1. Introduction

When an entity in the discourse has a prominent status, speakers tend to refer to it with an underspecified expression, such as a pronoun. In the theoretical literature this has been captured by Heim 1982 in her Prominence Condition, and see Arnold (2008) and Arnold et al. (2009) for psycholinguistic literature on the topic. Using a pronoun, therefore, requires pragmatic judgements about what is prominent, as well as the ability to take into account the perspective of the listener. It is not surprising, therefore, that young children often fail on tasks that involve these processes and use pronouns without clear antecedents (Hendricks et al. 2014, Wigglesworth 1997).

It is well-agreed upon that people with Autism Spectrum Disorders (ASD) have pragmatic difficulties, regardless the reasons to which these have been attributed (see Marinis et al. 2013, for a recent review). As a consequence, one of the topics that have been investigated the most in the related literature is the use of pronouns in the discourse of people with ASD. Although the findings do not always coincide, there seems to be a consensus that individuals with ASD differ from their typically developing (TD) controls in their use of pronouns in some way or another. Thus, in some studies, the difference is more dramatic, since it lies in the fact that individuals with ASD make use of a smaller amount of felicitous pronouns, namely, of pronouns with a clear referent (Norbury & Bishop 2009; Novogrodsky 2013; Novogrodsky & Edelson 2015). In other
studies, while the proportion of felicitous vs. infelicitous pronouns does not differ between ASD and TD populations, the pronouns used, as a proportion of all nominals, is smaller, with more explicit nouns (DPs) used instead (Colle et al. 2008; Arnold et al. 2009). While the groups of individuals with ASD, on which the above studies have focused, differ in terms of age and severity of autism, there are two striking characteristics that they all have in common: a) they have investigated English-speaking populations, and, b) with one exception, (Novogrodsky & Edelson 2015), they have looked at the reference of subject pronouns. In this work we are investigating object pronouns, more precisely, we are focusing on object clitic pronouns (henceforth, object clitics) given that the language we are studying is Greek, and it belongs to the type of languages that employ clitic pronouns in object position.

The current study focuses on object clitics because we have investigated extensively in earlier work the comprehension and production/use of object clitics via structured experiments. We have found mild difficulties for the high-functioning children with ASD, and we would like to see how the same individuals perform in less structured environments, namely, in narratives. Although, there are several differences between the group of children with ASD we have studied, and those in the study of Condouris et al. (2003), as well as between the structured tasks that have been used, the latter study has hinted that children with ASD perform worse on spontaneous speech as compared to standardized measures. This finding, which has to be taken with caution, as the authors admit, is conjectured to relate to impairments in pragmatics and social reciprocity manifested in spontaneous speech, but not on the standardized tests used (see also Novogrodsky & Edelson 2015 for related discussion). The present study aims to contribute to this issue as well.

2. Background

The present study was motivated by the studies of Terzi et al. (2012, 2014) and Terzi et al. (2016a, b). The participants in the present study are the same as those of Terzi et al. (2016a, b): they are 20 high-functioning Greek-speaking children with autism, aged: 65-104 months (mean age: 6;11), matched on their verbal abilities on the basis of the Greek Peabody Picture Vocabulary Test (PPVT) (Simos et al. 2011) with 20 typically developing (TD) children, aged: 61-98 months (mean age: 6;7). The children in both groups were also administered a number of baseline tasks: the Raven’s Coloured Matrices test (Raven, Court, & Raven, 2008), assessing their non-verbal abilities, the Diagnostic Test of Verbal Intelligence (DVIQ) (Stavrakaki and Tsimpli 2000), assessing production of morphosyntax, the PPVT, and two tasks assessing phonological and working memory (forward and backward digit span). Below are the scores of both groups on the verbal and non-verbal tasks, and see Terzi at al. (2016a) for their memory scores (on which the two groups did not differ).
The two groups differed significantly from each other only on non-verbal IQ (Raven et al. 2008), in which the ASD children scored slightly better than the TD controls.

2.1. Structured experiments and their findings

The main purpose of Terzi et al. (2016 a, b) was to compare the language abilities of high-functioning children with ASD with those of TD controls on a number of environments requiring or disallowing the presence of an object clitic pronoun. At the same time, it aimed to confirm the findings of Terzi et al. (2012, 2014) on the mild weakness on object clitics of high-functioning children with ASD. The latter studies found that Greek-speaking children with ASD scored lower than their TD controls on the comprehension and production of simple object clitic pronouns, although they did not score particularly low. Terzi et al. (2012, 2014) employed only one test of comprehension and one of production of clitic object pronouns, along with strong object pronouns and reflexive pronouns, whereas Terzi et al. (2016 a, b) employed many more tasks on a different group of participants, albeit of the same age and general verbal and non-verbal abilities.

The tasks that were administered to the children with ASD and their TD controls investigated environments in which clitics are either required or disallowed in Greek. Hence, the following environments were investigated for comprehension and production.

Comprehension

Condition 1: Simple clitics
This was a picture selection task, in which the participants heard a sentence and were asked to select one of three pictures displayed on a slide. For a sentence like (1), for instance, there were three pictures, one containing the mother washing another female character (target picture), one containing the other female character washing the mother (reverse), and a third one containing the
mother washing herself (reflexive). Clitics and their glosses are in italics in this section.

(1) I mama \textit{tin} pleni.
    the-nom mom-nom \textit{her} washes
    ‘Mom is washing her.’

**Condition 2: Clitic Left Dislocation**

This was a very similar task, in the sense that the three pictures on the slide were exactly the same as in Condition 1, but the associated sentence was one like (2).

(2) Ti mama \textit{tin} pleni
    the-acc mom-acc \textit{her} washes
    ‘(she/he) washes the mother.’

Children were also asked to match the sentence they heard to one of three pictures displayed on a slide that was shown to them at the same time.

**Production**

**Condition 1: Simple clitics**

This was an elicitation task, in which the children were shown a picture that contained two animal characters. The experimenter introduced the characters to the children and subsequently asked them a question, (3), the answer to which had to contain a clitic (Target answer).

(3) Edo exume ena liko ke mia gata. Ti kani o likos sti gata?
    here we-have a wolf and a cat. What does the wolf do to the cat

    Target answer: \textit{Tin} filai
    \textit{her} kisses
    ‘(He) kisses her.’

**Condition 2: Clitic Left Dislocation (CLLD)**

This was a sentence completion task, in which a picture was used with three characters. The experimenter asked a question, (4a), and started to answer it, (4b). The child had to complete the answer. The use of a clitic was required. The clitic was coreferent with the DP that was used to started the answer.

(4) a. Edo exume enan elefanda, mia arkuda ke mia maimou. Pios klotsai ti maimu?
    here have-1p an elephant, a bear and a monkey. Who kicks the monkey

    ‘Here we have an elephant, a bear and a monkey. Who kicks the monkey?’
b. Ti maimu …
the-acc monkey-acc

Target response: tin klotsai i arkuda.
her kisses the bear

Condition 3: DP 1
In this Condition the set up was the same as in Condition 1. Children were shown a picture with two characters and were introduced to the characters. However, the question they were asked was different from Condition 1, (5), and had to be answered with a DP (rather than its corresponding clitic). This is because, unlike in Condition 1, the question did not contain the DP that is part of the answer.

(5) Edo exume ena liko ke mia gata. Ti kani o likos?
here have-1p a wolf and a cat. What does the wolf
‘Here we have a wolf and a cat. What does the wolf do?’

Target answer: Filai ti gata.
  kisses the cat
  ‘(He) kisses the cat.’

Condition 4: DP2
In this Condition the pictures were the same as in Condition 3, and the same question was asked. However, the characters were not introduced, hence, the DP that is part of the answer was contained neither in the question nor in the introductory discourse.

(6) Des edo. Ti kani o likos?
look here. What does the wolf
‘Look here. What does the wolf do?’

Target answer: Filai ti gata
  kisses the cat
  ‘(He) kisses the cat.’

Condition 5: Focus construction
This was a sentence completion task, as in CLLD. The target answer was elicited via the use of a picture, and the experimenter asked a question and started to answer it. The participants had to complete the answer. In this condition, just like in CLLD, the object/patient DP appears at the beginning of the (target) sentence. However, the reasons for this non-neutral order are different: while it is widely accepted that the DP has moved to the beginning of the sentence when it is Focused, this view is not unanimously accepted for CLLDed elements. Moreover, while the former refers to new information, the
latter refers to old information. Finally, the DP bears a special intonation in Focus sentences, and it is not compatible with a co-referent clitic.

(7)  
a. Edo exume enan elefanda, mia arkuda ke mia maimou. Pion klotsai i arkuda?
   here we-have an elephant, a bear and a monkey. Who kicks the bear
   ‘Here we have an elephant, a bear and a monkey. Who does the bear kick?’

b. TI MAIMU …
   the-acc monkey-acc

Target response: (*tin) klotsai i arkuda.
   her kicks the-nom bear-nom

To summarize, the comprehension task investigated the comprehension (essentially Binding) of object clitics in simple clitic contexts and in contexts with CLLD. The production task assessed two contexts that require the presence of an object clitic in the response sentence (Conditions 1 and 2, that is, simple clitics and CLLD), and three contexts that do not allow a clitic (Conditions 3, 4, 5, that is, two simple DP contexts and one Focus context). Recall that one of the objectives was to check the validity of the Terzi et al. (2012, 2014) findings, which had only employed the two Conditions 1 (comprehension, production), and had detected mild problems in the comprehension and production of simple clitics. The study by Terzi et al (2016a, b) replicated the earlier findings, as it also found mild problems in the comprehension and production of simple clitics in a different group of children of similar age and general verbal and non-verbal abilities.

In addition to confirming the previous findings, a number of new findings emerged in the study of Terzi et al. (2016a, b). First, no difference was found between the two groups of children on the CLLD structure. Regardless of how exactly CLLD is to be analyzed, it is undoubtedly a context that is syntactically more complex than one containing simple clitics. This similarity offers support to the idea that syntactic complexity is not a problem for high-functioning children with autism. The two groups did not differ either when they were asked questions that elicited a DP, rather than its corresponding clitic. They did differ, however, when they were asked to produce a Focus structure. In this case, the predominant error of the children with ASD was the use of a clitic. That is, children with ASD produced a clitic to refer to the Focused DP in the beginning of the sentence, (7), which is strictly forbidden in Focus structures. This was the only other Condition, on which the children with ASD differed from their TD controls.

Terzi et al. (2016a, b) offered the following interpretation of the findings: high-functioning children with ASD do not seem to have problems with core syntax, otherwise they would differ from the TD children on CLLD. They seem to have difficulties to produce simple clitics, probably because they cannot
easily ascertain what is salient/prominent in the discourse. Most importantly, however, children with ASD have difficulties with the Focus structure and produce an object clitic where they shouldn’t, because they cannot figure out the role of the intonation in this construction, namely, that it signals the presence of a Focused element, which, as an element that conveys new information, cannot have a clitic as its antecedent. Let us clarify that the authors do not claim that high-functioning children with ASD do not perceive the distinctive intonation of this structure; they do perceive it, but they have difficulties to map it into the discourse representation. As a result, they end up considering the Focus structure somehow similar to CLLD, and having the object DP at the beginning of the sentence they repeat it by using a clitic because it is in the immediately preceding discourse, therefore, it is prominent. In other words, the high-functioning ASD children of the study have difficulties in aligning information coming in from the various components of grammar in order to construct a felicitous sentence. In particular, they have difficulties to map the experimenter’s distinctive intonation into the discourse representation and the role it plays in responding appropriately.

3. The current study
3.1. The participants and the narrative task

As mentioned at the beginning of the previous section, the participants of the current study are the same as those in Terzi et al. (2016a, b), where they are described in great detail. Let us add here that the children with ASD were referred to our collaborating clinics in Athens and Patras. The child psychiatrist of our team (KF), an ADOS trainer, corroborated the diagnosis with the use of Autism Diagnostic Observation Schedule, Second Edition – ADOS-2 (Lord et al. 2012).

Narratives are more structured than spontaneous speech, but more natural than structured experiments, hence, a good midway between the two. As mentioned in the introduction, one of the main objectives of the present study was to compare the findings on the structured experiments to those of the narrative task, in an effort to see how the results of structured experiments compare to the actual everyday spontaneous speech (discourse).

The two groups of our study had to narrate the Frog where are you story from the illustrated book of Mayer (1969). This is a book with pictures only, and it is a story about a boy, a dog, and a pet frog. One night the frog leaves his jar and the boy with his dog undertake a whole adventure in order to find him. We used this particular book because it has been used in a number of related studies (Colle et al. 2008; Norbury & Bishop 2009), as well as in the study of Novogrodsky & Edelson (2015), which is very much related to the study we are about to describe here. The experimenter of the present study was the same person who administered the structured experiments. She gave each child the book and told them that it was a book about a child, his dog, and his frog and that they would look at it together first by just turning the pages. Then, the children were asked to start looking at the book from the beginning again and
tell the experimenter what was going on on each page. The experimenter was not looking at the book during this stage, but was making sure the narratives were being audio-recorded.

Two coders undertook the transcription and annotation of the narratives for the purposes of their thesis (Grammatikou & Karamali 2015). The second author of this article read all transcriptions against the recordings for the purposes of her thesis and verified accuracy with an interrater reliability of 95% (Zafeiri 2016). The transcripts were then transferred into CHAT format by Konstantina Olioumtsevits as part of an Erasmus placement at the University of Reading. The third author checked the CHAT format and calculated the children’s MLU. The children with ASD had similar MLU (Mean = 8.52) to the TD children (Mean = 8.83) (p > 0.1).

The data were analysed in the following way:

We distinguished the environments that contained clitics in:

a) simple clitics environments, and
b) complex clitics environments.

The former are sentences, such as (8). The latter are sentences that contain CLLD, (9), and Clitic Doubling (CL) structures, (10).

(8) meta i kukuvaghia ton psachni then the owl him look for-3s ‘Then the owl looks for him.’ (CHI: 103)

(9) ke ton skilo ton kinighaghane i melises and the dog him chased-3p the bees ‘As for the dog, the bees chased him.’ (CHI: 109)

(10) ke pighan na ton kinighisun ton skilo and went-3p to him chase the dog ‘And they went to chase the dog.’ (CHI: 116)

We also distinguished between environments in which:

a) clitics have a felicitous reference, and
b) clitics have an infelicitous reference (ambiguous).

Infelicitous reference is due either to lack of a referent, (11), or presence of more than one potential referents, (12).

(11) Immediately previous context: When the child was asleep, the frog left from the window. The (he) searched everywhere … Epsakse padu. Molis tus idhe espase to vazo. searched-3s everywhere. when them he-saw, he-broke the vase. ‘(He) searched everywhere. When (he) found them, (he) broke the vase.’ (CHI: 101)
Immediately previous Context: - What can you see? - A dog, a frog and a kid.
Otan kimotan, ton pighe o skilos piso tu ke ton ksipnise when slept-3s, him took-3s the dog behind and him woke up-3s ‘When (he) was asleep, the dog followed him and woke him up.’ (CHI: 119)

Clitics with felicitous reference were divided according to the number of intervening DPs that could be potential referents:

a) no DP intervening between the clitic and its referent,
b) one DP intervening,
c) two DPs intervening,
d) three or more DPs intervening.

Clitics with felicitous reference were also divided according to whether the referent was in:

a) the subject position, (13), and
b) the object position, (14).

(13) Idhan oti o vatrachos dhen ipirche sto bukali. Ke meta ton epsaksan.
saw-3p that the frog not was-3s in-the bottle and then him looked for-3p ‘They saw that the frog was not in the bottle. And then they looked for him.’ (CHI: 107)

(14) Ke dhen brikan to vatracho! To aghoraki epsakse padu ke padu.
and not found-3p the frog. The boy-dim searched-3s everywhere and padu. Dhen boruse na to vri.
everywhere. not could-3s to it find ‘And they did not find the frog. The boy looked everywhere, he could not find him.’ (CHI: 105)

3.2. Results

The two groups did not differ from each other in the overall number of clitics produced. Table 1 below shows the total number of clitics used per group and structure and shows that both groups employed many more clitics in simple clitic contexts than in CLLD and CD.

<table>
<thead>
<tr>
<th></th>
<th>Simple Clitics</th>
<th>Clitic Left Dislocation</th>
<th>Clitic Doubling</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
<td>93</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>TD</td>
<td>115</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
There was no significant difference between the two groups on the amount of clitics used in any of the three types of clitic contexts (simple clitics \(t(38)=-1.120, \ p=0.27\); CD: \(t(38)<0.001, \ p=1\); CLLD: \(t(38)=-0.387, \ p=0.7\)). The two groups also had similar proportions of felicitous and infelicitous clitics, as Table 2 below demonstrates.

**Table 2: Distribution of felicitous and infelicitous clitics**

<table>
<thead>
<tr>
<th></th>
<th>Felicitous Clitics</th>
<th>Infelicitous Clitics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
<td>40</td>
<td>53</td>
</tr>
<tr>
<td>TD</td>
<td>50</td>
<td>65</td>
</tr>
</tbody>
</table>

In this case as well, there was no significant difference between the two groups in terms of felicitous and infelicitous use of clitics (felicitous: \(t(38)=-0.987, \ p=0.33\); infelicitous: \(t(38)=-0.781, \ p=0.44\)).

The only difference between the two groups is shown in Table 3 and has to do with the syntactic position in the sentence that the felicitous referents of the clitics occupy.

**Table 3: Reference of clitics and syntactic environment**

<table>
<thead>
<tr>
<th></th>
<th>Ø DP</th>
<th>1 DP</th>
<th>2DP</th>
<th>3 DP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subj</td>
<td>Obj</td>
<td>Subj</td>
<td>Obj</td>
</tr>
<tr>
<td>ASD</td>
<td>22</td>
<td>5</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>TD</td>
<td>14</td>
<td>19</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

The above Table demonstrates first that both groups use the majority of their clitics when no DP intervenes between the clitic and its referent. In this condition (Ø DP), children with ASD showed a clear preference for a subject referent (\(t(19)=3.655, \ p=0.002\)). No such preference was demonstrated by the TD children (\(t(19)=-0.592, \ p=0.561\)). In the 1 DP condition, on the other hand, both groups showed a preference for the clitic to refer to a DP in the subject position. Overall, therefore, the children with ASD showed a clear preference to use clitics to refer to an antecedent in the subject position, and this was the only difference that was found between the two groups in terms of the manner in which they used clitics in their narratives.

4. Discussion

A number of findings emerged from the narratives of the children we investigated in the present study. The overall conclusion is that the high-functioning children with ASD and their TD controls, of this age range at least, do not differ from each other in important ways in their use of pronominal object clitics when it comes to a task like narratives, which is not highly structured. This finding contrasts with the performance of children with ASD in structured experiments, where they fell behind their TD controls in the production and
comprehension of simple object clitics and in the production of clitics in Focus structures (an environment from which object clitics are strictly disallowed). As mentioned in section 2.1, these problems were attributed by Terzi et al. (2016a, b) to the fact that the children with ASD, although high-functioning, could not put together information from the various components of grammar. In particular, they could not easily detect the salient element in the discourse, in order to produce a simple clitic to refer to it, and they could not take into account the fact that particular (Focus) intonation signals particular interpretation which is not compatible with the use a clitic. It should be kept in mind that we are talking about the same group of ASD and TD children who participated in the narratives and the structured experiments.

Let us now turn to the narrative results in detail in their order of presentation. We see first, in Table 1, that both groups used complex structures with clitics. These were CLLD and CD structures, which were used in small numbers, yet, in equally small numbers by both the ASD and TD children. Moreover, although this is expected to a large extent, both types of complex structures were used successfully by both groups, in the sense that the reference of the object clitic was felicitous. Moreover, structures with simple clitics were also used in equal numbers by both groups, unlike, for instance, the findings of Arnold et al. 2009, where children with ASD used more (subject) DPs than pronouns. Table 2 demonstrates something more interesting: the reference of object clitics was equally felicitous for the two groups of children, that is, both groups used equal proportions of felicitous and infelicitous object clitics, unlike many of the studies reported in the Introduction. This tells us that the children with ASD do well with the reference of object clitics in narratives, by contrast to their performance in structured experiments. Hence, the previous two Tables demonstrate that the children with ASD we studied did not fall behind their TD controls with respect to either one of the two parameters on which they are found to fall behind in the literature, namely proportion of pronouns vs. corresponding DPs, and proportion of felicitous vs. infelicitous pronouns.

Recall, however, that all but one of the aforementioned studies investigated the reference of subject pronouns. Novogrodsky & Edelson (2015) is in fact the only study that investigated reference of both subject and object pronouns (in English). This study did not find different performance/use of object pronouns in a narrative task that used the very same story, namely, the *Frog where are you*. Because the participants with ASD used fewer felicitous subject pronouns than their TD controls, the authors conjecture that the result on object pronouns may not be reliable and may be due to the fact that by far fewer object pronouns were used in the narratives. Note that the children they studied were also high-functioning, and of similar age to ours. We have not studied reference of subject pronouns yet, and the object pronouns of the current study were even fewer than theirs. Nevertheless, the fact that we did not find difficulties with the reference of object (clitic) pronouns either suggests that the total number of object pronouns employed by the children of the present study may not be the (only) reason why the two groups did not differ in the proportion of their felicitous
reference. Moreover, the position of the pronoun, and not only of its referent, may be an issue that is worth giving some more attention.

A related question that arises at this point, which was in fact raised during the question period by Bonnie Swartz, is why TD children used so many object clitics with infelicitous reference. What we see as a possible answer lies in the observation reported in the literature, according to which children seem to be able to produce pronouns with clear reference during elementary school, or else, by around age 7 (Hendriks et al. 2014; Wigglesworth 1997). The vast majority of the TD children of our study were still in kindergarten, and their mean age was below 7. One would perhaps expect that a difference may arise between the two groups if we tested older groups of children, and this is a task that we should probably undertake in future research.

There is one more issue that our findings raise: as mentioned in the introduction, Condouris et al. (2013) and Novogrodsky & Edelson (2015) have suggested that children with ASD do better in structured experiments than in spontaneous speech, or in what comes closest to it (which is the case of narratives). Here we seem to have the reverse pattern, namely, an instance in which children with ASD perform worse in experimental tasks than in semi-spontaneous speech. We believe that the current study is a clear case of how misleading it is to make generalizations like the previous one. When structured experiments involve the participation of the experimenter, and they have to do with topics that involve the experimenter’s point of view, like the experiments in Terzi et al. (2016a, b), it should not be surprising that children with ASD do not do well on them. In the study of Condouris at al. 2013, on the other hand, the structured experiments were standardized tasks (in addition to the fact that the children that participated were not only high-functioning). A plausible explanation about why the children in our study did worse on the structured experiments than their TD controls while they did equally well on their narratives is that in the narrative task the children with ASD had full control of the discourse by contrast to the structured experiments, the nature of which was such that they had to take into account the discourse representation provided by the experimenter in each condition and trial.

Let us now turn to the one and only domain in which the two groups differed from each other, which were the simplest contexts with object clitics, namely, the contexts in which no element interferes between the clitic and its referent. These in fact constitute the majority of contexts in which object clitics are encountered for both groups, Table 3. We see in Table 3 that in this particular context the children with ASD used object clitics to refer to an element that occupied a subject position, while TD children did not show a preference for the position of the referent. It is widely established in the relevant literature that (adult) speakers tend to use pronouns more often for entities that were just mentioned when these are in subject position, compared to those that were just mentioned in a non-subject position. It has been suggested that this is so because the subject position confers salience on the entities referred to, in the sense that the speaker can assume that the listener is more likely to focus attention to things in the subject than in a non-subject position (Arnold 2008).
This is clearly a strategy that takes advantage of the structural characteristics (i.e., syntactic structure) of the sentence. High-functioning children with ASD do not have difficulties with (morpho)syntax, hence, it is reasonable to assume that they know what the subject of the sentence is and take advantage of this default strategy to its full extent. The TD controls, on the other hand, can override this default strategy and use a clitic to refer to a subject or an object. This shows that TD children are more flexible than children with ASD and use clitics to refer to the subject or the object of a preceding sentence, depending on the information they want to convey. It is important to find out if the pattern attested in the present study is also found for nominal expressions in the subject position and if this is also attested in high functioning children with ASD over the age of 8. These issues remain open for future research.

References


