### Language Use in Children With Attention Deficit Hyperactivity Disorder

Margaret Mathers

Grad Dip (Ling); Dip. Sp Thy (Cumberland)

A thesis submitted in fulfilment

of the requirements for the degree of

Doctor of Philosophy

March 2007

## DECLARATION

I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution.

(Signed)

### ACKNOWLEDGEMENTS

Numerous people have supported and contributed to the production of this thesis. Firstly, I sincerely thank my principal supervisor, Dr Alison Ferguson, for her untiring assistance and guidance. I would also like to acknowledge the financial support provided through the Australian Postgraduate Association, and the School of Education and Arts at the University of Newcastle for assistance with grants to attend conferences and funding for statistical support.

Thanks are also due to the families and the children who generously gave of themselves. I hope that you will all be suitably rewarded. In particular, I am grateful to the parents and children from the Newcastle - Hunter ADHD Support Group; the children, parents and staff of Bishop Tyrell Anglican College, Newcastle Grammar School, Our Lady of Lourdes Primary School, Tarro, St John's Primary School, Lambton, St Patrick's Primary School, Wallsend, St Phillip's Christian College, Waratah, and St Therese's Primary School, New Lambton.

Special thanks to my friends and colleagues in the Speech Pathology programme at the University of Newcastle, in particular Julie Thomson, Liz Spencer, and Sally Hewat. To Kim Colyvas, my statistical consultant, thank you for a job so well done and for your patience and encouragement. Thanks also to Jane Robertson, Andrew Murray, and Emily Walkom; without your time, input and effort, I doubt I would have reached this stage.

To my family, we've trodden this path together; thank you for bearing with me. To David, my loyal and long-suffering husband, you were wonderful; we did it! To my children, David, Daniel, Charlie, Tess, and Julia, thanks for putting up with my irritability and absences; let's go to the beach! Mum and Dad, I hope you are proud; Steve, I'm sure you're whooping from above; keep your watchful and loving eye on us and all our future endeavours won't you; hopefully nothing will ever take this long again!

> ... Nothing we do is complete ... No statement says all that could be said ... We lay foundations that will need further development ... We may never see the end results, but that is the difference between the master builder and the worker. Excerpts from Romero's Prayer, attributed to K Untener

## **PUBLICATIONS AND PRESENTATIONS**

The following journal articles and conference presentations resulted from work on this

thesis.

#### **Journal Articles**

- Mathers, M. (2006). Aspects of language in children with ADHD: applying functional analyses to explore language use. *Journal of Attention Disorders*, 9(3), 523-533.
- Mathers, M. (2005). Some evidence for distinctive language use by children with Attention Deficit Hyperactivity Disorder. *Clinical Linguistics and Phonetics*, 19(3), 215-225.
- Mathers, M. (2001). Language use in Attention Deficit Hyperactivity Disorder: a preliminary report. *Asia Pacific Journal of Speech Language and Hearing*, *6*(1), 47-52.

#### **Conference Presentations**

- Mathers, M. (2004, September). *Aspects of language use in Attention Deficit Hyperactivity Disorder*. Paper presented at the 26th world Congress of the International Association of Logopedics and Phoniatrics in conjunction with annual Speech Pathology Australia national conference.
- Mathers, M. (2003, August). *Exploring language use in Attention Deficit Hyperactivity Disorder: A functional perspective*. Paper presented at the Language, Learning and Literacy conference convened by the Children's Hospital Education and Research Institute (CHERI), Westmead Hospital, Sydney, Australia.
- Armstrong, E., Ferguson, A., Mortensen, L., Togher, L., Mathers, M., Spencer, E., Rigaudeau-McKenna, B., Grant, S., & Hand, L. (2001, December). Language disorder: A window to language organisation, the brain, and learning how to mean. Invited plenary – Language, Brain, and Culture, a conference sponsored by the Australian Systemic Functional Linguistics Association, and the Centre for Language in Social Life at Macquarie University. University of Sydney, Sydney.

- Mathers, M. (2000, July). *Exploring the language use of children diagnosed with attention deficit hyperactivity disorder*. Paper presented at the Asia Pacific Conference on Speech, Language and Hearing, Broadbeach, Queensland, Australia.
- Mathers, M. (2000, May). *Investigating the language of children with Attention Deficit Hyperactivity Disorder*. Paper presented at the Speech Pathology Australia national conference, Adelaide, South Australia, Australia.
- Mathers, M (1999, December). Language in children with Attention Deficit Hyperactivity Disorder. Paper presented at Children's language: Conversations across disciplines, a conference sponsored by the Australian Systemic Functional Linguistics Association and the Department of English at the University of Sydney, at the University of Sydney, Sydney, NSW, Australia.

# TABLE OF CONTENTS

Declaration	1	i
Acknowled	gements	ii
Publication	s and Presentations	iv
Table of Co	ontents	vi
Index of Ta	ıbles	X
Index of Fi	gures	xii
Glossary of	Abbreviated Terms	xiv
Abstract		xvi
Chapter 1	Attention Deficit Hyperactivity Disorder and Language	1
1.1. Ov	erview of Thesis	1
1.2. Att	ention Deficit Hyperactivity Disorder	7
1.2.1.	Introduction	7
1.2.2.	What is known about ADHD	8
1.2.3.	Issues in understanding the nature of ADHD	
1.2.4.	Summary of ADHD	
1.3. Ex	ploring Language Associated With ADHD	
1.3.1.	Introduction	
1.3.2.	Definition of terms	
1.3.3.	Variations in identified language difficulties	
1.3.4.	Ways of evaluating language	
1.3.5.	Limitations of previous work	
1.3.6.	Issues in language development and assessment	

-4

1.4.	Summary	
Chapte	r 2 A Framework for Investigating Language Use	50
2.1.	Introduction	
2.2.	Notions about language in children with ADHD	51
2.2	1. Information from previous research	
2.2	2. The place of Specific Language Impairment	
2.2	3. A theoretical basis for exploring language use	61
2.3.	Describing language use	65
2.3	1. Systemic Functional Linguistics	66
2.3	2. The SFL perspective on language issues in ADHD	73
2.3	3. The SALT programme	81
2.3	4. Descriptions of the texts	
2.4.	Summary	
Chapte	r 3 Methods	86
3.1.	Introduction	
3.2.	Ethics	
3.3.	Subjects	
3.3	1. Recruitment	
3.3	2. Selection criteria	
3.3	3. Sample	93
3.4.	Experimental procedure	95
3.4	1. Setting	95
3.4	2. Data collection	95
3.5.	Data	
3.6.	Data analysis	
3.6	1. Clause structure	
3.6	2. Thematic structure	
3.6	3. Imperative mood	
3.6	4. Quantity and lexico-grammar	
3.6	5. Spoken language	
3.6	.6. Conventions of written language	
3.6	7. Description	119

3.7.	Statistical methods	.119
3.7	.1. Quantitative analyses	.120
3.7	.2. Descriptive outcomes	.123
3.7	.3. Reliability	.124
3.8.	Summary	.126
Chapte	r 4 Results of the Study	.127
4.1.	Introduction	. 127
4.2.	Differences between ADHD and control children	.128
4.2	.1. Comparisons of formal language assessments	.131
4.2	.2 Summary of formal test information	.137
4.2	.3 Overall comparisons of elicited texts	.137
4.2	.4 The effect of mode of expression and text type	.145
4.3.	Summary of results	.151
Chapte	r 5 Discussion	.152
5.1.	Introduction	.152
5.2.	The Limits of Formal Testing In ADHD	.155
5.3.	Interpretations of Thematic Choices	.156
5.3	.1. Revisiting theme	.157
5.3	.2. ADHD, mode of expression, and text type affect theme	. 159
5.4.	Interpretations of Clause Structure Choices	.164
5.4	.1. ADHD, mode of expression, and text type affect clause structure	.164
5.5.	Interpretations of Lexico-grammatical Choices	.167
5.5	.1. Understanding grammatical intricacy and type/token ratio	.167
5.5	.2. ADHD and mode of expression affect grammatical intricacy and TTR .	.168
5.6.	Interpretations of Behaviour When Children With ADHD Speak	. 169
5.6	.1. Observations of spoken language and associated behaviours	.170
5.7.	Interpretations of the Use of Written Conventions in Texts	. 172
5.8.	Macro Textual Organisation	. 173
5.9.	Length of Texts	.173
5.10.	Summary of the Discussion	.175
5.11.	Clinical Applications	.176
5.12.	Limitations of the Study	.178

5.13. Directions for Further Research	
5.14. Conclusions	
References	184
Appendix A Parent Questionnaire	195
Appendix B Attrition of Initial Participants	
Appendix C ADHD and Control Groups: Age, CELF and TOPL scores	
Appendix D Method of Estimating Socio-economic Status	200
Appendix E Transcription Markers and Text Examples	201
E1.1. Transcription markers used for spoken texts	
E1.2. Text examples from control children	
E1.3. Text examples from children with ADHD	204
Appendix F Clause Division	207
F1.1. Examples from control children	207
F1.2. Examples from children with ADHD	
Appendix G Examples of Mazes	211
Appendix H Spelling Errors	213
H1.1. Errors made by control children:	213
H1.2. Errors made by children with ADHD:	214
H1.3. Punctuation errors	217
Appendix I Generalised Linear Mixed Model Data	218
Appendix J Formal Test Scores	219
Appendix K Raw Data Tallies for Descriptive Variables	221
Appendix L Logistic Regression Outcomes	

# **INDEX OF TABLES**

Table 1.1	Criteria for the diagnosis of ADHD (inattentive type)	11
Table 1.2	Criteria for the diagnosis of ADHD (hyperactive/impulsive type)	
Table 1.3	Criteria for the diagnosis of ADHD (combined type)	
Table 2.1	Example of Theme (source: Butt et al. 2000)	
Table 3.1	Background information for paired children with ADHD and control	
	children	39
Table 3.2	Variables within overarching categories	
Table 3.3	Examples of simple topical theme in spoken and written texts of controls	
		)8
Table 3.4	Examples of multiple theme (textual and topical) in spoken and written	
	texts of controls10	)9
Table 3.5	Examples of multiple theme (interpersonal and topical) in spoken and	
	written texts	10
Table 3.6	An example of multiple theme (textual, interpersonal, and topical) in	
	spoken and written texts of children with ADHD	10
Table 3.7	Examples of marked theme in spoken and written texts	11
Table 3.8	An example of predicated theme in a written text	12
Table 3.9	Examples of imperative mood in spoken procedural texts	13
Table 3.10	Examples of imperative mood in written procedural texts	13
Table 4.1	Observed differences between ADHD and control groups in use of	
	language features ('•' indicates observed difference)	30
Table 4.2	Observed differences between ADHD and control groups in use of	
	language features ('•' indicates observed difference); group effects only.	
		31
Table 4.3	Comparisons of CELF total, receptive, and expressive language, and TOP	L
	median scores for children with ADHD and control children	32
Table 4.4	Comparison between children with ADHD and control children for	
	descriptive variables	38
Table 4.5	Overall comparisons between children with ADHD and control children for	or
	measures of quantity	39
Table 4.6	Odds ratios for observed group main effect differences	43
Table 4.7	Odds ratios for observed group main effect differences in spoken only and	l
	written only	14
Table 4.8	Odds ratios for interactions between group and mode of expression 14	16
Table 4.9	Odds ratios for interactions between group and text type	17
Table 4.10	Odds ratios for the interaction between group and text type for number of	
	mazes	
Table 4.11	Odds ratios for interactions between group, mode, and text type14	19

-+

Table 4.12	Summary of odds ratios derived from logistic regression for suitable	
	variables1	150
Table B1	Attrition of Initial Participants1	198
Table C1	Summary statistics for age and two formal test outcomes (CELF; TOPL)	
		199
Table D1	Index of Education and Occupation	200
Table D2	Index of relative socioeconomic disadvantage	200
Table G1	Examples of mazes in spoken story retell texts of control children2	211
Table G2	Examples of mazes in spoken recount texts of control children	212
Table G3	Examples of mazes in spoken procedural texts of control children2	212
Table G4	Examples of mazes in spoken story retell texts of children with ADHD.2	212
Table G5	Examples of mazes in spoken recount texts of children with ADHD2	212
Table G6	Examples of mazes in spoken procedural texts of children with ADHD .2	212
Table J1	Formal test scores and comparisons	219
Table J2	Breakdown of mean CELF-3 results	220
Table J3	Breakdown of median CELF-3 results	220
Table K1	Raw counts for variables of associated behaviour for both modes, and each	ch
	text type. Categorical variables; N = 11	221
Table K2	Raw counts for variables of macro textual organisation for both modes, a	ınd
	each text type. Categorical variables; N = 11	222
Table L1	Outcomes of logistic regression showing degrees of freedom, deviance, a	
	p-values	223

# **INDEX OF FIGURES**

permission of Continuum International Publishers.	Figure 2.1.	Content and expression in examples of semiotic systems (Eggins, p18). Reproduced by kind permission of Continuum Internationa																																																																													
permission of Continuum International Publishers.																																																																															
Figure 2.3  Theme (adapted from Eggins, 1994, p274). Reproduced by kind permission of Continuum International Publishers.  78    Figure 3.1  Control child's (C17) use of clauses and a clause complex (shown bracketed) for spoken story retell.  107    Figure 3.2  Example of TTR as calculated by SALT RV8 from written story retell text of child with ADHD (S11).  115    Figure 3.3  Example of TTR as calculated by SALT RV8 from written procedural text of child with ADHD (S11).  116    Figure 3.4  Example of the calculation of grammatical intricacy in the spoken story retell text of control child (C09).  117    Figure 3.5  Example of the calculation of grammatical intricacy in the written procedural text of child with ADHD (S03).  117    Figure 4.1  Comparison of CELF-3 total language standard scores for children with ADHD and control children.  134    Figure 4.2  Comparison of CELF-3 expressive language standard scores.  135    Figure 4.3  Comparison of CELF-3 expressive language standard scores.  135    Figure 4.5  Comparison of TOPL language quotients.  136    Figure 5.1  Examples of marked theme in spoken stories by children for the total number of words in the analysis set.  140    Figure 5.1  Examples of marked theme in spoken stories by children with ADHD162  202    Figure 5.1	Figure 2.2.																																																																														
Figure 3.1  Control child's (C17) use of clauses and a clause complex (shown bracketed) for spoken story retell.  107    Figure 3.2  Example of TTR as calculated by SALT RV8 from written story retell text of child with ADHD (S11).  115    Figure 3.3  Example of TTR as calculated by SALT RV8 from written procedural text of child with ADHD (S11).  116    Figure 3.4  Example of the calculation of grammatical intricacy in the spoken story retell text of control child (C09).  117    Figure 3.5  Example of the calculation of grammatical intricacy in the written procedural text of child with ADHD (S03).  117    Figure 4.1  Comparison of CELF-3 total language standard scores for children with ADHD and control children.  134    Figure 4.2  Comparison of CELF-3 expressive language standard scores.  135    Figure 4.3  Comparison of CELF-3 subtest standard scores.  135    Figure 4.4  Comparison of TOPL language quotients  136    Figure 4.5  Comparison between children with ADHD and control children for the total number of words in the analysis set  140    Figure 5.1  Examples of marked theme in spoken stories by children with ADHD162  201    Figure 5.1  Examples of marked theme in spoken stories by children with ADHD162  203    Figure 5.1  Examples of marked theme in spoken stories by	Figure 2.3	Theme (adapted from Eggins, 1994, p274). Reproduced by kind																																																																													
Figure 3.2  Example of TTR as calculated by SALT RV8 from written story retell text of child with ADHD (S11)	Figure 3.1	Control child's (C17) use of clauses and a clause complex (shown	n																																																																												
Figure 3.3Example of TTR as calculated by SALT RV8 from written procedural text of child with ADHD (S11)	Figure 3.2	Example of TTR as calculated by SALT RV8 from written story	retell																																																																												
Figure 3.4Example of the calculation of grammatical intricacy in the spoken story retell text of control child (C09).117Figure 3.5Example of the calculation of grammatical intricacy in the written procedural text of child with ADHD (S03).117Figure 4.1Comparison of CELF-3 total language standard scores for children with ADHD and control children.134Figure 4.2Comparison of CELF-3 total language standard scores.134Figure 4.3Comparison of CELF-3 expressive language standard scores.135Figure 4.4Comparison of CELF-3 subtest standard scores.136Figure 4.5Comparison of CELF-3 subtest standard scores.136Figure 4.6Comparison of TOPL language quotients.136Figure 4.7Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set.140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162201Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E2Control child's (C04) spoken recount.202Figure E3Control child's (C05) written recount.203Figure E4Control child's (C24) written procedure.204Figure E5Child with ADHD (S03) spoken recount.205Figure E6Child with ADHD (S03) spoken recount.205Figure E7Child with ADHD (S03) spoken recount.205Figure E8Child with ADHD (S03) spoken procedure.206Figure E9Child with ADHD (S03) spoken recount.206<	Figure 3.3	Example of TTR as calculated by SALT RV8 from written proce	dural																																																																												
Figure 3.5Example of the calculation of grammatical intricacy in the written procedural text of child with ADHD (S03)	Figure 3.4	Example of the calculation of grammatical intricacy in the spoker	n story																																																																												
Figure 4.1Comparison of CELF-3 total language standard scores for children with ADHD and control children.134Figure 4.2Comparison of CELF-3 receptive language standard scores134Figure 4.3Comparison of CELF-3 expressive language standard scores135Figure 4.4Comparison of CELF-3 subtest standard scores135Figure 4.5Comparison of CPL language quotients136Figure 4.6Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162201Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken recount202Figure E3Control child's (C04) spoken recount203Figure E4Control child's (C24) written story retell203Figure E5Control child's (C24) written procedure204Figure E7Child with ADHD (S03) spoken recount205Figure E8Child with ADHD (S03) spoken procedure205Figure E9Child with ADHD (S03) written story retell206Figure E10Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedur	Figure 3.5	Example of the calculation of grammatical intricacy in the written	n																																																																												
Figure 4.2Comparison of CELF-3 receptive language standard scores134Figure 4.3Comparison of CELF-3 expressive language standard scores135Figure 4.4Comparison of CELF-3 subtest standard scores135Figure 4.5Comparisons of TOPL language quotients136Figure 4.6Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162201Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure203Figure E4Control child's (C04) written story retell203Figure E5Control child's (C24) written procedure204Figure E7Child with ADHD (S03) spoken recount205Figure E8Child with ADHD (S03) spoken procedure205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) spoken procedure206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F2Control child	Figure 4.1	Comparison of CELF-3 total language standard scores for childre	en with																																																																												
Figure 4.3Comparison of CELF-3 expressive language standard scores135Figure 4.4Comparison of CELF-3 subtest standard scores135Figure 4.5Comparisons of TOPL language quotients136Figure 4.6Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set140Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C03) spoken procedure202Figure E3Control child's (C03) spoken procedure203Figure E4Control child's (C05) written recount203Figure E5Control child's (C24) written procedure204Figure E7Child with ADHD (S03) spoken procedure205Figure E8Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written story retell206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written story retell206Figure E12Child with ADHD (S23) written procedure206 <td>Figure 4 2</td> <td></td> <td></td>	Figure 4 2																																																																														
Figure 4.4Comparison of CELF-3 subtest standard scores135Figure 4.5Comparisons of TOPL language quotients136Figure 4.6Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set140Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C03) spoken procedure202Figure E3Control child's (C16) written story retell203Figure E4Control child's (C24) written procedure204Figure E5Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell205Figure E8Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedure206Figure E11Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedure206Figu	•																																																																														
Figure 4.5Comparisons of TOPL language quotients136Figure 4.6Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set140Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C05) written story retell203Figure E4Control child's (C05) written recount203Figure E5Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) spoken procedure205Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedure206Figure E11Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedure206Figure E12 <t< td=""><td>•</td><td></td><td></td></t<>	•																																																																														
Figure 4.6Comparison between children with ADHD and control children for the total number of utterances/clauses in the analysis set	-	•																																																																													
total number of utterances/clauses in the analysis set140Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S23) written procedure207Figure E12Child with ADHD (S23) written procedure207Figure E12Child with ADHD (S23) written procedure206Figure E12Child with ADHD (S24) written story retell207Figure E12Child with ADHD (S24) written story retell207 <tr <td=""><tr t<="" td=""><td>•</td><td></td><td></td></tr><tr><td>Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set</td><td>0</td><td>1</td><td></td></tr><tr><td>total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retellFigure E2Control child's (C04) spoken recountFigure E3Control child's (C03) spoken procedureFigure E4Control child's (C16) written story retellFigure E5Control child's (C05) written recountFigure E6Control child's (C24) written procedureFigure E7Child with ADHD (S29) spoken story retellFigure E8Child with ADHD (S03) spoken procedureFigure E9Child with ADHD (S03) spoken procedureFigure E10Child with ADHD (S11) written recountControl child's (C17) spoken story retell206Figure F1Control child's (C04) written story retell207Figure E9Child with ADHD (S23) written procedure208Figure E12Child with ADHD (S23) written procedure205Figure E12Control child's (C04) written story retell206Figure F2Control child's (C04) written story retell207Figure F2Control child's (C04) written story retell</td><td>Figure 4.7</td><td></td><td></td></tr><tr><td>Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell.201Figure E2Control child's (C04) spoken recount.202Figure E3Control child's (C03) spoken procedure.202Figure E4Control child's (C16) written story retell.203Figure E5Control child's (C05) written recount.203Figure E6Control child's (C24) written procedure.204Figure E7Child with ADHD (S29) spoken story retell.204Figure E8Child with ADHD (S04) spoken recount.205Figure E10Child with ADHD (S03) written story retell.206Figure E11Child with ADHD (S11) written recount.206Figure E12Child with ADHD (S23) written procedure.206Figure E11Child with ADHD (S23) written procedure.206Figure E12Child with ADHD (S23) written procedure.206Figure F2Control child's (C17) spoken story retell.207Figure F2Control child's (C04) written story retell.208</td><td>8</td><td>-</td><td></td></tr><tr><td>Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E12Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207</td><td>Figure 5.1</td><td>•</td><td></td></tr><tr><td>Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207</td><td>-</td><td></td><td></td></tr><tr><td>Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>•</td><td></td><td></td></tr><tr><td>Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207</td><td>0</td><td></td><td></td></tr><tr><td>Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>•</td><td></td><td></td></tr><tr><td>Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>0</td><td></td><td></td></tr><tr><td>Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>-</td><td></td><td></td></tr><tr><td>Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>•</td><td></td><td></td></tr><tr><td>Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>•</td><td></td><td></td></tr><tr><td>Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>-</td><td></td><td></td></tr><tr><td>Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>•</td><td></td><td></td></tr><tr><td>Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208</td><td>•</td><td></td><td></td></tr><tr><td>Figure F1Control child's (C17) spoken story retell</td><td>•</td><td></td><td></td></tr><tr><td>Figure F2 Control child's (C04) written story retell</td><td>•</td><td></td><td></td></tr><tr><td></td><td>•</td><td></td><td></td></tr><tr><td></td><td>Figure F3</td><td></td><td></td></tr></tr>	•			Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set	0	1		total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retellFigure E2Control child's (C04) spoken recountFigure E3Control child's (C03) spoken procedureFigure E4Control child's (C16) written story retellFigure E5Control child's (C05) written recountFigure E6Control child's (C24) written procedureFigure E7Child with ADHD (S29) spoken story retellFigure E8Child with ADHD (S03) spoken procedureFigure E9Child with ADHD (S03) spoken procedureFigure E10Child with ADHD (S11) written recountControl child's (C17) spoken story retell206Figure F1Control child's (C04) written story retell207Figure E9Child with ADHD (S23) written procedure208Figure E12Child with ADHD (S23) written procedure205Figure E12Control child's (C04) written story retell206Figure F2Control child's (C04) written story retell207Figure F2Control child's (C04) written story retell	Figure 4.7			Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell.201Figure E2Control child's (C04) spoken recount.202Figure E3Control child's (C03) spoken procedure.202Figure E4Control child's (C16) written story retell.203Figure E5Control child's (C05) written recount.203Figure E6Control child's (C24) written procedure.204Figure E7Child with ADHD (S29) spoken story retell.204Figure E8Child with ADHD (S04) spoken recount.205Figure E10Child with ADHD (S03) written story retell.206Figure E11Child with ADHD (S11) written recount.206Figure E12Child with ADHD (S23) written procedure.206Figure E11Child with ADHD (S23) written procedure.206Figure E12Child with ADHD (S23) written procedure.206Figure F2Control child's (C17) spoken story retell.207Figure F2Control child's (C04) written story retell.208	8	-		Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E12Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	Figure 5.1	•		Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	-			Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	0			Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	0			Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	-			Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	-			Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure F1Control child's (C17) spoken story retell	•			Figure F2 Control child's (C04) written story retell	•				•				Figure F3		
•			Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set	0	1		total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retellFigure E2Control child's (C04) spoken recountFigure E3Control child's (C03) spoken procedureFigure E4Control child's (C16) written story retellFigure E5Control child's (C05) written recountFigure E6Control child's (C24) written procedureFigure E7Child with ADHD (S29) spoken story retellFigure E8Child with ADHD (S03) spoken procedureFigure E9Child with ADHD (S03) spoken procedureFigure E10Child with ADHD (S11) written recountControl child's (C17) spoken story retell206Figure F1Control child's (C04) written story retell207Figure E9Child with ADHD (S23) written procedure208Figure E12Child with ADHD (S23) written procedure205Figure E12Control child's (C04) written story retell206Figure F2Control child's (C04) written story retell207Figure F2Control child's (C04) written story retell	Figure 4.7			Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell.201Figure E2Control child's (C04) spoken recount.202Figure E3Control child's (C03) spoken procedure.202Figure E4Control child's (C16) written story retell.203Figure E5Control child's (C05) written recount.203Figure E6Control child's (C24) written procedure.204Figure E7Child with ADHD (S29) spoken story retell.204Figure E8Child with ADHD (S04) spoken recount.205Figure E10Child with ADHD (S03) written story retell.206Figure E11Child with ADHD (S11) written recount.206Figure E12Child with ADHD (S23) written procedure.206Figure E11Child with ADHD (S23) written procedure.206Figure E12Child with ADHD (S23) written procedure.206Figure F2Control child's (C17) spoken story retell.207Figure F2Control child's (C04) written story retell.208	8	-		Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E12Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	Figure 5.1	•		Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	-			Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	0			Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	0			Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	-			Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	-			Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•			Figure F1Control child's (C17) spoken story retell	•			Figure F2 Control child's (C04) written story retell	•				•				Figure F3			
•																																																																															
Figure 4.7Comparison between children with ADHD and control children for the total number of words in the analysis set	0	1																																																																													
total number of words in the analysis set140Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retellFigure E2Control child's (C04) spoken recountFigure E3Control child's (C03) spoken procedureFigure E4Control child's (C16) written story retellFigure E5Control child's (C05) written recountFigure E6Control child's (C24) written procedureFigure E7Child with ADHD (S29) spoken story retellFigure E8Child with ADHD (S03) spoken procedureFigure E9Child with ADHD (S03) spoken procedureFigure E10Child with ADHD (S11) written recountControl child's (C17) spoken story retell206Figure F1Control child's (C04) written story retell207Figure E9Child with ADHD (S23) written procedure208Figure E12Child with ADHD (S23) written procedure205Figure E12Control child's (C04) written story retell206Figure F2Control child's (C04) written story retell207Figure F2Control child's (C04) written story retell	Figure 4.7																																																																														
Figure 5.1Examples of marked theme in spoken stories by children with ADHD162Figure E1Control child's (C18) spoken story retell.201Figure E2Control child's (C04) spoken recount.202Figure E3Control child's (C03) spoken procedure.202Figure E4Control child's (C16) written story retell.203Figure E5Control child's (C05) written recount.203Figure E6Control child's (C24) written procedure.204Figure E7Child with ADHD (S29) spoken story retell.204Figure E8Child with ADHD (S04) spoken recount.205Figure E10Child with ADHD (S03) written story retell.206Figure E11Child with ADHD (S11) written recount.206Figure E12Child with ADHD (S23) written procedure.206Figure E11Child with ADHD (S23) written procedure.206Figure E12Child with ADHD (S23) written procedure.206Figure F2Control child's (C17) spoken story retell.207Figure F2Control child's (C04) written story retell.208	8	-																																																																													
Figure E1Control child's (C18) spoken story retell201Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E12Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	Figure 5.1	•																																																																													
Figure E2Control child's (C04) spoken recount202Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	-																																																																														
Figure E3Control child's (C03) spoken procedure202Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•																																																																														
Figure E4Control child's (C16) written story retell203Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell207	0																																																																														
Figure E5Control child's (C05) written recount203Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•																																																																														
Figure E6Control child's (C24) written procedure204Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	0																																																																														
Figure E7Child with ADHD (S29) spoken story retell204Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	-																																																																														
Figure E8Child with ADHD (S04) spoken recount205Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•																																																																														
Figure E9Child with ADHD (S03) spoken procedure205Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•																																																																														
Figure E10Child with ADHD (S03) written story retell206Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	-																																																																														
Figure E11Child with ADHD (S11) written recount206Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•																																																																														
Figure E12Child with ADHD (S23) written procedure206Figure F1Control child's (C17) spoken story retell207Figure F2Control child's (C04) written story retell208	•																																																																														
Figure F1Control child's (C17) spoken story retell	•																																																																														
Figure F2 Control child's (C04) written story retell	•																																																																														
	•																																																																														
	Figure F3																																																																														

Figure F4	Child with ADHD (S13) spoken story retell	209
Figure F5	Child with ADHD (S11) written story retell	
Figure F6	Child with ADHD (S23) spoken procedure	

#### ADHD

Attention Deficit Hyperactivity Disorder; used in this thesis to cover all subtypes

#### CELF

Clinical Evaluation of Language Fundamentals (Semel, 1987; Semel, 1995; Semel, 1998); a standardised test of language

#### DSM

Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1980, 1987, 1994); contains checklist often used to diagnose ADHD

#### ELS

Expressive Language Score; one of the composite scores on the CELF related to expressive language ability

### GI

Grammatical Intricacy; a way of quantifying complexity by calculating the proportion of clauses in a text that occur in clause complexes

#### LI

Language Impairment; a generic and self explanatory term referring to problems with language

#### OR

Odds Ratio; a statistical term meaning the likelihood of the occurrence of a particular event

#### RLS

Receptive Language Score; one of the composite scores on the CELF related to receptive language ability

#### SALT

Systematic Analysis of Language Transcripts; a programme for analysing and managing information from the analysis of discourse

#### SFL

Systemic Functional Linguistics; a sociolinguistic approach to the study of language

#### SLI

Specific Language Impairment; impairment in either the comprehension or expression of language, or both, that has no obvious cause

### TLS

Total Language Score; in the CELF, this is the composite score derived from adding the receptive and the expressive language scores

### TOPL

Test of Pragmatic Language (Phelps-Terasaki & Phelps-Gunn, 1992)

### TTR

Type/token ratio; a measure of lexical diversity derived from the proportion of total words in a text that are new words

## ABSTRACT

Questions continue to be raised about the language abilities of children who have a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). Recent conceptualisations of ADHD and also of language difficulties have acknowledged that aspects of context may contribute to the manifestations of these complex conditions. In the past, investigations of the language of children who had a diagnosis of ADHD appear to have been hampered by reliance on models of language impairment that emphasised formally measured language abilities and largely disregarded the role of context.

This thesis describes a study designed to test the hypothesis that important differences in language use exist between children who have a diagnosis of ADHD and their peers without ADHD, when specific language impairment has been excluded. A second goal of the study was to investigate the impact of aspects of context, specifically text type and mode of expression, on the language use of these children.

The study was community-based. Attempts were made to match the children for age (eight to twelve years), gender, level of education, and socio-economic status. Two standardised language tests were administered to each child, and only children who had achieved results within the normal range were accepted into the study. The sample

group consisted of eleven children who had a previous diagnosis of ADHD, and eleven control children. Discourse analysis based on a Systemic Functional Linguistics approach was used to describe spoken and written samples from three different examples of text type that were created by each child. Comparisons were made for multiple variables, and any observed differences were examined using a combination of quantitative and descriptive techniques.

The results showed differences between the groups for clause structure, thematic structure, macro textual organisation, lexico-grammar, behaviours surrounding spoken language, and conventions of written language. There were differences noted in the way the text type and the mode of expression appeared to affect the outcomes. The differences were discussed and interpreted as evidence of a greater degree of difficulty shown by the children with ADHD with regard to the organisation and complexity of their texts.

Clinical implications suggest that careful linguistic analysis of spoken as well as written language of children with ADHD may be warranted even in the absence of the diagnosis of specific language impairment. Such analyses may not only identify potentially problematic areas with respect to language use within everyday contexts, but may also highlight areas where particular intervention may be beneficial.