Narrative as an Assessment Tool for Greek-Speaking Children with Specific Language Impairment and High Functioning Autism

By

Kornilia Gkegka

korniliag@enl.auth.gr

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Thesis Supervisor:

Eleni Agathopoulou

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ABSTRACT

This study aimed at clarifying the extent to which linguistic and pragmatic skills contribute to the narrative competence of children with different communication impairments.

Thirty four 8- to 11-year-old Greek-speaking children participated in the study. A story retelling task was used according to the Edmonton Narrative Norms Instrument (ENNI; Schneider, Dubé & Hayward, 2005). The narratives of two clinical groups, children with high functioning autism (HFA; N = 10) and specific language impairment (SLI; N = 11), were compared to each other and to that of children with typical development (TD; N = 13). Narratives were examined in terms of microstructure and macrostructure, while all measures were used with all participants. The novelty of this study is the division of narratives into episodes according to which variables were also calculated and studied.

No significant group effect was found for SLI and HFA groups in terms of macrostructure, whereas only the grammatical accuracy measure statistically distinguished between children with SLI and HFA in terms of microstructure. Unexpectedly, the HFA group was outperformed by the SLI group in the grammatical accuracy variable. Other striking results include ToM deficits in the SLI group. Both groups were outperformed by controls on story structure complexity, while the division of narratives led to more outcomes, suggesting that such a technique could be replicated in the future. Expressive vocabulary scores were significantly correlated with lexical diversity scores in TD children. Story structure complexity was statistically associated with microstructure measures for the TD and HFA groups.

Results suggest that narrative abilities of SLI and HFA groups may overlap. Thus, the clinical assessment and intervention of these groups should be broad and focus both on language and socio-pragmatic skills.

Keywords: specific language impairment, high functioning autism, story retelling, microstructure, macrostructure
1. Introduction

The ability to effectively communicate with others is one of the most valuable skills throughout life, as it can affect experiences on a personal, academic and professional level. Discourse abilities develop from an early age and progress until language is fully acquired and individuals can make full use of their cognitive, social and pragmatic skills in order to engage in conversations, argue, explain things and narrate stories or personal experiences. Narrative discourse is a critical aspect of human communication used in everyday life and revealing much information on the communicative competence of an individual, as it forms the basis of many childhood speech acts (Botting, 2002). As a discourse genre that requires the interplay of linguistic, cognitive and pragmatic skills and is used across languages and cultures, it is also an ecologically valid tool to measure language competence across language impaired groups (Mäkinen, 2014; Norbury, Gemmel & Paul, 2013; Botting 2002). Moreover, narrative skills have proved to be important predictors of academic achievement (Boudreaux, 2008, as cited in Norbury et al., 2014) and literacy outcomes in children with language deficits (Miller et al., 2006 as cited in Colozzo, Morris & Mirenda 2015), making narration a useful differentiating tool that can highlight weaknesses to be targeted through clinical intervention.

Narrative is a monologic type of discourse; written or spoken, involving the depiction of fictive or real life based events that are temporally and causally related and focus on a particular theme (Boudreaux, 2007, as cited in Mäkinen, 2014). Plans and goals are enacted by an agent and play a role in narratives (Stein & Glen, 1979 as cited in Norbury et al., 2013). Narrators need to use decontextualized language and refer to events that happened in the past or that are fictional, while they also utilize the given context in order to exclude, imply or presuppose events according to the listeners’ needs (Cummings, 2009, as cited in Mäkinen, 2014). Furthermore, the structure of a narrative is what makes people recognize it and differentiate it from other discourse genres. A story must include an animate protagonist and a causal relationship among events but other elements, such as the setting, the initial event, the internal response, the outcome and the reaction need to be specified so that the story structure becomes evident (Stein & Glen, 1979).
Narratives can serve many purposes depending on whether they are scripts, personal or fictive but their primitive nature and basis lies in childhood and the first conversations between a child and its caregivers usually at the age of three (Leadholm & Miller, 1992, as cited in Mäkinen, 2014). In fact, the ability to narrate may develop from our innate ability to direct towards action and make ourselves understood. Long before children produce narratives, they listen to them by their parents, on TV or the movies and develop a skill to sequence events and distinguish between relevant and irrelevant information. Play situations and interactions with caregivers even at the age of two allow them to produce their first type of narratives, while later, at the age of four are even able to recount personal experiences, although without a logical sequence. At the age of six, they are able to produce more coherent narratives (Peterson & McCabe, 1983, as cited in Mäkinen, 2014) but definitely narrative skills do not stop developing until young adulthood. In order to build a cohesive and coherent narrative, children need to be familiar with the mental model of a story and be able to link sentences with linguistic devices while also attribute actions, goals and mental states to characters. As children grow older, they master each of these skills along with the complete mastery of the expressive language use. Therefore, narratives can reveal different aspects of language use and obtain the communicative profile of children with varied developmental disorders.

Although distinguishing between children with language and pragmatic disorders can be a tough task due to the overlap of the disorders, distinct profiles of communicative impaired children have been identified. The analysis of narratives is usually split between macro- and microstructure, first used by Kintsch and van Dijk (1978) in order to account for both linguistic and pragmatic aspects of the narrative production. Microstructure corresponds to the local structure and the relationship between sentences, whereas macrostructure corresponds to the global structure and describes the narrative as a whole. Different measures including language complexity and grammatical accuracy, when it comes to microstructure, and story grammar and mental state terms, when it comes to macrostructure, are employed in order to obtain scores for profiling and comparison between groups. Narrative tasks can also vary between generating, when the child produces a narrative on its own and retelling, when a child narrates a story that has already listened to. All these aspects can
contribute in profiling different language impaired groups but can also lead to inconsistencies among results.

Under these guidelines, narrative tasks have been used in research with children with autism spectrum disorder (ASD) and language impairments (LI), characterized as specific (SLI), although children with pragmatic language impairment (PLI) have also been described. SLI is a developmental disorder with unknown aetiology that is usually characterized by structural language deficits (Leonard, 1998). However, social cognition deficits have also been identified leading to low performance in the pragmatic aspect of a narrative (Colozzo et al., 2011, as cited in Colozzo et al., 2015). A great deal of controversy has been going on the diagnostic status of the PLI group, although it has been described as comprising of children who have significant pragmatic difficulties but do not meet the full criteria for autism spectrum disorder (Bishop & Norbury, 2002). Because of its recent and unclear diagnosis, not much recent has focused on children with PLI but more on those with ASD. Individuals with ASD are largely characterized by pragmatic deficits, repetitive patterns of behaviour and restrictive interests (American Psychiatric Association, APA, 2014). Therefore, lower scores in narrative production are obtained in story grammar, content and mental state terms (Norbury & Bishop, 2003, as cited in Mäkinen, 2014).

The direct comparison of these groups has not been frequent as studies usually compare results from clinical groups to that of typically developing children (TD) (Colozzo et al., 2015). Cross-disorder comparison has brought to light qualitative differences among groups but also mixed results that call for further research. It has mostly focused on English-speaking children, while the same amount of data from other languages is hard to find. In Greece, narrative production tasks have been used by Baldimtsi, Peristeri, Tsimpli & Nicolopoulou (2016) on bilingual children with ASD and by Tsimpli, Peristeri and Andreou (2016) on monolingual and bilingual children with SLI, but no published study has so far attempted to directly compare the two clinical groups. This study aims at filling in this dearth of information in the communicative profiles of these groups. Although the language difficulties of these groups have been examined on Greek-speaking children to a considerable degree (Clahsen & Dalalakis, 1999; Stavrakaki, 2001; Vogindroukas, 2007), the analysis of the narrative divided between microstructure and macrostructure can underline weaknesses and strengths under specific measures and find any possible correlations.
among them. As language disorders have proved to be long-term and as narratives can
detect later language and literacy achievement (Botting et al., 2001) any information
from narrative tasks can be useful for intervention. Narrative skills are needed in daily
activities and the effective use of them can lead to more positive experiences and less
social problems (Conti-Ramsden & Botting, 2004).

2. Literature review

2.1. Narrative as a clinical tool

The assessment of children through a narrative task has been considered by many
researchers as a more effective tool compared to standardized tests (Colozzo et al.,
2015; Manolitsi & Botting, 2011; Botting, 2002). According to Schraeder, Quinn,
Stockman & Miller (1999), narratives are an authentic approach to language
assessment as children’s language skills are examined in a task that represents
‘realistic learning demands and circumstances’ (as cited in Justice, Bowles, Pence &
Gosse, 2010, p. 219). Narrative is a type of discourse that even resembles
conversation because it involves the production and comprehension of multiple
sentences or utterances that unfold over time, and therefore any results coming from
this can be very conclusive about the communicative competence of a child. However,
narratives are not frequently used as tools because the unstructured
spontaneous speech samples cannot be scored and thus are mostly used in descriptive
ways (Botting, 2002). Nevertheless, there are exceptions starting from The Bus Story
(Renfrew, 1991), which is widely used with school-aged children in the UK, and the
more recent Edmonton Narrative Norms Instrument (ENNI; Schneider, Dubé &
Hayward, 2005) and Narrative Assessment Protocol (NAP; Justice, et al., 2010),
which also provide standardized score forms for the coding of narratives.

Narratives as clinical tools are thus ideal as they can be structured enough to
form the basis of a comparison among children with different developmental
disorders, but also naturalistic enough to reflect conversational style and the errors
within it (Botting, 2002, p.5). Manolitsi & Botting (2011) describe the benefits of
using a narrative in a clinical setting highlighting that narratives are less stressful for
most children and actually more valid because highly standardized tests can favor
certain individuals and be unfair for others. Furthermore, unlike standardized tests
narratives can reveal qualitative results and detect changes over time, while they can
also show a predictable developmental pattern. In fact, improved narrative skills in children with TD relate to improved comprehension and literacy (Johnston, 2008), while in clinical groups they are associated to verbal comprehension (Norbury & Bishop, 2002), meaning that narratives offer an insight into communication as a whole. Narratives are also appropriate for ‘hard to test’ populations, like young offenders, bilingual children and for those who are beyond the age range for which certain tests have been designed (Manolitsi & Botting, 2011, p.42). Botting (2002) also provides three main reasons why narratives should be considered a clinical tool. Normative data from children with typical development can be easily obtained, whereas such data from other forms of assessment may not be available outside the UK. Botting (2002) also underlines the relation between narrative competence and literacy and the fact that narratives can test pragmatic skills but are more formal than conversations, which makes them ideal for distinguishing between children with all kinds of communication difficulties.

The distinction between microstructural and macrostructural analysis is another asset of narrative production tasks because they can encompass a variety of measures. It is up to every researcher and the guidelines they follow to choose the measures for examination. Regarding microstructural analysis, these can include the total number of words (TNW) of a narrative or clausal-level elements like its communication-units (C-units) (Justice et al., 2006 as cited in Mäkinen, 2014). In addition, the number of different words can be tallied (NDW), along with the mean length of C-units (MLCU) in words (Fey et al., 2004) in order to measure complexity. The pragmatic aspect of a narrative, on the other hand, can focus on story content measured through information units that are predefined elements, essential in the story and described by researchers (Bishop & Donlan, 2005 as cited in Mäkinen, 2014). Other measures include the story structure, according to different guidelines (Story Grammar Model; Stein & Glenn, 1979: Gagarina et al., 2012) and the referential cohesion, for which both linguistic and pragmatic skills are required (Liles et al., 1995 as cited in Mäkinen, 2014). Finally, evaluative comments, including measures such as, frames of mind that explain the emotional and mental state of characters and direct and indirect character speech can be part of the pragmatic analysis (Norbury & Bishop, 2003). Nevertheless, when it comes to interpreting results it should be noted that narrative production can vary, even among children with the same deficits. Narration can reflect the communicative
strategies of speakers and thus somebody who is verbose may produce a long narrative, whereas a less talkative speaker would produce a shorter narrative, although both narratives may be easy to follow and comprehend (Mäkinen, 2014, p. 28). Therefore, many aspects should be considered before valuing the effectiveness of a narrative.

2.2. Specific Language Impairment

2.2.1. Definition of Specific Language Impairment

Specific Language Impairment (SLI) is said to represent around 7% of the population (Tomblin et al., 1997), although recently its prevalence has been estimated to less than 1% (Hannus et al., 2009). The male-to-female ratio is 1.33:1 (Tomblin et al., 1997), while there is also evidence that there is a genetic influence for twins in SLI (Bishop, 2006 as cited in Mäkinen, 2014). Children with SLI are characterized by unexplained difficulties in the acquisition of spoken language despite their normal non-verbal ability (Leonard, 1998). It is not a homogenous group but children with SLI usually face difficulties in morphology, semantics and syntax (Leonard, 1998) as well as pragmatics (Bishop, 1997 as cited in Mäkinen, 2014). However, not all children with SLI have pragmatic language difficulties but the overlap is estimated at around 15-20% (Conti-Ramsden et al., 2004 as cited in Mäkinen, 2014). Nevertheless, the debate whether PLI is part of SLI or is best described as a broader subtype of ASD will not be discussed further, as it is not the concern of this paper.

2.2.2. Narrative abilities in SLI

The stories produced by children with SLI are characterized by limited productivity, fewer C-units, words and number of different words compared to children with typical development (Norbury et al., 2013 as cited in Mäkinen, 2014). However, contradictory results on story length have been found (Norbury & Bishop, 2003 as cited in Mäkinen, 2014), which can be explained on the basis of the task, as fewer clauses have been found in story retelling tasks than in story generation tasks (Merritt & Liles, 1987). Furthermore, children with SLI produce ungrammatical and less syntactically complex stories in comparison to their controls (Colozzo et al., 2011). As pragmatics is concerned, although children with SLI perform similarly to TD peers (van der Lely, 1997 as cited in Mäkinen, 2014), there is evidence that they use more ambiguous pronouns in their stories (Norbury & Bishop, 2003). Furthermore, they
might produce fewer main story ideas compared to TD peers (Colozzo et al., 2011), although again there are contradictory results (Liles et al., 1995 as cited in Norbury & Bishop, 2003). Although mental states along with story grammar are considered relative strengths of SLI, evaluative comments and in particular emotional and mental state terms have been reported to be fewer in SLI (Johnston et al., 2001 as cited in Norbury & Bishop, 2003). Nevertheless, one possible explanation for this is that mental state terms are usually expressed in complex sentences and thus any deficit in complex syntax affects this measure (Miller, 2001 as cited in Mäkinen, 2014).

2.3. Autism Spectrum Disorder

2.3.1. Definition of Autism Spectrum Disorder

Autism spectrum disorder is a neurobiological condition, which is diagnosed on the basis of a ‘triad’ of impairments: social and communicative impairment and impairment in creativity, flexibility of thinking and generalization (APA, 2000 as cited in Manolitsi & Botting, 2011). According to the recent Diagnostic and Statistical Manual of Mental Disorders (DSM-5), autism and Asperger syndrome are no longer distinct but are both diagnosed as ASD (APA, 2013). The prevalence of autism is estimated at 8.4 per 1000 individuals, of which 60% are high-functioning (Mattila et al., 2011 as cited in Mäkinen, 2014). The male-to-female ratio is 1.8:1 and ASD is considered to be genetically based (Rutter, 2005 as cited in Mäkinen, 2014), although there is evidence that it can be attributed to environmental or non-heritable factors (Sandin et al., 2014 as cited in Mäkinen, 2014). The verbal and nonverbal abilities of children with ASD can vary a lot as 20-50% of the autistic population might not develop speech, which partly can be attributed to the wide range of IQ scores of this population (Lord et al., 2004 as cited in Manolitsi & Botting, 2011). As a matter of fact, most research focuses on high functioning children with autism, as they are verbose and are able to produce narratives. However, in this way the narrative skills of less able children with autism are left understudied or it might be the case that some low functioning children with ASD are included in ASD groups making results unclear.
2.3.2. Narrative abilities in ASD

The pragmatic aspect of language is most affected in ASD, resulting from a core cognitive deficit in central coherence (Frith, 1989 as cited in Norbury & Bishop, 2003). As a result of this, children with ASD focus on details rather than the global picture and in narrative tasks they tend to describe stories page by page rather than drawing an overall coherent meaning (Norbury & Bishop, 2003, p.290). Comprehension and inferencing skills, although not studied in lengthy story passages, have been described as inefficient in ASD; as such children are unable to explain why certain events in a story happened (Loth et al., 2008 as cited in Mäkinen, 2014). Furthermore, implicature questions are particularly demanding for children with ASD as they require again the processing of different information (Loukusa, Leinonen, Kuusikko et al., 2007 as cited in Mäkinen, 2014). As regards story grammar, results are inconclusive. Norbury et al. (2013) found that children with ASD do not differentiate from TD peers on story content, whereas Suh et al. (2014) discovered that the stories of children with ASD contained fewer story elements than those of TD peers. A relevant deficit reported is the use of irrelevant and additional information or the overly formal language in ASD narratives, which again has brought forward conflicting results (Norbury et al., 2013; Norbury & Bishop, 2003). However, this discrepancy can be explained. Losh and Capps (2003) mention that children with ASD used irrelevant information mostly in personal narratives and not in picture-based generation tasks. ToM skills are also impaired in ASD and children often find it difficult to interpret the motivations of the protagonist and construct a story around the mental states of others (Norbury & Bishop, 2003). When it comes to accurate referencing, this is also restricted in ASD because of ambiguity (Norbury & Bishop, 2003) or pedantic use through explicit noun phrases instead of pronominal references (Arnold et al., 2009 as cited in Mäkinen, 2014).

Regarding local structure, the narratives of children with ASD appear to be less impoverished. In many studies, children with autism perform similarly to their age- or language-matched peers in local measures like the number of words or clausal units (Suh et al., 2014; Losh & Capp, 2003 as cited in Mäkinen, 2014). Nevertheless, the description of the narrative abilities of the ASD population is quite challenging and confusing because of the distinction between able and less able children, the comparison with language- or age-matched controls and the different results coming
from structured and unstructured narrative tasks (Colozzo et al., 2015, p. 317). Therefore, conflicting results are often. Less able children with autism seem to produce shorter and syntactically simpler narratives (Capps, Losh & Thurber, 2000 as cited in Colozzo et al., 2015), whereas high-functioning children may (Norbury et al., 2013) or may not (Norbury & Bishop, 2003) produce shorter stories, with fewer complex sentences (Norbury & Bishop, 2003) or not (Norbury et al., 2013; Losh & Capps, 2003). Although structural language ability is not as impaired in ASD as in SLI, there is evidence of a high-functioning group with language impairment referred to as ASD-LI (Williams et al., 2008 as cited in Manolitsi & Botting, 2011). Nevertheless, complexity, production and syntax in this subgroup are not as delayed as in SLI and expressive language skills are more impaired than receptive skills, which are usually delayed in ASD (Tager-Flusberg et al., 2005 as cited in Manolitsi & Botting, 2011).

3. The present study

The aim of this study was to explore the narrative abilities of two clinical groups: the SLI and the HFA in order to discover weaknesses and strengths in narrative production tasks and describe the linguistic and pragmatic abilities profiles of these populations. More specifically, the main purpose was to evaluate their ability to organize past story events into a coherent story (macrostructural analysis), as well as their ability to use language and syntax in order to build a cohesive story (microstructural analysis) (Hughes, McGillivray & Schmidek, 1997). Children with HFA were chosen for this study as they are the most verbose among those with ASD and thus their narratives are lengthy enough and suitable for research. The narrative performance of the clinical groups was compared to that of neurotypical children in order to describe abilities against a standard base and make differences clearer. The literature suggests that both clinical groups exhibit deficits in narrative performance. In short, referencing, content and mental state language are particularly impaired in ASD, whereas SLI are mostly challenged by the grammatical and syntactic demands of narratives. The current study extends work that compared the two clinical groups by examining Greek-speaking children, aged 8 to 11 years, not only on the narrative task as a whole but for each episode of the narrative separately. In particular, the following questions were examined.
3.1. Research questions and hypotheses

Question 1

How did the clinical groups perform in all narrative measures when compared to each other and to children with TD?

Hypothesis 1

I suspected that children with SLI and HFA would exhibit deficits in microstructure and macrostructure respectively, but also that the morhosyntactic complexity of Greek would pose further difficulties for both groups, especially SLI.

Question 2

How did the three participating groups perform on micro- and macrostructure, when two episodes were examined individually?

Hypothesis 2

I expected that the TD group would perform above HFA and SLI groups in most of the narrative measures for both episodes, although the relative strengths and weaknesses of each group could become more evident within each episode’s scores.

Question 3

Was one of the episodes more difficult for the three groups and in terms of which measures?

Hypothesis 3

I expected that each group would exhibit different changes in its scores between episode 1 and 2. Furthermore, episode 2 could be particularly difficult for clinical groups because of the focus on the interaction of the characters.

Question 4

Does expressive vocabulary correlate to any of the narrative measures and do narrative measures correlate to each other?
Hypotheses 4

I suspected that expressive vocabulary could relate to any of the microstructure measures for each of the three groups, while micro- and macrostructure measures could be correlated, especially story structure complexity to any of the microstructure measures.

4. Method

4.1. Participants

A total of 34 children divided into three groups participated in this study: 10 with High Functioning Autism (HFA), 11 with Specific Language Impairment (SLI) and 13 with Typical Development (TD). All were monolingual Greek-speaking children that represented different social backgrounds and geographical areas of Greece. However, not all were recruited for the purposes of this study or by the same researcher. The children with SLI and ASD had an official diagnosis by a public diagnostic centre and a child psychiatrist. The TD group was selected for the present study and was examined by me. Participants across groups were matched for chronological age. The age range across the entire sample was from 8;7 (8 years and 7 months) to 11;11 (11 years and 11 months) and there was no statistically significant difference among the groups on age ($F(2,34) = 2.159, p = 0.132$). In all cases, consent by parents was given in order for the child to participate and for the data to be used in research.

Children with Typical Development (TD): This group consisted of 13 participants, 3 of whom were female. The excess of boys was selected for comparability with the clinical groups. Their age ranged from 9;2 (9 years and 2 months) to 11;11 (11 years and 11 months) (mean age:10,5 ($SD$:0.95). The Renfrew Word Finding Vocabulary test (1997), adapted into Greek by Vogindroukas, Protopapas and Sideridis (2009), was also administered to assess the children’s expressive vocabulary. All participants had to score above the cut-off point in order to be included in the study. They were selected so that they had normal hearing, no observed emotional, behaviour and neurological deficits and no history of language or speech delay.
Children with High Functioning Autism (HFA): This group consisted of 10 participants, including 8 male and 2 female. Their age ranged from 8;7 (8 years and 7 months) to 11;8 (11 years and 8 months) (mean age: 9;8 (SD:1.04). The participants of this group met criteria for Autism Spectrum Disorder (ASD) based on expert clinical judgment of the child’s social-adaptive behaviour conducted by a child psychiatrist. Except for these children’s scores on the Renfrew Word Finding Vocabulary test (1997), no other cognitive data were available.

Children with Specific Language Impairment (SLI): This group consisted of 11 participants, 4 of whom were female. Their age ranged from 8;11 (8 years and 11 months) to 11;11 (11 years and 11 months) (mean age: 10;6 (SD:1.14). All participants had been diagnosed with SLI by a speech and language therapist and a child psychiatrist. The children in this group presented expressive and receptive language difficulties but no autistic traits. Again only their scores on the Renfrew Word Finding Vocabulary test (1997) were available.

Table 4.1. Means and standard deviations for each group for age and the Renfrew Word Finding Vocabulary test scores

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
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<tr>
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<td>13</td>
<td>9;2</td>
<td>11;11</td>
<td>10;5</td>
<td>0.95</td>
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<tr>
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<td>11;8</td>
<td>9;8</td>
<td>1.04</td>
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<td>11;11</td>
<td>10;6</td>
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<tr>
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<tr>
<td>Total</td>
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</tbody>
</table>

Note: TD: typically-developing children; HFA: children with High Functioning Autism; SLI: children with specific language impairment
4.2. Data collection and material

4.2.1. General Procedure

The data of the TD group was collected in April, 2018, whereas the two clinical groups were examined in previous years. All participating children retold the Giraffe/Elephant story from Set A of the Edmonton Narrative Norms Instrument (ENNI; Schneider, Dubé & Hayward, 2005), although many of the children from the clinical groups narrated more than one story, when examined. The Renfrew Word Finding Vocabulary Test (1997) was administered to all groups along with the narrative production task. All children were tested individually in a quiet room, usually at their home. Participants’ narratives were audio-recorded for later transcription.

4.2.2. Narrative Production Task

Material: The Giraffe/Elephant story was chosen as it has been previously used in research with Greek-speaking children (Baldimtsi, Peristeri, Tsimpli, & Nicolopoulou, 2016). The A2 story, in particular, is about two friends, an elephant girl and a giraffe boy who are going swimming at the local pool. As the elephant girl is running excited towards the diving board, she slips, falls and hurts her knee. At the end of the story, an elephant lifeguard appears and helps the elephant girl but also reprimands her, saying she should not be running near the pool.

Procedure: Before administering the story telling task, children were told that the examiner was not familiar with the story and therefore they would have to be as explicit as possible when telling the story. The children, without the examiner being present, listened to the recorded story, while they also watched 8 eight pictures, which appeared in pairs on the computer screen. Immediately, after the narration, the child was asked to re-tell the story while looking at the same 8 pictures.

4.3. Data Analysis

The stories were transcribed verbatim by me. False starts (‘The giraffe no the elephant was trying to get to the pool’), repetitions (‘and hurt hurt her knee’), fillers and comments made both by the examinee and the examiner were excluded from the analysis. The scoring of the transcripts was according to the guidelines of the Multilingual Assessment Instrument for Narratives tool (Gagarina et al., 2012), which
has been adapted into Greek and piloted in Greek-speaking monolingual and bilingual children (Tsimpli et al., 2016). Narrative skills were analysed and coding was divided into microstructural and macrostructural properties.

4.3.1. Coding and Scoring of Narratives

The narrative measures were chosen according to the assessment guidelines and to previous literature of narrative studies with the same kind of participants. The measures included in microstructure were language complexity, syntactic complexity, lexical diversity and grammatical accuracy. Language complexity was calculated by dividing the number of coordinate and subordinate sentences by the total number of simple and complex sentences in the story, while syntactic complexity was tallied by dividing the number of subordinate clauses by the total number of complex sentences. Lexical diversity was the score of the number of content word types divided by the total number of content word tokens. The three measures were also estimated for each of the two episodes of the story. For the measure of grammatical accuracy, the story had to be segmented into communication units (c-units) according to the guidelines by Loban (1976). A c-unit consists of a main clause along with its subordination clauses. Coordinated clauses are separate c-units, except when the co-referential subject of the second clause is elliptical (And the elephant girl run and Ø hurt her knee). The grammatical accuracy score was calculated by dividing the grammatically correct c-units by the total number of c-units. Reversed word order, omitted words, like prepositions and omitted bound morphemes, like tense in obligatory contexts are some of the errors marked.

Macrostructure analysis included scores on story structure complexity (Story Grammar Model; Stein & Glenn, 1979; Gagarina et al., 2012), diversity in the use of Internal State Terms (ISTs) and referential ambiguity. The story structure was scored by assigning a total of 11 points when a child successfully referred to the setting of the story, its 3 characters and the two episodes, including their structure as goal, attempt and outcome. The ISTs were also analysed by diving them into ‘plus’ and ‘minus’ Theory of Mind (ToM) terms ISTs, which were calculated as the percentage of each subcategory out of the total number of main clauses (as in Tsimpli et al., 2016). The ISTs as two subcategories were also tallied for each episode of the story. The referential ambiguity measure referred to the use of ambiguous pronouns to
maintain reference for the 3 characters of the story. It was tallied by dividing the number of overt and null pronouns in syntactic subject and object position by the total number of pronouns produced by each child.

5. Results

5.1. Analysis strategy

After the scoring of the narratives, the data obtained from the three groups were analysed with the statistical package SPSS (version 25). To compare group performances for each of the microstructural and macrostructural measures, one-way analyses of variance (ANOVA)s were conducted. When the main effect of group was significant, Bonferroni post-hoc tests were run to compare each group pair. Paired-samples t tests were also conducted in order to account for within group comparisons of performance scores on different measures between the two episodes. Furthermore, multiple regression analyses were run in order to reveal any correlation between the children’s expressive vocabulary and all the measures and also among the measures within each group.

5.2. Comparison of groups on microstructure and macrostructure measures

Table 2 provides descriptive statistics for both microstructure (language and syntactic complexity, lexical diversity and grammatical accuracy) and macrostructure measures (story structure complexity, ±ToM-related ISTs and referential ambiguity) across the three groups. The results seem to both confirm and contradict the general hypotheses about the strengths and weaknesses of the two clinical groups. In particular, microstructure measures revealed a significant group effect for the grammatical accuracy measure, $F(2, 34) = 3.554, p = .041$, which stems from the fact that the children with HFA had a significantly lower score ($M = 75.10$) than the children with SLI ($M = 88.10$) $p = .041$. This result contradicts the hypothesis that usually SLI and not HFA score lower on language measures as the SLI group actually scored above both the TD ($M = 84$) and the HFA group. However, there were no other significant between-group differences in grammatical accuracy scores. Language complexity, $F(2,34) = 2.357, p = .111$, syntactic complexity, $F(2,34) = .0671, p = .518$ and lexical diversity, $F(2,34) = 1.538, p = .231$, did not reveal any significant group differences.
Results on macrostructure revealed significant group effects for story structure complexity, $F(2, 34) = 7.857$, $p = .002$, and [+ToM-related] IST use, $F(2, 34) = 6.001$, $p = .006$. The group effect in story structure complexity is attributed to the fact that both the HFA group ($M = 5.70$) $p = .012$ and the SLI group ($M = 5.36$) $p = .003$ scored significantly lower than the TD group. The difference between the two clinical groups ($p = 1$) was not significant. Regarding [+ToM-related] terms, the group effect was due to SLI children’s significantly lower performance ($M = 2.73$) compared to their peers with TD ($M = 12.08$) $p = .005$. This unexpected result highlights ToM deficits in SLI which are not usually reported. The HFA group scored more favorably ($M = 7.10$) $p = .420$ than the SLI group, although the difference was not significant. The rest of the macrostructure measures, [-ToM-related] IST use, $F(2, 34) = 1.829$, $p = .177$, and referential ambiguity, $F(2, 34) = 1.166$, $p = .325$, did not significantly differentiate the three groups.

**Table 5.1.** Group mean scores (and SDs) on microstructure and macrostructure variables

<table>
<thead>
<tr>
<th>Measure</th>
<th>TD $(n=13)$</th>
<th>HFA $(n=10)$</th>
<th>SLI $(n=11)$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microstructure:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language complexity</td>
<td>78.31 (9.68)</td>
<td>74.60 (10.75)</td>
<td>64.18 (24.51)</td>
</tr>
<tr>
<td>Syntactic complexity</td>
<td>38.15 (9.54)</td>
<td>31.30 (21.38)</td>
<td>30.55 (21.44)</td>
</tr>
<tr>
<td>Lexical diversity</td>
<td>67.08 (6.60)</td>
<td>72.90 (10.69)</td>
<td>65.73 (12.28)</td>
</tr>
<tr>
<td>Grammatical accuracy</td>
<td>84 (9.84)</td>
<td>75.10 (10.75)</td>
<td>88.10 (13.61)</td>
</tr>
<tr>
<td><strong>Macrostructure:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Story structure complexity</td>
<td>8.46 (1.56)</td>
<td>5.70 (2.83)</td>
<td>5.36 (1.91)</td>
</tr>
<tr>
<td>+ToM-related terms</td>
<td>12.08 (7.71)</td>
<td>7.10 (7.72)</td>
<td>2.73 (3.19)</td>
</tr>
<tr>
<td>-ToM-related terms</td>
<td>27.23 (8.28)</td>
<td>17 (13.27)</td>
<td>21.18 (16.62)</td>
</tr>
<tr>
<td>Referential ambiguity</td>
<td>11.54 (14.1)</td>
<td>21.80 (27.14)</td>
<td>23.36 (20.57)</td>
</tr>
</tbody>
</table>

*Note: TD: typically-developing children; HFA: children with High Functioning Autism; SLI: children with specific language impairment*
5.3. Comparison of groups’ performance scores on the two episodes

One-way analyses of variance (ANOVAs) were also conducted in order to compare the groups’ scores on selected measures for each of the two episodes. Table 3 presents details on each group’s scores on microstructure (language and syntactic complexity and lexical diversity) and macrostructure measures (+ToM-related ISTs) for each episode. As regards episode 1, a significant group effect was found for the language complexity measure, $F(2, 34) = 4.798, p = .015$, which was attributed to the significantly lower score of the SLI group ($M = 53.18$), compared to that of the TD group ($M = 75.85$) $p = .016$. The HFA group ($M = 71.10$) scored fairly similar to the TD group, resulting in a non-significant difference ($p = 1$). No significant group differences were found for syntactic complexity, $F(2, 34) = .283, p = .755$, lexical diversity, $F(2, 34) = .025, p = .975$, +ToM-related terms, $F(2, 34) = .715, p = .497$ and –ToM-related terms, $F(2, 34) = 1.243, p = .303$ in episode 1.

When it comes to episode 2, there was a significant group effect for +ToM-related ISTs, $F(2,34) = 7.334, p = .002$, which was due to the SLI group’s lower performance ($M = 3.09$) than the TD group’s performance ($M = 17.92$) $p = .002$. Unexpectedly, the HFA group ($M = 8$) scored more favorably than the SLI group, although their difference was not significant ($p = .767$). The difference between the HFA and the TD group was marginally not significant ($p = .063$). Nevertheless, the three groups showed fairly similar patterns of performance on –ToM-related IST use, $F(2,34) = 1.280, p = .292$, language complexity, $F(2, 34) = 0.372, p = .693$, syntactic complexity, $F(2,34) = 1.389, p = .264$ and lexical diversity, $F(2,34) = .117, p = .890$ in the second episode.
Table 5.2. Group mean scores (and SDs) on microstructure and macrostructure variables for each episode

<table>
<thead>
<tr>
<th>Measure</th>
<th>TD (n=13)</th>
<th>HFA (n=10)</th>
<th>SLI (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75.85 (8.82)</td>
<td>71.10 (13.41)</td>
<td>53.18 (28.39)</td>
</tr>
<tr>
<td><strong>Episode 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language complexity</td>
<td>37.08 (16.03)</td>
<td>31.50 (21.70)</td>
<td>31.64 (24.47)</td>
</tr>
<tr>
<td>Syntactic complexity</td>
<td>75.38 (5.70)</td>
<td>75 (18.67)</td>
<td>74.18 (13.92)</td>
</tr>
<tr>
<td>Lexical diversity</td>
<td>7 (7.58)</td>
<td>5.90 (6.87)</td>
<td>3.73 (5.40)</td>
</tr>
<tr>
<td>+ToM related terms</td>
<td>25.85 (8.36)</td>
<td>17.40 (16.09)</td>
<td>20.36 (14.69)</td>
</tr>
<tr>
<td>-ToM-related terms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Episode 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language complexity</td>
<td>81.46 (14.78)</td>
<td>73.10 (29.15)</td>
<td>75.36 (28.44)</td>
</tr>
<tr>
<td>Syntactic complexity</td>
<td>40.08 (9.42)</td>
<td>27.40 (26.22)</td>
<td>30.64 (20.39)</td>
</tr>
<tr>
<td>Lexical diversity</td>
<td>57.77 (9.90)</td>
<td>56.20 (22.03)</td>
<td>59.64 (16.46)</td>
</tr>
<tr>
<td>+ToM-related terms</td>
<td>17.92 (10.2)</td>
<td>8 (12.12)</td>
<td>3.09 (5.77)</td>
</tr>
<tr>
<td>-ToM-related terms</td>
<td>26.92 (14)</td>
<td>18.10 (18.21)</td>
<td>23.82 (19.43)</td>
</tr>
</tbody>
</table>

*Note:* TD: typically-developing children; HFA: children with High Functioning Autism; SLI: children with specific language impairment

5.4. Comparison of the two episodes within the groups

In order to get a clearer view of the overall performance of each group on the narrative production task, each episode was considered separately. The scores of each group on ±ToM-related IST use, language and syntactic complexity and lexical diversity for each episode were compared to each other, by using paired-samples t tests, in order to report and explain any major change in scores from the first to the second episode. As reported in table 3, the TD group scored significantly lower in the second episode on the lexical diversity measure, \( t (34) = 6.380, p < .05, sd = 9.95, \)
resulting in a great difference between the two scores ($MD = 17.615$). Paired-samples t tests also indicated a statistical significance on the +ToM-related ISTs for the TD group, $t (34) = -4.212, p = .001, sd = 9.34$. Children with typical development seem to have used much more +ToM-related terms in the second episode compared to the first ($MD = -10.923$). The comparison of the two episodes on language complexity, $t (34) = -1.442, p = .175, sd = 14.03$, syntactic complexity, $t (34) = -.631, p = .540, sd = 17.14$ and –ToM-related ISTs, $t (34) = -.849, p = .412, sd = 16$ for the TD group did not reach statistical significance.

The performance of the HFA group, on the other hand, did not vary between the two episodes and their overall performance on the narrative production task could be characterized as homogenous. Neither scores on microstructure measures (language complexity: $t (34) = -.194, p = .850, sd = 32.55$, syntactic complexity: $t (34) = .645, p = .535, sd = 20.11$, lexical diversity: $t (34) = 1.930, p = .086, sd = 30.80$) nor on macrostructure (+ToM-related ISTs: $t (34) = -.522, p = .614, sd = 12.71$, -ToM-related ISTs: $t (34) = -.112, p = .913, sd = 19.79$) statistically differentiated the scores of the HFA group between the two episodes. Nevertheless, similar to controls, children with HFA scored much lower in episode 2 on the lexical diversity measure ($MD = 18.800$) (see Table 3), although the difference did not reach statistical significance, $t (34) = 1.930, p = .086, sd = 30.80$.

When it comes to the SLI group, initial inspection of the data revealed a difference between episode 1 and episode 2 scores on the language complexity and lexical diversity measures. These observations were supported by paired-samples t tests which revealed statistical significance for both language complexity, $t (34) = -2.769, p = .020, sd = 26.56$, and lexical diversity, $t (34) = 2.741, p = .021, sd = 17.59$. Thus, the stories of the children with SLI were more complex in terms of structure ($MD = 22.182$) but less diverse in terms of language ($MD = 14.545$) in the second episode (see Table 3). +ToM-related ISTs, $t (34) = .271, p = .792, sd = 7.788$, -ToM-related ISTs, $t (34) = -.778, p = .454, sd = 14.720$ and syntactic complexity, $t (34) = .219, p = .831, sd = 15.126$, measures did not significantly differentiate the two episodes’ scores for the SLI group.
5.5. Relationship between expressive vocabulary and narrative measures for each group

A further concern of this study was to find out which narrative measures relate to expressive vocabulary. Therefore, a multiple regression analysis was carried out for each group. Expressive vocabulary score was used as a response variable and language and syntactic complexity, lexical diversity, grammatical accuracy, story structure complexity, ±ToM-related ISTs and referential ambiguity as explanatory variable to further examine the associations between measures. All the measures were entered in stepwise fashion in order to find out the one with the highest contribution to expressive vocabulary. As regards children with typical development, one model had to be entered, as only lexical diversity contributed to expressive vocabulary. In fact, lexical diversity explained for 44.5% of the variance in the expressive vocabulary score ($R^2 = .445, F(1, 11) = 8.819, p < .013$), indicating a positive change in expressive vocabulary, when lexical diversity scores were also high. More specifically, the TD group’s expressive vocabulary is equal to 26.831$+ .273$ (lexical diversity) points when lexical diversity is measured in percentage. Expressive vocabulary increased .273 for each percentage of lexical diversity (see table 4). The rest of the measures did not contribute significantly to expressive vocabulary and therefore were not entered into the model.

Table 5.3. Regression analysis predicting expressive vocabulary from language and syntactic complexity, lexical diversity, grammatical accuracy, story structure complexity, ±ToM-related ISTs and referential ambiguity scores in the TD group

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>26.831</td>
<td>6.198</td>
<td>4.329</td>
<td>.001</td>
</tr>
<tr>
<td>Lexical diversity</td>
<td>.273</td>
<td>.092</td>
<td>.667</td>
<td>2.970</td>
</tr>
</tbody>
</table>

Note: Only one model was entered with lexical diversity as the predictor variable

Regarding the two clinical groups, no significant relationship was found between expressive vocabulary and any of the narrative measures, neither for the HFA nor for
the SLI group. The same multiple regression analysis was conducted with expressive vocabulary as an outcome variable and all the microstructure and macrostructure measures as explanatory variables. However, none of the variables was entered into a model, suggesting that expressive vocabulary cannot predict any of the narrative measures and none of them contributes to a higher expressive vocabulary score, neither for HFA not for SLI children. Therefore, it seems that different skills set clusters characterize narrative production in the three groups.

5.6. Relationship among narrative measures for each group

Another important observation was the correlation between story structure complexity and syntactic complexity for the TD group ($r = .722, p = .003$), suggesting that the ability to narrate effectively is dependent or combined with the ability to effectively use subordinate clauses (see table 5). Furthermore, although the SLI group did not show any significant correlations between expressive vocabulary and narrative measures and among narrative measures, a significant relationship was found in the HFA group between story structure complexity and grammatical accuracy ($r = .815, p = .002$) (see table 6). Thus, accurate grammar was associated with the ability to produce a narrative rich in content in children in HFA.

Table 5.4. Correlations among narrative measures for the TD group

<table>
<thead>
<tr>
<th></th>
<th>LC</th>
<th>SC</th>
<th>LD</th>
<th>+ToM</th>
<th>-ToM</th>
<th>GA</th>
<th>RA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>.013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>-.016</td>
<td>.383</td>
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<tr>
<td>+ToM</td>
<td>.230</td>
<td>.322</td>
<td>-.401</td>
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<tr>
<td>-ToM</td>
<td>.140</td>
<td>.006</td>
<td>-.262</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>-.222</td>
<td>.292</td>
<td>.544</td>
<td>-.202</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RA</td>
<td>.176</td>
<td>-.391</td>
<td>-.220</td>
<td>.291</td>
<td>-.468</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STS</td>
<td>-.391</td>
<td>.722</td>
<td>.473</td>
<td>-.247</td>
<td>.293</td>
<td>-.438</td>
<td></td>
</tr>
</tbody>
</table>

Note: LC, language complexity; SC, syntactic complexity; LD, lexical diversity; +ToM, +ToM ISTs; -ToM, -ToM ISTs; GA, grammatical accuracy; RA, referential ambiguity; STS, story structure complexity Number in bold is significant at $p < .01$
Table 5.5. Correlations among narrative measures for the HFA group

<table>
<thead>
<tr>
<th></th>
<th>LC</th>
<th>C</th>
<th>LD</th>
<th>+ToM</th>
<th>-ToM</th>
<th>GA</th>
<th>RA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>-.401</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>.420</td>
<td>-.035</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ToM</td>
<td>.022</td>
<td>.190</td>
<td>-.665</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-ToM</td>
<td>.029</td>
<td>.674</td>
<td>-.053</td>
<td>.420</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GA</td>
<td>-.437</td>
<td>.276</td>
<td>-.452</td>
<td>.429</td>
<td>.477</td>
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<td></td>
</tr>
<tr>
<td>RA</td>
<td>.188</td>
<td>-.169</td>
<td>.120</td>
<td>-.096</td>
<td>-.581</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STS</td>
<td>.076</td>
<td>.114</td>
<td>-.111</td>
<td>.286</td>
<td>.591</td>
<td>.815</td>
<td>-.393</td>
</tr>
</tbody>
</table>

Note: LC, language complexity; SC, syntactic complexity; LD, lexical diversity; +ToM, +ToM ISTs; -ToM, -ToM ISTs; GA, grammatical accuracy; RA, referential ambiguity; STS, story structure complexity.

Number in bold is significant at p < .01

6. Discussion

This study is an extension to the small body of research that focused on the comparison of children with Specific Language Impairment and High Functioning Autism. Most such studies examine English-speaking children, while, to the best of my knowledge, there is only one such published study that directly compares Greek-speaking children with SLI and HFA (Manolitsi & Botting, 2011), without including a control group however. Therefore, as a result of the direct comparison and the juxtaposition with the TD group, it is able in this study to gain a comprehensive picture of the narrative abilities of these children. The multiple linguistic and pragmatic dimensions along with the two clinical groups are examined highlight areas that call for further assessment and intervention. All narrative measures were studied for all three groups in order to make clear all possible deficits and strengths. The two episodes of the story were looked into separately in an attempt to find what could be particularly difficult or problematic for each group. The extent to which expressive vocabulary aids narrative competence and how linguistic and pragmatic skills could be related were also examined. Results showed that the clinical groups had poorer scores in most of the narrative measures compared to their TD peers. As expected, the SLI and the HFA group showed deficits in the linguistic and the pragmatic aspect of the story, accordingly. Nevertheless, unexpected results also emerged, including ToM deficits in SLI and difficulty in grammatical accuracy for HFA. The comparison of
the episodes revealed the relative difficulty of the second episode, while expressive vocabulary was contributing to narrative skill only for the TD group.

6.1. Comparison of SLI and HFA groups to each other and to TD peers

6.1.1. Microstructure

Nearly all linguistic and syntactic measures did not distinguish either between HFA and SLI groups or between clinical groups and their TD peers. The only microstructure measure that revealed a statistical significance between the scores of SLI and HFA was grammatical accuracy. Nevertheless, it was an unexpected result as it was the HFA group that had a poorer score. Grammatical accuracy is not usually studied in HFA, as in Mäkinen’s (2014) research, because morphosyntactic deficits are viewed as a common characteristic of SLI (Leonard, 1998) but not necessarily of ASD in general (Leyfer et al., 2008). However, this study examines linguistic deficits in HFA, indicating that further research is needed in order to determine the extent to which HFA could be described by linguistic deficits also.

More studies that examined grammar in HFA include Colozzo et al. (2015) that studied grammatical errors both separately and along lexical and referential errors giving an overall error rate for every group. In line with this study’s results, the ASD group had an overall higher error rate compared both to SLI and TD and specifically more grammatical errors than the SLI group. One possible explanation for this is the heterogeneity of the ASD population, including both able and less able children, challenged by structural language deficits also (Kjelgaard & Tager-Flusberg, 2001). Williams et al. (2008) has also identified a particular high-functioning group with structural language impairments (ASD-LI) and impaired expressive language skills. Therefore, it might be the case that certain participants of the present HFA group belong to an ASD subgroup with SLI deficits. Nevertheless, Norbury & Bishop (2003) that examined tense-marking errors in ASD and SLI did not find a statistical significance between the clinical groups’ scores, although both groups had a poorer performance compared to TD peers and struggled with morphology and syntax in their narratives. As syntactic abilities are traditionally intact in HFA (Minshew et al., 1995 as cited in Norbury & Bishop, 2003), Norbury & Bishop (2003) suggest that children be identified according to an objective test, such as the CCC (Children’s
Communication Checklist, Bishop, 1998) in order to make results clear for any subgroup of ASD. It should also be noted that Greek is a morphosyntactically complex language and thus could create further difficulties to ASD, which is nonetheless a neurodevelopmental disorder that constrains language development. As a whole, the errors of the present ASD group included word order errors, erroneous use of prepositions and participles and inconsistent use of tenses, which indicate their inability to follow grammar rules in Greek. In any case, it seems that assessment of language skills should not be neglected in ASD groups and might also call for intervention (Feehan, Francis, Bernhardt & Colozzo, 2015 as cited in Colozzo et al., 2015).

The rest of the microstructure measures did not reveal any significant group effects, although there were some surprising trends that did not reach significance. Despite the core structural language deficits, the SLI group attained the highest score in the grammatical accuracy measure, even above the TD group, without being significant however. It could be the case that the particular story used in the production task called for simple structures and therefore grammar was not affected. The story was rather simple focusing on real-life events, despite the animal characters, meaning that children could draw on personal experiences, which might have helped them. Children could be examined on two stories, as in Colozzo et al. (2015) in order to test whether such results are story-specific and if performance decreases when story demands increase. Nevertheless, in line with previous literature, children with SLI scored the lowest in language and syntactic complexity and lexical diversity. As a matter of fact, the first hypothesis of this study was partly confirmed, as language and syntactic skills were impaired in SLI, except for grammatical accuracy.

6.1.2. Macrostructure

Regarding macrostructural analysis, only two measures distinguished between the clinical groups and their TD peers. +ToM terms were significantly more in children with SLI compared to TD children, while both clinical groups attained a much lower score in the story structure complexity measure compared to children with TD. As far as the use of +ToM terms is concerned, surprisingly the SLI group had the lowest score compared both to HFA and TD groups. This unexpected result, however, is in keeping with the findings of Mäkinen (2014), who also found out fewer mental state
expressions in SLI in comparison with the TD group. Possible explanations for this include a relationship between syntactic skills, usually impaired in SLI and mind reading (Miller, 2001 as cited in Mäkinen, 2014). As Mäkinen (2014) underlines, mental state expressions often require the use of sentential complements and thus the low language and syntactic complexity scores in SLI may account for the scarce use of ToM ISTs. However, this could not be the sole explanation as emotions for example can be expressed with simple copula clauses like (The elephant girl was excited) and hence language competence and vocabulary may contribute apart from syntactic skills. Astington & Baird (2005) discuss how language helps express mental states and as a result the low lexical diversity scores of the present SLI group and their poor performance in the Renfrew Word Finding Vocabulary test (1997) may be further evidence of their inability to express emotions and desires or beliefs.

Furthermore, school-aged children tend to focus more on the actions and not the underlying mental states of the characters (Mäkinen, 2014; Norbury & Bishop, 2003) and the ability to use evaluative language seems to develop throughout school years into adolescence (Norbury & Bishop, 2003). Therefore, the lack of frames of mind in the narratives of clinical groups and even TD groups (Bamberg-Damrad-Frye, 1991) is not that surprising. Nevertheless, the fact that the HFA group scored higher than the SLI group could be attributed to the fact that the story used in the current study mostly requires first order ToM skills. Children with ASD seem to manage well with first order ToM skills (Baron-Cohen, 2000), such as the fact that in this story they knew that the characters should not be running near the pool but the characters did not because they did not see the relevant sign. Thus, such stories can be particularly easy for HFA groups, in terms of ToM skills.

Norbury et al. (2013) also report similar results when examining 6 ½ to 15 year-old children. The LI group in this study obtained a lower score in the internal state language use measure compared to ASD and TD groups, while the inability to talk about emotions and desires of others is again attributed to low language skills (Norbury & Bishop, 2003). As stated, the LI group is able to recognize internal state language but does not have the vocabulary to discuss such terms. In keeping with the current finding, another study on Greek-speaking children by Tsimpli et al. (2016) reports deficits in ToM skills in monolingual children with SLI in comparison to their TD peers. Tsimpli et al. (2016) suggest that the use of +ToM-related ISTs rely on
working memory skills, as the recognition of mental states of characters while narrating carries a working memory load, an idea that had been supported by previous studies also (Spanoudis & Natsopoulos, 2011).

Contrary to the current finding on the use of +ToM terms, Colozzo et al. (2015) found out a strong trend for children with ASD to produce less mental state terms compared to children with SLI, whereas the same measure did not differentiate between clinical and TD groups. Colozzo et al. (2015) also suggests that psychological state terms should be examined as a distinct category and not as part of evaluative language in order to report conclusive results. This is confirmed by Norbury & Bishop (2003) who used an evaluation measure but found no group differences across SLI, PLI, HFA and TD groups, even when mental and emotion terms were examined as a distinct subcategory. Therefore, results regarding the ToM skills of children with SLI are somewhat mixed but most studies seem to converge on the fact that although children are presented with visual stimuli that exhibit characters’ emotions, the use of frames of mind remains scarce (Mäkinen, 2014, Siller et al., 2014, Colozzo et al., 2015). In the current study, this is also true as children with SLI failed to mention that the giraffe boy was happy at the beginning of the story or that he was scared when he saw his friend falling down, while in many cases the same observations are true for the HFA and the TD group. This might mean that the illustration of the story did not trigger children and definitely that some parts of the story are more challenging or do not appeal to children and thus narratives should be examined in episodes.

As anticipated, the clinical groups did not exhibit the same narrative skills as their TD peers and their mean scores in the story structure complexity measure differentiated them from controls. The story grammar guidelines that were followed in this study (Stein & Glenn, 1979; Gagarina et al., 2012) indicated that participants should mention the setting, the characters and the episodes of the story, elements that both clinical groups did not always refer to. Regarding the HFA group, the time and place of the story was left out by 7 out of the 10 participants of the group. The hierarchical organization of the second episode seemed also to be very demanding for the HFA group as 8 out of 10 children failed to describe the structure of the episode in terms of goal, attempt and outcome and were assigned zero points. Other difficulties included two participants’ problem to mention all characters and the fact that another
animal was used in the place of the actual animal character, for instance rabbit instead of giraffe. Although not studied here, some children with HFA made some inappropriate comments, as two of them started narrating by saying what they see and one of them began with the sentence ‘We should not be running’ as if it was a title. These observations are in line with previous studies that reported bizarre or irrelevant comments by ASD groups (Colozzo et al., 2015, Suh et al., 2014, Diehl et al., 2006). The SLI group performed fairly similar to the HFA, with 9 out of 11 children completely omitting time and place references in their narratives and 7 out of 11 children scoring a zero for the second episode.

According to Bishop & Donlan (2005, as cited in Manolitsi & Botting, 2011) such deficits in story grammar could be the result of limited story-recalling and conceptual understanding, as well as impaired structural language skills in SLI. As far as HFA is concerned, poor executive working memory in autism hinders children from producing a well structured narrative (Bishop & Norbury, 2005). Pragmatic errors are also seen as a possible explanation and increase in them is associated with decrease in the coherence and structure of a narrative (Norbury et al., 2013). In the current study a pragmatic error index was not calculated but it could have helped to understand how pragmatics contributes to narration. The fact that the current SLI group did not perform above the HFA group in story grammar comes in contrast to some previous studies’ results. Macro-level ability is considered to be a relative strength for children with SLI and better performance compared to ASD peers has been found (Mäkinen, 2014, Fey et al., 2004). Nevertheless, there are studies (Colozzo et al., 2015; Norbury et al., 2013; Norbury & Bishop, 2003) that did not report significant group effects for SLI and HFA groups. However, such studies use similar but not the same story grammar measure. It seems that there is no research that includes both clinical groups and the same story structure complexity measure for direct comparison. Therefore, this could be an area for further research.

6.2. Comparison of groups within each episode

Some of the micro- and macrostructure measures were also examined for each episode separately in order to find out whether the division of episodes could result in more group differences, making results clearer. Regarding episode 1, the language complexity measure significantly distinguished between TD and SLI groups, which is
a result that did not arise when language complexity was calculated for the narrative as a whole. Hence, the second hypothesis predicting that certain weaknesses could be evident only in episodic scores was confirmed. The poorer performance of the SLI group compared to TD peers on such a measure is rather expected considering the language and syntactic deficits of the SLI population (Leonard, 1998). This measure examines the ability of children to use coordinate and subordinate clauses which seems to be low in SLI as their narratives are described by short utterance length (Norbury et al, 2013) and simple clauses (Colozzo et al, 2011). This means that they have difficulty in linking events temporally and spatially and rather recount story events by using simple sentences. Nevertheless, the syntactic complexity measure that examines only subordination did not differentiate SLI from the other groups. Thus, subordination, although demanding, did not negatively affect the present SLI group.

As far as the second episode is concerned, +ToM terms of the SLI group were significantly lower to their TD peers, while the HFA group scored very low compared to controls but the difference was not significant. The deficit in +ToM ISTs in SLI was also evident in the overall examination of the narrative, so the division of episodes in this case did not add a new finding. However, it does highlight the fact that the two clinical groups faced great difficulty in expressing emotions and mental states, like desires and beliefs in the second episode compared to controls that scored much more favorably. In fact, the second episode is lengthier and more complex, as a new character is introduced and characters interact a lot. As a result of the subsequent actions, a few emotions are described, including the fact that the elephant girl was crying while explaining to the lifeguard what happened and that the giraffe boy was relieved and happy when he saw that his friend was better. Only two out of eleven children with SLI mentioned that the elephant girl was crying and none of them that the giraffe boy was relieved or that the lifeguard angrily looked at the girl and showed the sign writing ‘Do not run’. Therefore, the load of the actions and their complexity might have prevented children from focusing on ToM states. Nonetheless, the deficits in +ToM skills in SLI might also be attributed to impairments in vocabulary, syntax and working memory or to young age, as previously mentioned.
6.3. Comparison of the two episodes for each group

The novelty of the current study to examine narrative measures within each episode further gave the opportunity to understand whether one episode was more demanding than the other and for which group. Starting from the measures that increased from the first to the second episode, +ToM ISTs significantly increased in the second episode in the TD group. It seems that the complexity of the second episode did not hinder controls form managing both narrating events and focusing on underlying emotions. Only two out of the thirteen controls did not mention any of the internal state terms of the episode, although six of them did not manage to successfully describe the events, which means that the second episode was rather demanding even for them. Advanced ToM skills in controls compared to clinical groups seem to always be reported in studies, as typically developing children have the vocabulary to discuss such states and are not impaired in syntactic skills or mind-reading (Miller, 2001). Therefore, such change in scores between episodes could be attributed to the episode itself and the division of episodes could assess the successfulness of narratives to describe language and pragmatics skills.

Another measure that increased in the second episode was language complexity in children with SLI, but this finding is difficult to explain. The SLI group scored the lowest in the language complexity measure but the difference with controls was significant only when the first episode was considered separately. The increase in the second episode means that the SLI group made a considerable effort to narrate this complex part of the story, implying that the demands of it made them try harder. Furthermore, both TD and HFA groups had higher language complexity scores in the second episode but not statistically significant. Lexical diversity, on the other hand, decreased in the second episode both for children with TD and SLI. This variable that calculates content word types divided by the total number of content word tokens is mostly viewed as a measure of semantic diversity (Leadholm & Miller, 1992 as cited in Mäkinen, 2014). Therefore, the fact that this measure decreased in the second episode could be a result of its complexity and load in terms of content. However, a lexical diversity measure could be more conclusive in a story generation task because in retellings words are primed, as children have listened to the story before.
6.4. Associations between expressive vocabulary and narrative measures and among narrative measures

In an attempt to find further information of the narrative skills of each group regression analyses and correlations were run between expressive vocabulary and narrative variables and among micro- and macrostructure measures. A significant correlation between expressive vocabulary and lexical diversity was found only for the control group, while the clinical groups did not exhibit any significant relationships. Lexical diversity was the best predictor for expressive vocabulary in controls and this seems rather plausible as children who produce many different word forms in narratives are subsequently quite able in speaking or writing. We can imagine that expressive vocabulary increases with age (Mäkinen, 2014) and thus this ability is more evident and effective in narrative production in children with normal development. Nevertheless, we would not want to overstate this case as the two measures are not entirely independent. This finding does not seem to be comparable to any other study’s finding and actually Mäkinen (2014) reports an association between NDW (number of different words) and event content. NDW is a measure of productivity and semantics and Mäkinen (2014) suggests that more word forms in a narrative provide more opportunities to express meaning. However, such findings are not reported in the current study, as also the information units of the narrative were not measured.

It would be more interesting to find correlations between linguistic and pragmatic skills and therefore more tests such as the Clinical Evaluation of Language Fundamentals-4 (CELF-4; Semel, Wiig & Secord, 2003) and Children’s Communication Checklist (CCC, Bishop, 1998) or any other test adapted into Greek could be administered in order to gain a comprehensive picture of the linguistic and pragmatics profiles and performance of these children. In terms of this association between language and pragmatics, this study reported a significant positive correlation between story structure complexity and syntactic complexity in the TD group. As syntactic complexity is a measure of subordination, it is possible that more sentences provide space for more content in narratives. Nonetheless, the story structure complexity measure was highly associated with grammatical accuracy in children with HFA, perhaps suggesting that language skills in HFA might allow them
overcome their pragmatics deficits. These suggestions, however, call for further investigation.

7. Conclusions

This study aimed at examining the contribution of pragmatic and language deficits to narrative competence by comparing the narratives of children with specific language impairment and high functioning autism to that of age-matched controls. It also highlights narrative as an ecologically valid way to assess socio-pragmatic and structural language skills as narration is part of real-life communication and can be linked to socio-communicative and even academic success. Narratives appear to be more sensitive in revealing qualitative information of children with communication impairments especially in languages other than English, as they do not rely on normal distribution as standardized tests do (Manolitsi & Botting, 2011). Therefore, narrative production tasks should be used more often as a clinical tool in language assessment batteries (Mäkinen, 2014). They are semi-structured and even resemble naturalistic language because they required the use of connected speech. For these reasons, from a research perspective, they have been frequently used in order to describe the language and pragmatics profile of different clinical groups. From a clinical perspective, they could become the starting point for language intervention. Extended language use can be practiced while there is also opportunity to discuss internal state terms and understand the causal and temporal relation of events as well as the underlying motives and intentions of characters (Mäkinen, 2014).

These observations are supported by this study which uses a story retelling task in order to compare children with SLI and HFA. What this study adds however in terms of the use of the narrative is that each episode is also examined separately. As a result of this certain deficits, such as weakness in language complexity in the SLI group compared to controls were only evident when the story was divided into its two episodes. Furthermore, the performance of each group was traced form the first to the second episode bring up interesting findings that could both characterize the groups’ performance and the demands of each episode. Lexical diversity, for instance, decreased in the second episode both for controls and children with SLI suggesting that the content load of the second episode affected both groups’ use of vocabulary. Hence, the division of episodes seems to offer a more specific view of how a narrative
can differentiate between groups and such a technique could be implement in future studies. The use of more or different narrative variables and bigger sample sizes could also result in more findings.

Another novelty of this study is the fact that the two clinical groups were not only examined on the impairments that they are traditionally described with but both on language and pragmatics skills. In fact, this study seems to be the first attempt to compare Greek-speaking children with SLI and HFA between them and to age-matched controls, as Manolitsi & Botting (2011) did not include a control group. Results both confirmed and contradicted the traditional characterizations of HFA groups as pragmatically impaired and SLI groups as linguistically impaired. Although the SLI group scored low in language measures, such as language and syntactic complexity, it also exhibited difficulty in expressing +ToM terms, which was partly attributed to impaired linguistic skills. The HFA group, on the other hand, scored low in pragmatic measures but it also performed low in the grammatical accuracy measure, which could be a result of the heterogeneity of the group or of the morhosyntactic complexity of Greek. Nevertheless, apart from grammatical accuracy no other narrative variable significantly differentiated the two clinical groups. This could imply that larger sample sizes or a wider age range should be included or that more background assessment should be done in order to identify participants. Nonetheless, findings suggest that these groups can overlap as they were both vulnerable in story grammar and thus any clinical assessment or intervention should be broad regardless of the diagnosis.

If we were to try to explain and interpret every outcome of such studies we would still be left with contradictory results that seem to converge however on the fact that children with different developmental disorders might share some aetiological and behavioral similarities. The complex relationship between language, social cognition and discursive abilities always calls for further research and this study adds to the evidence regarding the comparison between SLI and HFA groups. Despite their communicative deficits, it is possible through study and intervention to help these populations from childhood into adolescence and adulthood develop plot structure or the ability to express emotions. It is hoped that this study’s results will be replicated and extended in order to successfully describe narrative competence in Greek-speaking and other non-English-speaking children. In this way, certain aspects
of communication could be identified as important in narrative skills and could be targeted through intervention.
References


APPENDICES

Appendix 1

Sample narratives and coding examples.

11;10-year-old girl with SLI

Πρώτα ἐτρεξαν/ First they ran
Μετά σταμάτησαν/ Then they stopped
Σταμάτησαν /They stopped
Ετρεξαν/ They ran
Και το κορίτσι, ο ελέφαντας ἐπεσε / And the girl, the elephant fell
και χτύπησε/ and was hurt
μετά κάποιος ἠρθε/ then someone came
και της ἐβαλε κάτι πάνω στο πόδι της/ and put something on her leg
και μετά την πήγε/ and then took her
να κάτσει κάπου/ to sit somewhere
και την φώναξε/ and was yelling at her

Microstructural analysis

Language complexity: 8/11 = 73% (Simple sentences: 3; Coordinate: 7; Subordinate: 1); Syntactic complexity: 1/8 = 12%; Lexical diversity: 18/22 = 82% (Total number of words: 22; Total number of words uniquely mentioned: 18); Grammatical accuracy: 4/4 = 100% (Number of C-units: 4)

Macrostructural analysis

Story structure complexity: 3/11 (Time: 0; Place: 0; Characters: 1; Episode 1: goal: 0; attempt: 1; outcome: 1; Episode 2: goal: 0; attempt: 0; outcome: 1); +ToM ISTs: 0/11 = 0%; -ToM ISTs: 2/11 = 18%; Referential ambiguity: 4/13 = 31%
Episodic analysis

Episode 1

Microstructure

Language complexity: 50%; Syntactic complexity: 0%; Lexical diversity: 80%

Macrostructure

+ToM ISTs: 0%; -ToM ISTs: 17%

Episode 2

Microstructure

Language complexity: 100%; Syntactic complexity: 20%; Lexical diversity: 83%

Macrostructure

+ToM ISTs: 0%; -ToM ISTs: 20%

9;9-year-old boy with SLI

There were an elephant girl and a giraffe

They wanted to run

They raced each other

And the giraffe was hurt

And put her a band-aid

And helped her
Και μετά την πήγαν σε ένα παγκάκι/ And then they took her to a bench
Και μετά η έλεφαντίνα έγινε καλά/ And then the elephant girl was good
Και η καμηλοπάρδαλη έφυγε/ And the giraffe left
Ενώ ο ναυαγοσώστης την κοίταξε/ Whereas the lifeguard looked at her
Και την είπε/ And told her
‘δεν έβλεπες την κάμερα/ ‘were you not paying attention to the camera
Ποι λέει/ That says
Να μην τρέχεις;’/ Do not run?’

Microstructural analysis

Language complexity: 12/18 = 66% (Simple sentences: 6; Subordinate: 3; Coordinate: 9); Syntactic complexity: 3/12 = 25%; Lexical diversity: 28/33 = 84% (Total number of words: 33; Total number of words uniquely mentioned: 28); Grammatical accuracy: 11/12 = 92% (Number of C-units: 12)

Macrostructural analysis

Story structure complexity: 7/11 (Time: 0; place: 0; characters: 3; Episode 1: goal: 0; attempt: 1; outcome: 1; Episode 2: goal: 1; attempt: 0; outcome: 1); +ToM ISTs: 1/18 = 5%; -ToM ISTs: 6/18 = 33%; Referential ambiguity: 4/15 = 27

Episodic analysis

Episode 1

Microstructure

Language complexity: 28%; Syntactic complexity: 50%; Lexical diversity: 91%

Macrostructure

+ToM ISTs: 14; -ToM ISTs: 14
Episode 2

Microstructure

Language complexity: 91%; Syntactic complexity: 20%; Lexical diversity: 82%

Macrostructure

+ToM ISTs: 0%; -ToM ISTs: 45%

10:9-year-old boy with HFA

Ήταν ένα ποντικάκι με ένα γάιδαρο/ There were a little mouse and a donkey

Και έκαναν τσουλήθρα/ And they were going down the slide

Και ήταν από πίσω ο γάιδαρος/ And the donkey was behind

Την έσπρωξε/ Pushed her

Ανέβηκε/ Went to the top

Και έκανε τσουλήθρα/ And went down the slide

Και κυλήθηκε/ And rolled

Και τώρα κατέβηκε/ And now came down

Περπατάει μπροστά το ποντικάκι κι ο ελέφαντας/ The mouse is walking ahead and the elephant

Και πίσω τρέχει ο γάιδαρος να τον προλάβει/ And behind the donkey is running to reach him

Την πρόλαβε/ He reached her

Και μετά πάει ο μεγάλος ελέφαντας/ And then goes the big elephant

Και την πήρε αγκαλιά/ And hugged her
Microstructural analysis

Language complexity: 9/13 = 69% (Simple sentences: 4; Coordinate: 9; Subordinate: 0); Syntactic complexity: 0/9 = 0; Lexical diversity: 20/30 = 67% (Total number of words: 30; Total number of words uniquely mentioned: 20); Grammatical accuracy: 6/9 = 67% (Number of C-units: 9)

Macrostructural analysis

Story structure complexity: 3/11 (Time: 0, place: 0; characters: 3; Episode 1: goal: 0; attempt: 0; outcome: 0; Episode 2: goal: 0; attempt: 0; outcome: 0); +ToM ISTs: 0%; -ToM ISTs: 0%; Referential ambiguity: 8/13 = 67%

Episodic analysis

Episode 1

Microstructure

Language complexity: 7/11 = 64%; Syntactic complexity: 0; Lexical diversity: 27

Macrostructure

+ToM ISTs: 0%; -ToM ISTs: 0%

Episode 2

Microstructure

Language complexity: 100%; Syntactic complexity: 0; Lexical diversity: 67%

Macrostructure

+ToM ISTs: 0%; -ToM ISTs: 0%
8;7-year-old girl with HFA

Μία φορά και έναν καυρό ήτανε μία καμηλοπάρδαλη και ένας ελέφαντας/ Once upon a time there were a giraffe and an elephant

Που περπατούσανε μέχρι την πισίνα/ That were walking to the pool

Μετά όμως σταμάτησαν/ But then they stopped

Και κοίταξαν/ And looked

Αν είναι ζεστό το νερό/ if the water is hot

Μετά ήτανε κρύο/ Then it was cold

Έτρεξαν/ They ran

Και όμως ο ελέφαντας γλίστρησε/ But the elephant slipped

Έπεσε κάτω/ Fell down

Και η καμηλοπάρδαλη πήγε/ And the giraffe went

να την βοηθήσει/ to help her

όμως όταν χτύπησε/ but when she was hurt

ήρθε ο μπαμπάς της/ her dad came

και την έβαλε ένα χαζαπλάστ/ and put a band-aid on her

μετά την άφησε/ then left her

την έβαλε/ took her

να καθίσει κάτω/ to sit down

και την είπε να μην ξανατρέξει στο νερό/ and told her not to run again near the water
**Microstructural analysis**

Language complexity: 14/19 = 74% (Simple sentences: 5; Coordinate: 9; Subordinate: 5); Syntactic complexity: 5/14 = 36%; Lexical diversity: 31/42 = 74% (Total number of words: 42; Total numbers of words uniquely mentioned: 31); Grammatical accuracy: 7/9 = 78%

**Macrostructural analysis**

Story structure complexity: 7/11 (Time: 1; Place: 1; Characters: 3; Episode 1: goal: 0; attempt: 1; outcome: 1; Episode 2: goal: 0; attempt: 0; outcome: 0); +ToM ISTs: 0%; -ToM ISTs: 15%; Referential ambiguity: 8/16 = 50%

**Episodic analysis**

**Episode 1**

**Microstructure**

Language complexity: 73%; Syntactic complexity: 38%; Lexical diversity: 81%

**Macrostructure**

+ToM ISTs: 0%; -ToM ISTs: 9%

**Episode 2**

**Microstructure**

Language complexity: 75%; Syntactic complexity: 33%; Lexical diversity: 60%

**Macrostructure**

+ToM ISTs: 0%; -ToM ISTs: 25%

**11;6-year-old girl with typical development**

Έταν λοιπόν η ελεφαντίνα και ο καμηλοπάρδαλης/ So there were the elephant girl and the giraffe boy

Και είχαν πάει στην πισίνα/ And had gone to the pool
Και η ελεφαντίνα λέει/ And the elephant girl says

’όποιος φτάσει πιο γρήγορα εκεί’/ whoever is going to reach first there

Που είχε ένα ξύλο/ where there is a wood

Από κει που κάνουν βουτιές όλο/ from which everyone dives

Και πήγαν/ And went

όσο πιο γρήγορα μπορούσαν/ As fast as they could

και η ελεφαντίνα σκόνταψε/ And the elephant stumbled

και χτύπησε/ and fell

και ο καμηλοπάρδαλης είχε φοβηθεί/ And the giraffe boy was scared

και μετά ήρθε ένας ναυαγοσώστης/ and then a lifeguard came

και τη βοήθησε/ and helped her

της έβαλε τσιρότο/ put a band-aid on her

και μετά άρχισε ο φίλος της ο καμηλοπάρδαλης/ and then started her friend the giraffe boy

την είδε/ saw her

να ήτανε καλύτερα/ that she was better

και χάρηκε γι’ αυτό/ and was happy for this

και μετά ο ναυαγοσώστης/ and then the lifeguard

είπε στην ελεφαντίνα/ told the elephant girl

να προσέχει άλλη φορά / to be careful next time

και να βλέπει τις ταμπέλες/ and to pay attention to signs

που έγραφαν ‘να μην τρέχετε’/ that said ‘Do not run’
Microstructural analysis

Language complexity: 20/23 = 87% (Simple sentences: 3; coordinate: 11; subordinate: 9) Syntactic complexity: 9/20 = 45%; Lexical diversity: 40/54 = 74% (Total number of words: 54; Total number of words uniquely mentioned: 40); Grammatical accuracy: 9/11 = 82%

Macrostructural analysis

Story structure complexity: 9/11 (Time: 0; Place: 1; Characters: 3; Episode 1: goal: 1; attempt: 1; outcome: 1; Episode 2: goal: 1; attempt 0; outcome: 1); +ToM ISTs: 13%; -ToM ISTs: 26%; Referential ambiguity: 1/14 = 7%

Episodic analysis

Episode 1

Microstructure

Language complexity: 91%; Syntactic complexity: 40%; Lexical diversity: 75%

Macrostructure

+ToM ISTs: 9%; -ToM ISTs: 18%

Episode 2

Microstructure

Language complexity: 83%; Syntactic complexity: 50%; Lexical diversity: 73%

Macrostructure

+ToM ISTs: 17%; -ToM ISTs: 33%

10;1-year-old boy with typical development

Μια φορά και έναν καιρό ήταν ένας ελέφαντας και μια καμηλοπάρδαλη/ Once upon a time there were an elephant and a giraffe

Και είχε έρθει η φίλη της η ελεφαντίνα/ And her friend the elephant girl had come
Και κανένας απ’ τους δυο τους δεν είχε δει την πινακίδα/ And none of the two had seen the sign

Που έγραφε ‘μην τρέχετε’/ that said ‘Do not run’

Και λέει η ελεφαντίνα ‘ποιος θα φτάσει πρώτος’/ And the elephant girl says ‘who is going to reach first’

Και άρχισαν/ And they started

Να τρέχουνε/ Running

Και την ώρα που ο καμηλοπάρδαλος πήγε να την φτάσει/ And the time the giraffe boy was about to reach her

Αυτήν έπεσε/ She fell

και χτύπησε το πόδι της/ And hurt herself

μετά ήρθε ο ναυαγοσώστης/ Then the lifeguard came

και έβαλε στο πόδι της ένα τσιρότο/ and put a band-aid on her leg

και ο φίλος της που ήταν καθιστός/ and her friend who was sitting

και την έβλεπε/ and watching her

την ώρα που έφευγε/ the time he was leaving

ο ναυαγοσώστης την κοιτούσε μ’ ένα σοβαρό βλέμμα/ the lifeguard was looking at her with a solemn gaze

και την έλεγε την πινακίδα ‘μην τρέχετε’/ and was saying to her ‘the sign ‘Do not run’

tην είδατε; did you see it?’

Microstructural analysis

Language complexity: 17/20 = 85% (Simple sentences: 3; Coordinate: 11; subordinate: 6); Syntactic complexity: 6/17 = 35%; Lexical diversity: 36/50 = 72% (Total number of words: 50; Total number of words uniquely mentioned: 36) Grammatical accuracy: 9/11 = 82% (Number of C-units: 11)
Macrostructural analysis

Story structure complexity: 7/11 (Time: 1; Place: 0; Characters: 3; Episode 1: goal: 1; attempt: 1; outcome: 1; Episode 2: goal: 0; attempt: 0; outcome: 0); +ToM ISTs: 1/20 = 5%; -ToM ISTs: 7/20 = 35%; Referential ambiguity: 4/15 = 27%

Episodic analysis

Episode 1

Microstructure

Language complexity: 83%; syntactic complexity: 40%; lexical diversity: 83%

Macrostructure

+ToM ISTs: 0; -ToM ISTs: 25%

Episode 2

Microstructure

Language complexity: 88%; syntactic complexity: 29%; lexical diversity: 55%

Macrostructure

+ToM ISTs: 13%; -ToM ISTs: 50%

Appendix 2

Transcribed story.

Εικόνα 1: Μια μέρα μία χαρούμενη καμηλοπάρδαλη αγοράκι, ο καμηλοπάρδαλης και μία παιχνιδιάρα ελεφαντίνα πήγαν βόλτα στην πισίνα της γειτονιάς τους. Η ελεφαντίνα αμέσως πρόσεξε μία σανίδα από την οποία μπορούσαν να κάνουν πολλές βουτιές. Κανείς τους όμως δεν είδε τη ταμπέλα που έγραφε «μην τρέχετε».

Picture 1: One day one happy giraffe boy and a playful elephant girl went to the swimming pool in their neighbourhood. The elephant girl immediately saw a diving board from which they could dive many times. None of the two however saw the sign that said ‘Do not run’.
Εικόνα 2: Μη χάνοντας χρόνο αποφάσισε να ξεκινήσει το παιχνίδι λέγοντας στον καμηλοπάρδαλη «Ας δούμε ποιος θα φτάσει πιο γρήγορα στη σανίδα!». 

Picture 2: Without losing any time she decided to start the game telling the giraffe boy ‘Let’s see who is going to reach the diving first!’.

Εικόνα 3: Ξεκίνησαν το τρέξιμο με την ελεφαντίνα μπροστά και τον καμηλοπάρδαλη να την ακολουθεί.

Picture 3: They starting running and the elephant girl was ahead while the giraffe boy was following.

Εικόνα 4: Ενώ ο καμηλοπάρδαλης προσπαθούσε να τη φτάσει η ελεφαντίνα γλίστρησε και έπεσε. Πόνεσε και έβαλε τα κλάματα, ενώ ο καμηλοπάρδαλης κοίταξε φοβισμένος.

Picture 4: As the giraffe boy was trying to the elephant girl, she slipped and fell. She was hurt and starting crying, while the giraffe boy was looking scared.

Εικόνα 5: Ένας ελέφαντας ναυαγοσώστης τους έδειξε και πλησίασε προς το μέρος τους για να δει τι συνέβη.

Picture 5: One elephant lifeguard saw them and headed towards them to see what happened.

Εικόνα 6: Η ελεφαντίνα του εξήγησε κλαίγοντας τι έπαθε. O ναυαγοσώστης αφού εξέτασε την πληγή της της έβαλε ένα τσιρότο, καθώς ο φίλος της παρακολουθούσε γονατιστός.

Picture 6: The elephant girl explained what happened while crying. After examining her wound, the lifeguard put a band-aid on her, while her friend was kneeling down and watching.

Εικόνα 7: Αμέσως τη βοήθησαν να περπατήσει μέχρι το παγκάκι για να ξεκουραστεί. O φίλος της ο καμηλοπάρδαλης ανακουφίστηκε και χάρηκε που η φίλη του φαινόταν καλά.

Picture 7. Right away they helped her walk to the bench in order to rest. Her friend the giraffe boy was relieved and happy that his friend seemed to be good.
Εικόνα 8: Μόλις έφυγε ο φίλος της, ο ναυαγοσώστης κοίταξε την ελεφαντίνα αυστηρά και της έδειξε την πινακίδα που έγραφε «μην τρέχετε» λέγοντάς της ότι την επόμενη φορά θα πρέπει να είναι πιο προσεχτική. Εκείνη του το υποσχέθηκε και τον ευχαρίστησε για τη βοήθεια του.

Picture 8. Once her friend left, the lifeguard looked at the elephant girl strictly and showed her the sign that said ‘Do not run’, telling her that next time she should be more careful. She promised it and thanked the lifeguard for his help.

Appendix 3

Pictured story.