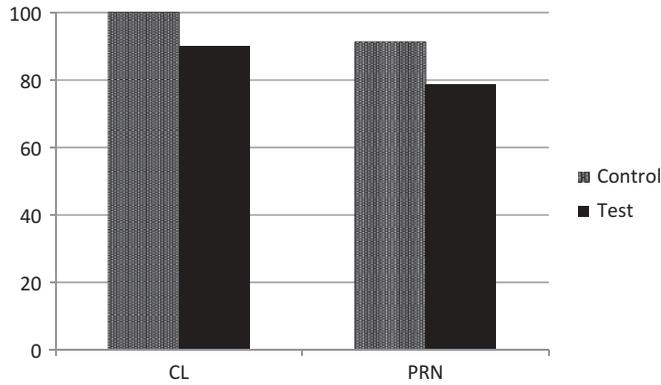


FIGURE 3 Percentage of target responses on each of the control and test conditions: clitic (CL) and strong pronoun (PRON). Child group.

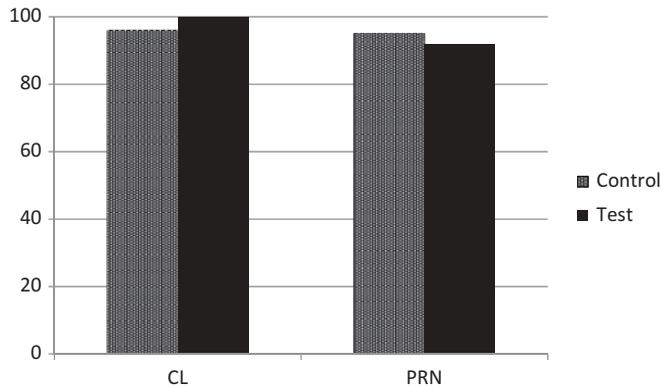


FIGURE 4 Percentage of target responses on each of the control and test conditions: clitic (CL) and strong pronoun (PRON). Adult group.

on the clitic conditions were 96% (control) and 100% (test), and on the pronoun conditions 95% (control) and 92% (test).⁷

Statistical analysis of the child data showed no significant difference between test and control conditions for clitics ($z = 2.271$, $p = .023$, $r = 0.359$) and for strong pronouns ($z = 1.533$, $p = .125$, $r = 0.242$), and no difference between clitics and pronouns for control conditions ($z = 2.121$, $p = .034$, $r = 0.335$) and for test conditions ($z = 1.634$, $p = .102$, $r = 0.258$). Wilcoxon signed rank tests, significance level set at $p < .012$ to control for Type I error.

Similarly, for the adult data, all comparisons remained below significance (clitics control versus clitics test ($z = 1.0$, $p = .317$, $r = -0.224$); pronouns control versus pronouns test ($z = .447$, $p = .655$, $r = 0.1$); clitics control versus pronouns control ($z = 0.577$, $p = .564$, $r = 0.129$);

⁷On the reflexive conditions, adults gave target responses 100% of the time (control and test conditions), while the corresponding percentages for the child group were 96% and 99% respectively.

clitics test versus pronouns test ($z = 1.732$, $p = .083$, $r = 0.387$). Wilcoxon signed rank tests, significance level set at $p < .012$.

A between-group analysis showed no statistically significant difference between the child and the adult group in any condition (clitics control $p = .681$; clitics test $p = .198$; pronoun control $p = .812$; pronouns test $p = .422$; Mann-Whitney U test). Overall, no differences were detected in any of the between- and within-group comparisons.

2.5. Interim Discussion

This experiment examined the interpretation of pronominal clitics and strong pronouns in monolingual Greek-speaking children and adults using a picture TVJ task. Children accepted a deictic interpretation and rejected an anaphoric interpretation of clitics and strong pronouns, thus, replicating findings of studies using a dynamic TVJ task with Greek-speaking children (Varlokosta 2000).

The present experiment, by including adults, provided a model against which children's responses could be evaluated, especially with regard to the interpretation of strong pronouns. Similarly to children, adults accepted a deictic interpretation (and rejected an anaphoric interpretation) of strong pronouns. Before attempting to analyze these results and their implications for the existence of infelicity in experimental sentences, we report on a second experiment, which examines the interpretation of pronouns in both children and adults using a task that has not been previously employed to assess strong pronouns in Greek-speaking populations.

3. EXPERIMENT 2

3.1. Participants

Nineteen monolingual Greek children (nine boys, 10 girls; age range 4;05–6;03, mean age 5;04) were tested in this experiment. Four more children were excluded because they did not understand the experimental task or they did not manage to complete the tests. The children were tested in three nurseries in Iraklio, in the Greek island of Crete. All children were reported by school staff as having normal linguistic and cognitive development and no hearing difficulties or learning disabilities. A cut-off point of seven correct responses out of nine in the control condition (see section 3.2) had been predetermined as an additional measure for the selection of child participants. All children who managed to complete the tests satisfied this criterion.

Eighteen adults (13 women, five men; age range 23–67), who had not participated in Experiment 1, were also tested in this experiment. All adult participants were raised in a monolingual Greek environment in Crete and had no symptoms or history of language impairment or learning disabilities.

3.2. Design and Materials

A manual Picture Selection task was used in this study. The PS task has been used to examine children's interpretation of a wide range of (morphosyntactic) contrasts, such as the distinction

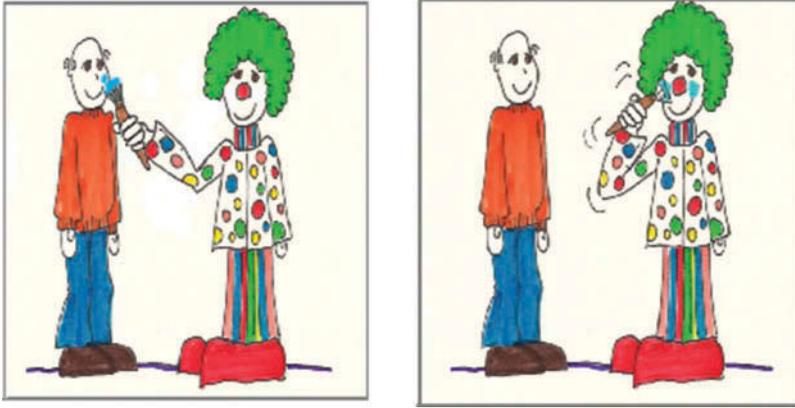


FIGURE 5 Example of the picture stimuli (pictures developed within COST A33).

between affirmative and negative (Fraser, Bellugi & Brown 1963), the use of determiners (Katz, Baker & McNamara 1974), etc. The PS task has also been used in research on binding by Wexler and Chien (1985), Deutsch, Koster & Koster (1986), Baauw et al. (2011), and Varlokosta & Nerantzini (2012).

Participants listened to sentences and were asked to choose one of two pictures for each sentence by pointing to it with their finger. Within each picture pair, one picture depicted a person performing an action on somebody else, while the other picture presented the same person performing the same action on themselves in the presence of the other person (see Figure 5). As in the previous experiment, the stimuli were based on materials developed within COST Action A33.

There were two test conditions: clitic (CL), and strong pronoun (PRON), and one control condition, involving nouns only (CNTRL). Two further conditions involving reflexive pronouns were also included but are not reported here (see Sanoudaki & Varlokosta 2014a, 2014b). There were nine trials for each condition. An example for each condition is given in Table 3.

TABLE 3
Experimental Conditions

<i>Condition</i>	<i>No. of Trials</i>	<i>Example</i>
CL	9	O prigipas ton skepazi. the prince himCL is covering 'The prince is covering him.'
PRON	9	I mama skupizi aftin. the mum is drying herPRON 'Mum is drying her.'
CNTRL	9	I magisa chtenizi ti vasilisa. the witch is combing the queen 'The witch is combing the queen.'

Nine verbs were used: *pleno* ‘wash,’ *chtenizo* ‘comb,’ *vafo* ‘paint,’ *γlifo* ‘lick,’ *skupizo* ‘dry,’ *skepazo* ‘cover,’ *agaliazo* ‘hug,’ *agizo* ‘touch,’ and *zoyraftizo* ‘draw.’ Each of the nine verbs was presented in all test conditions as well as in the control condition. One further verb, *vrecho* ‘soak,’ was used to create two practice items. Five picture fillers were included. The pictures were drawings of novel animals, and they were included to renew the participants’ interest in the task.

As in Experiment 1, sentences were arranged in two different orders. The first randomized order can be seen in Appendix 2. Each test sentence was preceded by an introductory sentence, presenting the two characters, as described for Experiment 1 (section 2.3). For example:

(13a) Introductory sentence

Edo vlepume ena prigipa ki ena nano.
here we see a prince and a dwarf
‘Here we see a prince and a dwarf.’

(13b) Test sentence

O prigipas ton skepazi.
the prince himCL is covering
‘The prince is covering him.’

3.3. Procedure

The picture pairs were shown side by side on a 15.6” computer screen, and the linguistic stimuli were presented by the experimenter with neutral prosody.

During practice, the experimenter asked the participant to “show [her] which picture matches this” (i.e., the sentence). As in Experiment 1, instructions were not given in trials following practice, except for cases when the child did not point to either picture. All remaining aspects of the procedure were identical to those described in section 2.3 for Experiment 1.

3.4. Results

Figure 6 shows the percentage of target responses for the child and adult groups for each condition.

Responses of the child group on the control and clitic conditions were at ceiling (98% and 95% respectively), while the strong pronoun condition presented a lower percentage (74%).⁸ Statistical testing revealed a significant difference between different conditions in children’s performance ($p < .001$; Friedman test). *Post hoc* analysis with Wilcoxon Signed-Rank Tests was conducted with a Bonferroni correction applied, resulting in a significance level set at $p < .017$. Tests showed a statistically significant difference between children’s performance at the control condition and their performance at the strong pronoun condition ($p < .001$), as well as between the clitic and strong pronoun conditions ($p = .002$). A comparison between the control condition and the clitic condition was below significance ($p = .206$).

⁸Responses on the reflexive condition were at ceiling (95% target). In the adult group, the percentage for reflexives was 100%.

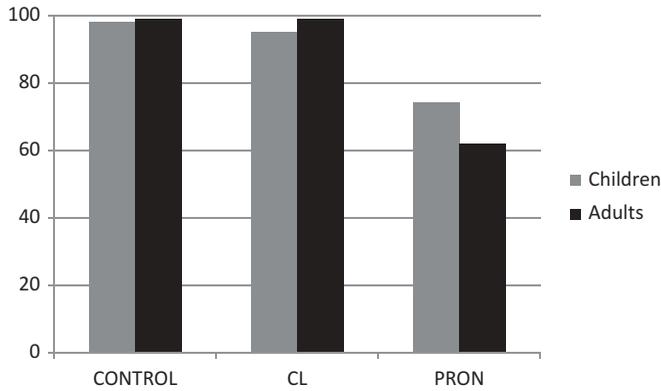


FIGURE 6 Percentage of target responses for the child and adult group on each condition: control (CONTROL), clitic (CL), and strong pronoun (PRON).

For the adult group, results reveal almost 100% target responses in all conditions apart from the strong pronoun condition, which had 62% target responses. There was a statistically significant difference between different conditions in adults' performance ($p < .001$; Friedman test). As before, *post hoc* analysis with Wilcoxon Signed-Rank Tests was conducted with a Bonferroni correction applied, resulting in a significance level set at $p < .017$. The strong pronoun condition differed significantly from both remaining conditions (control versus strong pronoun $p = .001$, clitic versus strong pronoun $p = .001$), while the comparison between the control condition and clitic condition was not significant ($p = 1$).

Finally, in a comparison between children's and adults' performance, using a Mann-Whitney U test, no statistically significant difference was detected in any of the conditions tested.

Overall, testing confirmed that children's performance was lower at the strong pronoun condition, while it did not differ from adult performance, which was also low at the strong pronoun condition.

4. DISCUSSION

Our findings show that Greek pronouns are not subject to PIP. Greek-speaking children respond in an adultlike fashion in tests examining their interpretation of both strong pronouns and pronominal clitics. Moreover, experimental manipulations did not seem to influence children's adultlike behavior, as children consistently gave adultlike responses irrespective of the experimental task employed.

However, our experimental results indicated that children as well as adults often assign an anaphoric reading to the strong pronoun when a PS task is employed (Experiment 2). This was not the case in the picture TVJ task (Experiment 1), when either children or adults are tested, as both populations accepted only a deictic interpretation for the strong pronoun.

Note that the detected difference between Greek clitics and pronouns cannot be linked to the clitic-pronoun asymmetry hypothesis in language acquisition. According to the asymmetry

hypothesis, children have difficulties in establishing the adult interpretation for strong pronouns (but not clitics), occasionally interpreting them as reflexive elements. In contrast, our results indicate that children have adultlike interpretations for both elements, following adults in occasionally assigning anaphoric interpretations to strong pronouns when tested with a PS task. Consequently, the results of Experiment 2 (PS task) cannot be straightforwardly employed to support either hypothesis on the relationship between clitics and pronouns in child language (asymmetry or no asymmetry).

The asymmetry between clitics and strong pronouns detected in both child and adult groups is linked instead to the infelicity of strong pronoun sentences and reveals different effects of infelicity on performance depending on the task. Recall (section 1.3) that experimental sentences containing Greek strong pronouns employed in the acquisition literature are infelicitous. A pronominal clitic could, and thus should, be used in the relevant context, instead of the strong pronoun. The sentences in question contain a minimality principle violation (Cardinaletti & Starke 1999b). Our experimental results indicate that this violation influences performance in both children and adults when a PS task is used, but not when a picture TVJ task is used.

The failure to detect any effect of the minimality violation in the results of the picture TVJ task is in line with findings from the field of experimental pragmatics showing tolerance to pragmatic infelicity when a TVJ task is used (Katsos & Bishop 2011, see section 1.3).⁹ It appears that participants in the TVJ task simply assign a Principle B abiding (i.e., deictic) interpretation to strong pronoun sentences and evaluate this against the events (or picture), accepting the sentence as true (or rejecting this as false), depending on the picture, irrespective of any minimality violations.

In contrast, in the PS task, responses appear to violate Principle B around one-third of the time. We argue that this violation of the syntactic principle is only apparent, indicating instead a strategy applied to resolve a conflict between different grammatical requirements. In this task, the two pictures presented forced participants to consider two alternative interpretations for the sentence, one anaphoric and one deictic. We suggest that participants, facing a choice between two interpretations, one violating Principle B (anaphoric interpretation) and the other violating pronoun minimality (deictic interpretation), followed one of the following two strategies. The majority of child and adult participants (74% and 62% respectively) selected the picture consistent with the deictic interpretation, choosing to ignore or amend the violation of minimality by replacing the strong pronoun with a clitic. Several of our adult participants who chose this strategy repeated the test sentence aloud, substituting the clitic for the pronoun, while some performed clitic doubling (14), which would also be allowed in this context.

- (14) O kloun ton vafi ton papu.
 the clown himCL is painting the grandpa
 ‘The clown is painting grandpa.’

Some of the participants chose instead to amend the sentence in a way that allows an anaphoric interpretation, by adding (often aloud, while pointing to the relevant picture) the element *ton idhio*, which allows the sentence to take an anaphoric interpretation.

⁹We are grateful to the anonymous reviewers for their helpful suggestions regarding task differences.

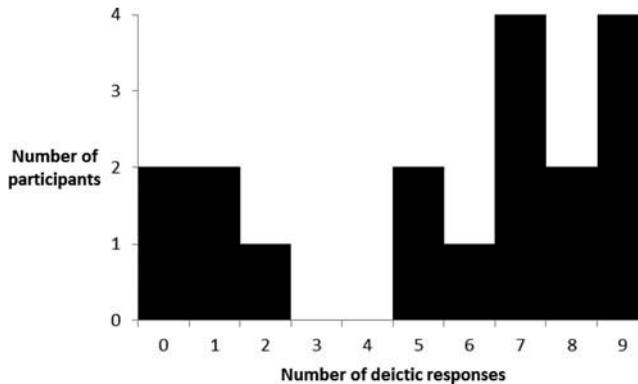


FIGURE 7 Histogram of deictic responses in the strong pronoun condition, PS task, adults.

- (15) O kloun vafi afton ton idhio.
 the clown is painting himPRON the same
 ‘The clown is painting him himself.’

The claim that participants followed two distinct strategies for the resolution of the conflict in the strong pronoun condition is also supported by the distribution of their responses in the relevant condition. The histogram of deictic responses for the adult group (Figure 7), showing how many adults gave one, two, three, etc., nonanaphoric responses, reveals a pattern that resembles a bimodal distribution, rather than a binomial distribution. If participants were answering uniformly and randomly, we would expect to see a binomial distribution with one mode at four or five. What we see instead is a concentration of responses at the two edges (with a preference for the right edge) and a dip at the center, indicating the presence of two distinct groups, one of which prefers the anaphoric interpretation, while the other prefers the deictic one. A similar albeit weaker trend can be observed in the corresponding histogram of the child group (Figure 8). The patterns observed in these histograms are consistent with the existence of two distinct strategies in the participants’ responses.

Note that the suggested analysis involves an extralinguistic strategy applied in order to conform to task demands. It is not suggested here that participants sometimes construct a linguistic representation of the sentence that involves an anaphoric interpretation of the strong pronoun in the experimental sentence, as this is not possible in Greek. Instead, the strategy reflects task pressures to settle in one of two choices when neither is suitable.¹⁰ As this is the first study to reveal such effects, further theoretical and empirical research, including the use of different tasks to test the interpretation of felicitous and infelicitous pronoun sentences, will shed more light on the mechanisms involved.

Our results suggest that children have knowledge of binding and pragmatic conditions of pronoun interpretation. In the pronoun literature, our findings are in line with the increasing awareness that children interpret personal pronouns in an adultlike fashion from very early on:

¹⁰We thank an anonymous reviewer for his input regarding the nature of the mechanisms in question.

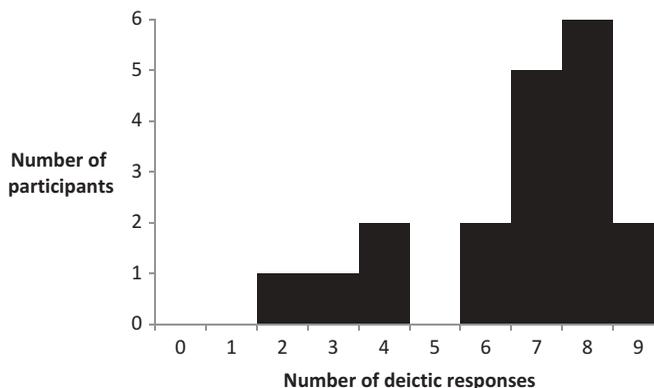


FIGURE 8 Histogram of deictic responses in the strong pronoun condition, PS task, children.

Results of a recent study combining a PS task and online methods (eye-tracking) indicate that children start to identify the correct referent of Dutch pronouns at the age of 4 (Bergmann, Paulus & Fikkert 2012).

It is worth noting here an apparent paradox arising in the juxtaposition of the present study with the pronoun literature, notably the Conroy et al. (2009) results: On the one hand, it is argued here that pragmatic tolerance leads children to accept (otherwise true) infelicitous strong pronoun sentences in TVJ tasks. On the other hand, Conroy et al.'s (2009) analysis holds that the PIP is primarily due to children rejecting (otherwise true) infelicitous sentences (in TVJ tasks). However, we argue that this inconsistency is only superficial: In the latter case the term *infelicity* is mostly linked to insufficient accessibility of relevant antecedents, possibly creating a processing difficulty. In the present case, as in similar studies on informativeness and implicature, no accessibility/processing issue arises (although processing considerations may also be relevant in certain cases in informativeness tasks: Pouscoulous et al. 2007): Infelicity relates to the violation of pragmatic conditions (minimality, in this case), which children (as well as adults) seem to tolerate. The combined results of the two tasks in the present study show that children have sophisticated knowledge of pragmatic conditions. This is in line with recent evidence in the experimental pragmatics literature, showing that children's response to infelicity in tasks testing informativeness and implicature is not due to lack of pragmatic competence (Katsos & Bishop 2011). Evidence for pragmatic tolerance has been found in several studies, examining various aspects of pragmatic infelicity. For example, Robinson & Whittaker (1985) report that children are able to detect ambiguity even though they respond as if they had not detected it. In some cases, children are found to be more tolerant than adults (Guasti et al. 2005), although in the present case children responded in an adultlike fashion.

The present study focused on Greek, but the methodological issues that were raised can be implemented in the study of other languages: For example, future research could seek to replicate findings in relation to minimality violations in other languages that have more than one personal pronoun type. Crucially, future (and existing) studies of the PIP can now be evaluated under a new light. Current findings, and experience from the sophisticated experimental pragmatics

literature, tell us that designs that do not meet all felicity conditions need not be dismissed as flawed: Such tasks are useful in providing information about children's understanding of and access to pragmatic conditions. Manipulations of context and combinations of different tasks can help shed light on how children (and adults) (mis)interpret pronouns and why, even when they have the necessary syntactic and pragmatic competence.

5. CONCLUSION

The present study examined the comprehension of pronouns in Greek-speaking children and adults. In line with cross-linguistic findings, results show that pronominal clitics do not present problems to typically developing children, irrespective of task choice. At the same time, our findings highlight the significance of task selection by revealing that responses in children and adults showed sensitivity to certain properties of the elements tested when one task (PS task) was employed, but less so when a different task (picture TVJ task) was used. These effects were linked to the interplay of experimental task with infelicity in pronoun type selected, in the first study to examine strategies in dealing with this type of infelicity.

ACKNOWLEDGMENTS

The authors wish to thank audiences at the GALA2011, ISTAL20, ICGL11, Bangor University, the University of Kent, and St George's, University of London, where parts of these data were presented, for their suggestions. We would also like to thank the children and adults who participated in this study, as well as three anonymous reviewers for their detailed comments.

FUNDING

We acknowledge a research grant from the Greek State Scholarship Foundation (I.K.Y.) awarded to the first author and access to materials developed within COST (European Cooperation in Science and Technology) Action A33 "Cross-Linguistically Robust Stages of Children's Linguistic Performance" (2006–2010).

REFERENCES

- Avrutin, Sergey & Kenneth Wexler. 1992. Development of principle B in Russian: Coindexation at LF and coreference. *Language Acquisition* 2. 259–306.
- Baauw, Sergio. 1999. The role of clitic-full pronoun distinction in the acquisition of pronominal reference. *Proceedings of the 23rd Boston University Conference on Language Development [BUCDL 23]*, 32–43. Somerville, MA: Cascadilla Press.
- Baauw, Sergio, Maria Escobar & William Philip. 1997. A delay of principle B effect in Spanish speaking children: The role of lexical feature acquisition. In Antonella Sorace, Caroline Heycock & Richard Shillcock (eds.), *Proceedings of the GALA 97 Conference on Language Acquisition (Generative Approaches to Language Acquisition)*, 16–21. University of Edinburgh.

- Baauw, Sergio, Shalom Zuckerman, Esther Ruigendijk & Sergey Avrutin. 2011. Principle B delays as a processing problem: Evidence from task effects. In Angela Grimm, Anja Muller, Cornelia Hamann & Esther Ruigendijk (eds.), *Production-comprehension asymmetries in child language*, 247–272. Berlin: Mouton De Gruyter.
- Bergmann, Christina, Markus Paulus & Paula Fikkert. 2012. Preschoolers' comprehension of pronouns and reflexives: The impact of the task. *Journal of Child Language* 39. 777–803.
- Cardinaletti, Anna & Michal Starke. 1999a. The typology of structural deficiency: A case study of the three classes of pronouns. In Henk van Riemsdijk (ed.), *Clitics in the languages of Europe*, 145–233. Berlin/New York: Mouton de Gruyter.
- Cardinaletti, Anna & Michal Starke. 1999b. Responses and demonstratives. In Henk van Riemsdijk (ed.), *Clitics in the languages of Europe*, 273–290. Berlin/New York: Mouton de Gruyter.
- Chien, Yu-Chin & Kenneth Wexler. 1990. Children's knowledge of locality conditions in binding as evidence for the modularity of syntax and pragmatics. *Language Acquisition* 1. 225–295.
- Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.
- Chomsky, Noam. 1986. *Knowledge of language: Its nature, origin and use*. New York: Praeger.
- Chondrogianni, Vicky, Theo Marinis & Susan Edwards. 2010. On-line processing of articles and pronouns by Greek successive bilingual children: Similar or different from children with SLI? *Proceedings of 34th Boston University Conference on Language Development [BUCLD 34]*, 78–89. Somerville, MA: Cascadilla Press.
- Conroy, Anastasia, Eri Takahashi, Jeff Lidz & Colin Phillips. 2009. Equal treatment for all antecedents: How children succeed with principle B. *Linguistic Inquiry* 40. 446–486.
- Crain, Stephen & Rosalind Thornton. 1998. *Investigations in Universal Grammar: A guide to experiments on the acquisition of syntax and semantics*. Cambridge, MA: MIT Press.
- Deutsch, Werner, Charlotte Koster & Jan Koster. 1986. What can we learn from children's errors in understanding anaphora? *Linguistics* 24. 203–225.
- Elbourne, Paul. 2005. On the acquisition of principle B. *Linguistic Inquiry* 36. 333–365.
- Elbourne, Paul. 2008. The interpretation of pronouns. *Language and Linguistics Compass* 2. 119–150.
- Fraser, Colin, Ursula Bellugi & Roger Brown. 1963. Control of grammar in imitation, comprehension, and production. *Journal of Verbal Learning and Verbal Behavior* 2. 121–135.
- Grodzinsky, Yosef & Tanya Reinhart. 1993. The innateness of binding and coreference. *Linguistic Inquiry* 24. 69–102.
- Guastrini Maria Teresa, Gennaro Chierchia, Stephen Crain, Francesca Foppolo, Andrea Gualmini & Luisa Meroni. 2005. Why children and adults sometimes (but not always) compute implicatures. *Language and Cognitive Processes* 20. 667–696.
- Hamann, Cornelia, Odette Kowalski & William Philip. 1997. The French "Delay of Principle B Effect." *Proceedings of the 21st Boston University Conference on Language Development [BUCLD 21]*, 205–219, Somerville, MA: Cascadilla Press.
- Hartman, Jeremy, Yasutada Sudo & Ken Wexler. 2012. Principle B and phonologically reduced pronouns in child English. Paper presented at the 5th Generative Approaches to Language Acquisition, North America [GALANA 5], October 11–13, University of Kansas.
- Jakubowicz, Ceila. 1984. On markedness and binding principles. In Charles Jones and Peter Sells (eds.), *Proceedings of North East Linguistic Society [NELS] 14*, 154–182. Amherst: University of Massachusetts.
- Jakubowicz, Celia, Lea Nash, Catherine Rigaut & Gerard Christophe-Loic. 1998. Determiners and clitic pronouns in French-speaking children with SLI. *Language Acquisition* 7. 113–160.
- Katsos, Napoleon & Dorothy Bishop. 2011. Pragmatic tolerance: Implications for the acquisition of informativeness and implicature. *Cognition* 120. 67–81.
- Katz, Nancy, Erica Baker & John Macnamara. 1974. What's in a name? A study of how children learn common and proper names. *Child Development* 45. 469–473.
- Manika, Sophia, Spyridoula Varlokosta & Kenneth Wexler. 2011. The lack of omission of clitics in Greek children with SLI: An experimental study. *Proceedings of the 35th Boston University Conference on Language Development [BUCLD 35]*, 429–437. Somerville, MA: Cascadilla Press.
- Mavrogiorgos, Marios. 2010. *Clitics in Greek. A minimalist account of proclisis and enclisis*. Amsterdam: Benjamins.
- McDaniel, Dana, Helen Smith Cairns & Jennifer Ryan Hsu. 1990. Binding principles in the grammar of young children. *Language Acquisition* 1. 121–139.
- McKee, Cecile. 1992. A comparison of pronouns and anaphors in Italian and English acquisition. *Language Acquisition* 2. 21–54.

- Philip, William & Peter Coopmans. 1996. The double Dutch delay of principle B effect. *Proceedings of the 20th Boston University Conference on Language Development [BUCLD 20]*, 629–642. Somerville MA: Cascadilla Press.
- Pouscoulous, Nausicaa, Ira Noveck, Guy Politzer & Anne Bastide. 2007. A developmental investigation of processing costs in implicature production. *Language Acquisition* 14. 347–376.
- Robinson, Elizabeth & Steve Whittaker. 1985. Children's responses to ambiguous messages and their understanding of ambiguity. *Developmental Psychology* 21. 446–454.
- Sanoudaki, Eirini. 2004. Αλληλεπίδραση κατά τη δίγλωσση κατάκτηση μητρικής γλώσσας: η περίπτωση των ανωνυμικών συστημάτων Ελληνικής - Αγγλικής. [Bilingual first language acquisition: On the acquisition of pronominal reference by Greek-English bilingual children.] *Proceedings of the 6th International Conference of Greek Linguistics [ICGL]*. University of Crete.
- Sanoudaki, Eirini & Spyridoula Varlokosta. 2014a. Pronoun comprehension in individuals with Down syndrome: Deviance or delay? *Journal of Speech, Language and Hearing Research* 59. 1442–1452.
- Sanoudaki, Eirini & Spyridoula Varlokosta. 2014b. Pronoun comprehension in individuals with Down syndrome: The role of age. *International Journal of Language and Communication Disorders*.
- Sigurjónsdóttir, Sigga & Nina Hyams. 1992. Reflexivization and logophoricity: Evidence from the acquisition of Icelandic. *Language Acquisition* 2. 359–413.
- Solan, Lawrence. 1987. Parameter setting and the development of pronouns and reflexives. In Thomas Roeper & Edwin Williams (eds.), *Parameter setting*, 189–210. Dordrecht: Reidel.
- Stavarakaki, Stavroula & Heather van der Lely. 2010. Production and comprehension of pronouns by Greek children with specific language impairment. *British Journal of Developmental Psychology* 28. 189–216.
- Thornton, Rosalind. 1990. *Adventures in long-distance moving: The acquisition of complex wh-questions*. Storrs, CT: University of Connecticut dissertation.
- Tsimpli, Ianthi Maria & Stavroula Stavarakaki. 1999. The effects of a morphosyntactic deficit in the determiner system: The case of a Greek SLI child. *Lingua* 108. 31–85.
- Varlokosta, Spyridoula. 2000. Lack of clitic pronoun distinctions in the acquisition of principle B in child Greek. *Proceedings of the 24th Boston University Conference on Language Development [BUCLD 24]*, 738–748. Somerville, MA: Cascadilla Press.
- Varlokosta, Spyridoula. 2001a. On the acquisition of pronominal and reflexive reference in child Greek. In Margareta Almgreen, Andoni Barreña, María-José Ezeizabarrena, Itziar Idiazabal & Brian MacWhinney (eds.), *Research on Child Language Acquisition*, 1383–1400. Somerville, MA: Cascadilla Press.
- Varlokosta, Spyridoula. 2001b. Typology of pronouns and the DPBE in child Greek. Ms. University of Reading.
- Varlokosta, Spyridoula. 2002. (A)symmetries in the acquisition of principle B in typically-developing and specifically language impaired (SLI) children. In Ingeborg Lasser (ed.), *The process of language acquisition*, 81–98. Berlin: Peter Lang Verlag Publishing.
- Varlokosta, Spyridoula & Joanna Dullaart. 2001. The acquisition of pronominal reference by Greek-Dutch bilingual children: Evidence for early grammar differentiation and autonomous development in bilingual first language acquisition. *Proceedings of the 25th Boston University Conference on Language Development [BUCLD 25]*, 780–791. Somerville, MA: Cascadilla Press.
- Varlokosta, Spyridoula, Katerina Konstanidou & Michaela Nerantzini. 2014. On the production of direct object clitics in Greek typical development and specific language impairment: The effect of task selection. In Kleantes K. Grohmann & Theoni Neokleous (eds.), *Developments in the acquisition of clitics*, 188–211. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Varlokosta, Spyridoula & Michaela Nerantzini. 2012. Pronominal and anaphoric reference in Greek specific language impairment. In Zoi Gavrilidou, Ageliki Efthymiou, Evangelia Thomadaki & Penelope Kambakis-Vougiouklis (eds.), *Selected Papers of the 10th International Conference on Greek Linguistics*, 584–591. Komotini: Democritus University of Thrace.
- Wexler, Kenneth & Yu-Chin Chien. 1985. The development of lexical anaphors and pronouns. *Papers and Reports on Child Language Development* 24. 138–149.
- Zentrum für Allgemeine Sprachwissenschaft. n.d. COST A33: *Crosslinguistically robust stages of children's linguistic performance*. Brussels: COST Office. <http://www.zas.gwz-berlin.de/cost.html?andL=0>

Submitted 6 December 2012

Final version accepted 31 March 2014

APPENDIX 1: TRUTH VALUE JUDGMENT TASK-ORDER 1

<i>Linguistic Stimulus</i>	<i>Condition</i>
Warm-up	
Edo vlepume enan elefanda ki enan andra. O elefandas vrehi ton andra. here we see an elephant and a man. the elephant is soaking the man 'Here we see an elephant and a man. The elephant is soaking the man.'	NounControl
Edo vlepume ena mago ki ena papu. O papus pleni ta pjata. here we see a wizard and a grandpa. the grandpa is washing the dishes 'Here we see a wizard and a grandpa. The grandpa is washing the dishes'.	NounTest
Experimental sentences	
Edo vlepume ena skilo ki enan elefanda. O skilos glifi ton eafto tu. here we see a dog and an elephant. the dog is licking himself 'Here we see a dog and an elephant. The dog is licking itself/himself.'	RefControl
Edo vlepume mia mama ke mia jaja. I mama pleni aftin. here we see a mom and a grandma. the mom is washing herPRON 'Here we see a mom and a grandma. The mom is washing her.'	PronControl
Edo vlepume ena prigipa ki ena baba. O prigipas kathete. here we see a prince and a dad. the prince is sitting 'Here we see a prince and a dad. The prince is sitting.'	NounTest
Edo vlepume ena vasilia ki ena mago. O vasilias ton pleni. here we see a king and a wizard. the king himCL is washing 'Here we see a king and a wizard. The king is washing him.'	ClTest
Edo vlepume mia kamilopardali ke mia ajelada. I kamilopardali glifi aftin. here we see a giraffe and a cow. the giraffe is licking herPRON 'Here we see a giraffe and a cow. The giraffe is licking it/her.'	PronControl
Edo vlepume ena nano ki ena prigipa. O nanos kimate. here we see a dwarf and a prince. the dwarf is sleeping 'Here we see a dwarf and a prince. The dwarf is sleeping.'	NounTtest
Edo vlepume ena nano ki ena prigipa. O nanos chtenizi afton. here we see a dwarf and a prince. the dwarf is combing himPRON 'Here we see a dwarf and a prince. The dwarf is combing him.'	PronControl
Edo vlepume ena skilo ki enan elefanda. O skilos ton glifi. here we see a dog and an elephant. the dog himCL is licking 'Here we see a dog and an elephant. The dog is licking it/him.'	ClControl
Edo vlepume mia prigipisa ke mia magisa. I prigipisa vafi ton eafto tis. here we see a princess and a witch. the princess is painting herself 'Here we see a princess and a witch. The princess is painting herself.'	RefTest
Edo vlepume ena baba ki ena papu. O papus forai ble panteloni. here we see a dad and a grandpa. the grandpa is wearing blue trousers 'Here we see a dad and a grandpa. The grandpa is wearing blue trousers.'	NounControl

(Continued)

(Continued)

<i>Linguistic Stimulus</i>	<i>Condition</i>
Edo vlepume mia magisa ke mia horeftria. I magisa chtenizi aftin. here we see a witch and a dancer. the witch is combing herPRON 'Here we see a witch and a dancer. The witch is combing her.'	PronTest
Edo vlepume ena baba ki ena papu. O babas forai paputsia. here we see a dad and a grandpa. the dad is wearing shoes 'Here we see a dad and a grandpa. The dad is wearing shoes.'	NounControl
Edo vlepume mia kamilopardali ke mia ajelada. I kamilopardali glifi ton eafto tis. here we see a giraffe and a cow. the giraffe is licking herself 'Here we see a giraffe and a cow. The giraffe is licking itself/herself.'	RefTest
Edo vlepume mia mama ke mia jaja. I mama pleni ton eafto tis. here we see a mom and a grandma. the mom is washing herself 'Here we see a mom and a grandma. The mom is washing herself.'	RefTest
Edo vlepume mia majisa ke mia horeftria. I magisa tin chtenizi. here we see a witch and a dancer. the witch herCL is combing 'Here we see a witch and a dancer. The witch is combing her.'	CLControl
Edo vlepume ena prigipa ki enan andra. O andras stekete. here we see a prince and a man. the man is standing 'Here we see a prince and a man. The man is standing.'	NounControl
Edo vlepume ena vasilia ki ena mago. O vasiliias pleni ton eafto tu. here we see a king and a wizard. the king is washing himself 'Here we see a king and a wizard. The king is washing himself.'	RefControl
Edo vlepume mia mama ke mia jaja. I mama forai kapelo. here we see a mom and a grandma. the mom is wearing a hat 'Here we see a mom and a grandma. The mom is wearing a hat.'	NounTest
Edo vlepume ena nano ki ena prigipa. O nanos ton chtenizi. here we see a dwarf and a prince. the dwarf himCL is combing 'Here we see a dwarf and a prince. The dwarf is combing him.'	CITest
Edo vlepume mia neraida ke mia prigipisa. I neraida kratai ti miti tis. here we see a fairy and a princess. the fairy is holding her nose 'Here we see a fairy and a princess. The fairy is holding her nose.'	NounTest
Edo vlepume ena kloun ki ena papu. O kloun vafi ton eafto tu. here we see a clown and a grandpa. the clown is painting himself 'Here we see a clown and a grandpa. The clown is painting himself.'	RefControl
Edo vlepume ena vasilia ki ena mago. O vasiliias grafi ston ipologisti. here we see a king and a wizard. the king is writing at the computer 'Here we see a king and a wizard. The king is writing at the computer.'	NounTest
Edo vlepume mia magisa ke mia horeftria. I magisa chtenizi ton eafto tis. here we see a witch and a dancer. the witch is combing herself 'Here we see a witch and a dancer. The witch is combing herself.'	RefTest

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<i>Linguistic Stimulus</i>	<i>Condition</i>
Edo vlepume ena kloun ki ena papu. O kloun ton vafi. here we see a clown and a grandpa. the clown himCL is painting 'Here we see a clown and a grandpa. The clown is painting him.'	CIControl
Edo vlepume mia vasilisa ke mia horeftria. I vasilisa pezi kithara. here we see a queen and a dancer. the queen is playing guitar 'Here we see a queen and a dancer. The queen is playing the guitar.'	NounControl
Edo vlepume ena skilo ki enan elefanda. O skilos glifi afton. here we see a dog and an elephant. the dog is licking himPRON 'Here we see a dog and an elephant. The dog is licking it/him.'	PronTest
Edo vlepume mia kamilopardali ke mia ajelada. I kamilopardali ti glifi. here we see a giraffe and a cow. the giraffe herCL is licking 'Here we see a giraffe and a cow. The giraffe is licking it/her.'	CI Test
Edo vlepume ena papu ki ena pirosvesti. O pirosvestis forai kranos. here we see a grandpa and a fireman. the fireman is wearing helmet 'Here we see a grandpa and a fireman. The fireman is wearing a helmet.'	NounControl
Edo vlepume mia jaja ke mia horeftria. I jaja diavazi efimerida. here we see a grandma and a dancer. the grandma is reading newspaper 'Here we see a grandma and a dancer. The grandma is reading a newspaper.'	NounTest
Edo vlepume mia prigipisa ke mia magisa. I prigipisa vafi aftin. here we see a princess and a witch. The princess is painting herPRON 'Here we see a princess and a witch. The princess is painting her.'	PronTest
Edo vlepume ena vasilias ki ena mago. O vasilias pleni afton. here we see a king and a wizard. the king is washing himPRON 'Here we see a king and a wizard. The king is washing him.'	PronTest
Edo vlepume mia mama ke mia jaja. I mama tin pleni. here we see a mom and a grandma. the mom herCL is washing 'Here we see a mom and a grandma. Mom is washing her.'	CIControl
Edo vlepume ena mago ki ena vasilias. O magos ton zografizi. here we see a wizard and a king. the wizard himCL is drawing 'Here we see a wizard and a king. The wizard is drawing him.'	NounControl
Edo vlepume mia prigipisa ke mia magisa. I prigipisa ti vafi. here we see a princess and a witch. the princess herCL is painting 'Here we see a princess and a witch. The princess is painting her.'	CI Test
Edo vlepume ena kloun ki ena papu. O kloun vafi afton. here we see a clown and a grandpa. the clown is painting himPRON 'Here we see a clown and a grandpa. The clown is painting him.'	PronControl
Edo vlepume ena nano ki ena prigipa. O nanos chtenizi ton eafto tu. here we see a dwarf and a prince. the dwarf is combing himself 'Here we see a dwarf and a prince. The dwarf is combing himself.'	RefControl

APPENDIX 2: PICTURE SELECTION TASK. ORDER 1

<i>Linguistic Stimulus</i>	<i>Condition</i>
Warm-up	
Edo vlepume enan elefanda ki enan andra. O elefandas ton vrexī. here we see an elephant and a man. the elephant himCL is soaking 'Here we see an elephant and a man. The elephant is soaking him.'	Cl
Edo vlepume enan elefanda ki enan andra. O elefandas vrexī ton eafto tu. here we see an elephant and a man. the elephant is soaking himself 'Here we see an elephant and a man. The elephant is soaking itself/himself.'	Refl
Experimental sentences	
Edo vlepume ena baba ki ena papu. O babas skupizi ton eafto tu. here we see a dad and a grandpa. the dad is drying himself 'Here we see a dad and a grandpa. The dad is drying himself.'	Refl
Edo vlepume mia prigipisa ke mia magisa. I prigipisa vafi ti magisa. here we see a princess and a witch. the princess is painting the witch 'Here we see a princess and a witch. The princess is painting the witch.'	Noun
Edo vlepume mia jaja ke mia magisa. I jaja tin agizi. here we see a grandma and a witch. the grandma herCL is touching 'Here we see a grandma and a witch. The grandma is touching her.'	Cl
Edo vlepume ena prigipa ki ena nano. O prigipas skepazi ton nano. here we see a prince and a dwarf. the prince is covering the dwarf 'Here we see a prince and a dwarf. The prince is covering the dwarf.'	Noun
Edo vlepume ena mago ki ena vasilia. O magos zografizi ton eafto tu. here we see a wizard and a king. the wizard is drawing himself 'Here we see a wizard and a king. The wizard is drawing himself.'	Refl
Edo vlepume ena vasilia ki ena mago. O vasilias dipla sto mago pleni ton eafto tu. here we see a witch and a wizard. the king next to the wizard is washing himself 'Here we see a witch and a wizard. The king next to the wizard is washing himself.'	Refl2
Edo vlepume mia neraida ke mia prigipisa. I neraida skepazi ton eafto tis. here we see a fairy and a princess. the fairy is covering herself 'Here we see a fairy and a princess. The fairy is covering herself.'	Refl
Edo vlepume mia magisa ke mia horeftria. I magisa chtenizi ton eafto tis. here we see a witch and a dancer. the witch is combing herself 'Here we see a witch and a dancer. The witch is combing herself.'	Refl
Edo vlepume mia kamilopardali ke mia ajelada. I kamilopardali ti glifi. here we see a giraffe and a cow. the giraffe herCL is licking 'Here we see a giraffe and a cow. The giraffe is licking it/her.'	Cl
Edo vlepume ena skilo ki enan elefanda. O skilos dipla ston elefanda glifi ton eafto tu. here we see a dog and an elephant. the dog next to the elephant is licking itself/himself 'Here we see a dog and an elephant. The dog next to the elephant is licking itself/himself.'	Refl2

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<i>Linguistic Stimulus</i>	<i>Condition</i>
Edo vlepume mia vasilisa ke mia magisa. I vasilisa zografizi aftin. here we see a queen and a witch. the queen is drawing herPRON 'Here we see a queen and a witch. The queen is drawing her.'	Pron
Edo vlepume mia mama ke mia jaja. I mama tin pleni. here we see a mom and a grandma. the mom herCL is washing 'Here we see a mom and a grandma. The mom is washing her.'	Cl
Edo vlepume ena papu ki ena pirosvesti. O papus agaliazi afton. here we see a grandpa and a fireman. the grandpa is hugging himPRON 'Here we see a grandpa and a fireman. The grandpa is hugging him.'	Pron
Edo vlepume mia mama ke mia jaja. I mama skupizi aftin. here we see a mom and a grandma. the mom is drying herPRON 'Here we see a mom and a grandma. The mom is drying her.'	Pron
Edo vlepume ena prigipa ki ena nano. O prigipas ton skepazi. here we see a prince and a dwarf. the prince himCL is covering 'Here we see a prince and a dwarf. The prince is covering him.'	Cl
Edo vlepume mia magisa ke mia horeftria. I magisa chtenizi ti horeftria. here we see a witch and a dancer. the witch is combing the dancer 'Here we see a witch and a dancer. The witch is combing the dancer.'	Noun
Edo vlepume mia prigipisa ke mia magisa. I prigipisa ti vafi. here we see a princess and a witch. the princess herCL is painting 'Here we see a princess and a witch. The princess is painting her.'	Cl
Edo vlepume mia mama ke mia jaja. I mama pleni ti jaja. here we see a mom and a grandma. the mom is washing the grandma 'Here we see a mom and a grandma. The mom is washing the grandma.'	Noun
Edo vlepume ena prigipa ki ena nano. O prigipas dipla sto nano skepazi ton eafto tu. here we see a prince and a dwarf. the prince next to the dwarf is covering himself 'Here we see a prince and a dwarf. The prince next to the dwarf is covering himself.'	Ref2
Edo vlepume mia jaja ke mia horeftria. I jaja agkaliazi ton eafto tis. here we see a grandma and a dancer. the grandma is covering herself 'Here we see a grandma and a dancer. The grandma is covering herself.'	Refl
Edo vlepume ena baba ki ena papu. O babas ton skupizi. here we see a dad and a grandpa. the dad himCL is drying 'Here we see a dad and a grandpa. The dad is drying him.'	Cl
Edo vlepume mia neraida ke mia prigipisa. I neraida skepazi aftin. here we see a fairy and a princess. the fairy is covering herPRON 'Here we see a fairy and a princess. The fairy is covering her.'	Pron
Edo vlepume mia magisa ke mia horeftria. I magisa ti htenizi. here we see a witch and a dancer. the witch herCL is combing 'Here we see a witch and a dancer. The witch is combing her.'	Cl

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<i>Linguistic Stimulus</i>	<i>Condition</i>
Edo vlepume ena papu ki ena pirosvesti. O papus ton agaliazi. here we see a grandpa and a fireman. the grandpa himCL is hugging 'Here we see a grandpa and a fireman. The grandpa is hugging him.'	Cl
Edo vlepume ena skilo ki enan elefanda. O skilos glifi ton elefanda. here we see a dog and an elephant. the dog is licking the elephant 'Here we see a dog and an elephant. The dog is licking the elephant.'	Noun
Edo vlepume ena kloun ki ena papu. O kloun vafi ton eafto tu. here we see a clown and a grandpa. the clown is painting himself 'Here we see a clown and a grandpa. The clown is painting himself.'	Refl
Edo vlepume mia neraida ke mia vasilisa. I neraida agizi aftin. here we see a fairy and a queen. the fairy is touching herPRON 'Here we see a fairy and a queen. The fairy is touching her.'	Pron
Edo vlepume ena nano ki ena prigipa. O nanos dipla ston prigipa htenizi ton eafto tu. here we see a dwarf and a prince. the dwarf next to the prince is combing himself 'Here we see a dwarf and a prince. The dwarf next to the prince is combing himself'.	Refl2
Edo vlepume mia kamilopardali ke mia ajelada. I kamilopardali glifi aftin. here we see a giraffe and a cow. the giraffe is licking herPRON 'Here we see a giraffe and a cow. The giraffe is licking it/her.'	Pron
Edo vlepume ena mago ki ena vasilisa. O magos zografizi to vasilisa. here we see a wizard and a king. the wizard is painting the king 'Here we see a wizard and a king. The wizard is painting the king.'	Noun
Edo vlepume ena baba ki ena papu. O babas skupizi ton papu. here we see a dad and a grandpa. the dad is drying the grandpa 'Here we see a dad and a grandpa. The dad is drying the grandpa.'	Noun
Edo vlepume mia neraida ke mia vasilisa. I neraida agizi ton eafto tis. here we see a fairy and a queen. the fairy is touching herself 'Here we see a fairy and a queen. The fairy is touching herself.'	Refl
Edo vlepume ena kloun ki ena papu. O kloun vafi afton. here we see a clown and a grandpa. the clown is painting himPRON 'Here we see a clown and a grandpa. The clown is painting him.'	Pron
Edo vlepume mia jaja ke mia horeftria. I jaja dipla sti horeftria agaliazi ton eafto tis. here we see a grandma and a dancer. the grandma next to the dancer is hugging herself 'Here we see a grandma and a dancer. The grandma next to the dancer is hugging herself.'	Refl2
Edo vlepume mia vasilisa ke mia magisa. I vasilisa dipla sti magisa zografizi ton eafto tis. here we see a queen and a witch. the queen next to the witch is drawing herself 'Here we see a queen and a witch. The queen next to the witch is drawing herself.'	Refl2
Edo vlepume mia mama ke mia jaja. I mama dipla sti jaja skupizi ton eafto tis. here we see a mom and a grandma. the mom next to the grandma is drying herself 'Here we see a mom and a grandma. The mom next to the grandma is drying herself.'	Refl2

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<i>Linguistic Stimulus</i>	<i>Condition</i>
Edo vlepume ena nano ki ena prigipa. O nanos htenizi afton. here we see a dwarf and a prince. the dwarf is combing himPRON 'Here we see a dwarf and a prince. The dwarf is combing him.'	Pron
Edo vlepume ena skilo ki ena elefanda. O skilos glifi ton eafto tu. here we see a dog and an elephant. the dog is licking himself 'Here we see a dog and an elephant. The dog is licking itself/himself.'	Refl
Edo vlepume mia mama ke mia jaja. I mama pleni aftin. here we see a mom and a grandma. the mom is washing herPRON 'Here we see a mom and a grandma. The mom is washing her.'	Pron
Edo vlepume ena papu ki ena pirosvesti. O papus agaliazi ton pirosvesti. here we see a grandpa and a fireman. the grandpa is hugging the fireman 'Here we see a grandpa and a fireman. Grandpa is hugging the fireman.'	Noun
Edo vlepume mia jaja ke mia magisa. I jaja dipla sti magisa agizi ton eafto tis. here we see a grandma and a witch. the grandma next to the witch is touching herself 'Here we see a grandma and a witch. The grandma next to the witch is touching herself.'	Ref2
Edo vlepume ena vasilia ki ena mago. O vasilias pleni ton eafto tu. here we see a king and a wizard. the king is washing himself 'Here we see a king and a wizard. The king is washing himself.'	Refl
Edo vlepume mia neraida ke mia vasilisa. I neraida agizi ti vasilisa. here we see a fairy and a queen. the fairy is touching the queen 'Here we see a fairy and a queen. The fairy is touching the queen.'	Noun
Edo vlepume mia prigipisa ke mia magisa. I prigipisa dipla sti magisa vafi ton eafto tis. here we see a princess and a witch. the princess next to the witch is painting herself 'Here we see a princess and a witch. The princess next to the witch is painting herself.'	Ref2
Edo vlepume ena mago ki ena vasilia. O magos ton zografizi. here we see a wizard and a king. the wizard himCL is drawing 'Here we see a wizard and a king. The wizard is drawing him.'	Cl