An investigation of oral narratives in children with High Functioning Autism: aspects of microstructure and macrostructure

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Aims

- to compare the narrative performance of children with High Functioning Autism (HFA) to that of typically-developing (TD) children in terms of referential cohesion and global narrative coherence
- to examine whether lexical and syntactic abilities correlate with cohesion and coherence in narrative discourse
Individuals with HFA belong to the autism spectrum with no learning disability (Frith, 2004)

Basic language functioning (phonology, syntax) is age-appropriate while higher level linguistic abilities (e.g. use of language in context, pragmatic inferencing, intentionality) are inappropriate (Joliffe & Baron-Cohen, 2000; Tager-Flusberg, Paul & Lord, 2005)

Verbal and non-verbal IQ ≥85
Narratives as linguistic and cognitive markers of development

- **Linguistic** development: reference, coordination, subordination, temporal anchoring

- **Cognitive** (and pragmatic) development: constructing the episode(s) and building a mental model of the narrative
  
  (Johnson-Laird, 1983; Bower & Morrow, 1990; Arnold, Benetto & Diehl, 2008)

- **Central coherence** - *Theory of Mind*

Definite DP, Null Pronoun and Overt pronouns for Maintenance

Lexical Definite DP for Shift. Overt pronoun only when gender cues or prominence disambiguate.

Nicolopoulou, Aksu-Koc & Tsimpli, 2013
Reference use in autism

- **Underspecification:** Children with autism overused pronouns and zero-pronouns where full DPs should have been used in shift contexts ((Norbury & Bishop, 2003; Norbury et al., 2013; Tager-Flusberg, 1995)

- **Overspecification:** children with autism overused full DPs expressions instead of pronouns in maintenance (Baltaxe, 1977; Colle, Baron-Cohen, Wheelwright & Van der Lely, 2008; Arnold et al., 2009)

- Why?
  - A. Memory problems (maintaining activation in cases of overload)
  - B. Taking the listener’s perspective into account (ToM)
B. Global narrative coherence

- holistic organization of discourse,
- use of causal explanatory frameworks to integrate narrated events in meaningful ways,
- and referential cohesion
  
  (Hogan-Brown, Losh, Martin, & Mueffelmann, 2013)

→ Individuals with autism tend to use fewer evaluatives (i.e. characters’ thoughts & emotions), fewer causal networks and more irrelevant, inappropriate utterances while narrating a story
  
  (Norbury et al., 2013; Diehl et al., 2006)
I. The study - Participants

- 20 Greek-speaking children diagnosed with HFA (1 girl, age range: 7;0-12;6, **Mean: 9;4 yrs.**, **SD: 1.8**)

**Diagnostic criteria:**

- Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994)
- Clinical assessment of the child’s social-adaptive functioning by a child psychiatrist

- 20 typically-developing (TD) Greek-speaking children (1 girl, age range: 7;0-12;5, **Mean: 9;4 yrs.**, **SD: 1.78**
II. The study – Methodology

Screening tasks

- **Morpho-Syntactic Comprehension** (Diagnostic Verbal IQ (DVIQ); Stavrakaki & Tsimpli, 1999)

- **Greek Expressive Vocabulary task** (Vogindroukas, Protopapas, & Sideridis, 2009; adaptation from Renfrew Word Finding test, 1995).
### Results (WISC-III, DVIQ, Vocabulary), Means (SD)

<table>
<thead>
<tr>
<th>Groups</th>
<th>WISC (general IQ index)</th>
<th>DVIQ score</th>
<th>Expressive Vocabulary (max. score: 50)</th>
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<tbody>
<tr>
<td><strong>TD control Children</strong></td>
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<tr>
<td>Children</td>
<td>120.6</td>
<td>17.1 (3.9)</td>
<td>45.1 (3.7) MEVA: 11;7</td>
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<tr>
<td></td>
<td>Mean verbal IQ: 120.65 (16.4)</td>
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<td>Mean performance IQ: 115.7 (15.4)</td>
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<tr>
<td><strong>Children with HFA</strong></td>
<td>103.9</td>
<td>15.0 (3.8)</td>
<td>42.4 (5.0) MEVA: 10;7</td>
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<tr>
<td></td>
<td>*Mean verbal IQ: 103.8 (17.3)</td>
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<tr>
<td></td>
<td>**Mean performance IQ: 103.2 (15.4)</td>
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*verbal IQ index*: 9 children with HFA scored sign. lower (p<.05) than the mean of the control children

**performance IQ index**: 7 children with HFA scored sign. lower (p<.05) than the mean of the control children

(Singlims_ES software; Crawford et al., 2003)
II. The story

- Wordless storybook: ‘Harry the dirty dog’ (Zion, 1956)

- **Telling:** all pictures were presented initially and then page by page in a book form; the experimenter was watching

- **Retelling:** the child listens to the story through headphones; the experimenter was sitting opposite the child without looking at the book; the child had to retell the story looking at the pictures again
“Harry the dirty dog” picture-story
II. a. Microstructure

- **Lexical Diversity** of Internal State terms (emotions, beliefs, attitudes, ... expressed through different categories)
- **Syntactic Complexity Index** (Hunt, 1970): No of subordinated sentences for every c-unit
II.b. Macrostructure

- No of Episodes
- Setting

-Closing events: statements that indicate goal attainment/ failure of the protagonists actions

-Accuracy: theme & point of the story

-Causal connectivity: the average number of connections between propositions

Causal Networks (Trabasso & Sperry, 1985)

- In text cause-and-effect connections between events or linguistic units create a network of information.
- This network identifies the causal chain, the events that create the gist of the story (Trabasso & Sperry, 1985)
Causal connections in the story "Harry the dirty dog" between 5 events:

1. Harry was a white dog with black spots
2. who liked everything, except... getting a (2) bath.
3. So one day when he heard the water running in the tab, (3)
4. he took the scrubbing brush... and buried it in the backyard
5. Then he ran away from home.
I. Frequencies of use of referential forms in telling and retelling in Maintenance

- Pronouns > Lex. DPs in both telling and retelling (p<.05) for both groups
- No significant between-group differences in either telling or retelling
I. Frequencies of use of referential forms in telling and retelling in **Reintroduction**

- Pronouns > Lex. DPs in telling only (p<.05) for both groups
- Non significant between-group differences in both modes
- Lex. DPs sign. higher in retelling (p<.010) for both groups (**retelling effect**)
II. Narrative length and Lexical Diversity of IST Telling

- TD children: higher rates for both C-units and lexical diversity in retelling (p < .005)
- Children with HFA: higher rates for lexical diversity in retelling (p = .013)
- Significant between-group differences in both C-units and Lexical Diversity in Retelling

(TD children > children with HFA)
III. Microstructure: Syntactic Complexity Index

TD children: higher Syntactic Complexity Index in Retelling ($p = .013$) 

n.s. between-group differences
IV. Macrostructure measures

- **TD children**: narrative mode effect; higher rates for **Settings** in Retelling ($p=.025$)
- **Children with HFA**: narrative mode effect; higher rates for **No of Episodes** ($p=.034$) and **No of Peripheral Events** ($p=.046$) in Retelling.
- **Telling**: TD > children with HFA in Causal Connectivity, Accuracy, No of Episodes and Peripheral Events
- **Retelling**: TD > children with HFA in all 5 categories
• **HFA children**

✓ Syntactic Comprehension (DVIQ) was positively correlated with the Syntactic Complexity index in retelling \((F(1, 19)=4.003, p=.051, r=.182)\).

✓ Expressive Vocab was positively correlated with Causal connectivity in the telling condition \((F(1, 19)=4.113, p=.058, r=.186)\).
Summary

- Referential Cohesion: no significant between-group differences in the use of appropriate referential forms per referential function
- Microstructure: children with HFA produced shorter narratives and less lexical diversity in the use of internal state terms
- Macrostructure: children with HFA had less structured causal networks than the TD children---story structure and coherence were problematic for the children with autism
- Narrative mode effects: retelling had more marked effects on TD children than children with HFA in terms of number of C-units, Syntactic Complexity and Settings as part of causal networks
Remaining questions

- To what extent can differences in language ability in children with HFA vs. TD account for problems in encoding macrostructure?
Many thanks to the children participating in the study and their parents
And thank you for your attention!


Peripheral events of the story

1. Harry was a white dog with black spots
2. who liked everything, except… getting a bath.

- 1st. Harry is avoiding the bath
- 2nd. Harry’s adventure w/ sub-episodes
- 3rd. Harry’s trouble back home
- 4th. Finding the brush
- 5th. Towards the bath tub
- 6th. Taking a bath
- 7th. Bach home

- 1. Harry’s bath was the soapiest one he’d ever had. It worked like magic.
  As soon as the children started to scrub, they began shouting, “Mummy! Daddy! Look! Come quick! It’s Harry! It’s Harry! It’s Harry!” they cried.
- 2. Harry wagged his tail and was very, very happy.
- 3. It was wonderful to be home
“Harry the dirty dog” story is that it is about a white dog with black spots who loves everything, except baths. So one day before bath time, Harry runs away. He plays outside all day long, digging and sliding in everything from garden soil to pavement tar. By the time he returns home, Harry is so dirty he looks like a black dog with white spots. His family doesn't even recognize him!

Of all things, Harry has to ask for a bath and when finally gets it then his family recognizes him.