Asperger Syndrome and High Functioning Autism: Same, Different, or a Spectrum? An Investigation Using a Comprehensive Communication Assessment Battery

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Candidate's Statement of Originality

The material presented in this thesis is the original work of the candidate, except as acknowledged in the text, and has not previously been submitted, either in whole or part, for a degree at this or any other university.

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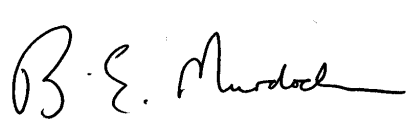
All of the jointly authored papers incorporated into this thesis are the original work of the candidate, including all text, tables, and figures.

Statement of Contribution by Others

The author of this thesis acknowledges the intellectual input provided by her thesis advisers and paper co-authors, which was to the extent of providing expertise and guidance in the design, implementation, and writing up of the studies reported in the thesis.

I hereby certify that all co-authors have provided the consent for the inclusion of the papers in this thesis and the co-authors accept that the student's contribution to the paper is as described in the Statement of Originality.



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Arcanum Linguae

List of Prizes, Presentations, and Publications

Prizes awarded to the Candidate Relating to the Thesis

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Presentations by the Candidate Relating to the Thesis

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Publications by the Candidate Relating to the Thesis

Lewis, F. M., Murdoch, B. E., & Woodyatt, G. C. (2007). Asperger syndrome and/or high functioning autism: Clinical application of findings from research into language and communication skills. *Communicative Disorders Review*, *1*(1), 37-47.

Lewis, F. M., Murdoch, B. E., & Woodyatt, G. C. (2007). Linguistic abilities in children with Autism Spectrum Disorder. *Research in Autism Spectrum Disorders*, *1*, 85-100.

Lewis, F. M., Murdoch, B. E., & Woodyatt, G. C. (2007). Communicative competence and metalinguistic ability: Performance by children and adults with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *37*, 1525-1538.

Lewis, F. M., Woodyatt, G. C., & Murdoch, B. E. (in press). Linguistic and pragmatic language skills in adults with Autism Spectrum Disorder: A pilot study. *Research in Autism Spectrum Disorders*.

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Abstract

Language and communication difficulties are central to Asperger Syndrome/Disorder (AS) and Autistic Disorder (AD), two pervasive developmental disorders classified in the *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition* (*DSM-IV*). Research findings from studies investigating language and communication skills in AS and AD may, therefore, have the potential to assist with the development of clinical intervention strategies to promote positive psychosocial, educational, behavioural, and vocational outcomes for children and adults with the disorders.

Research into the language and communication skills associated with AS and high-functioning individuals with AD (HFA) reflects the ongoing debate regarding if and how AS fits into the autism paradigm. Three theoretical approaches have been applied to research. These are a) validation studies, where the relevance of developmental language history on linguistic outcomes in AS and HFA has been examined; b) studies where AS and HFA are combined into a single experimental group; and c) studies that view AS and HFA as dimensions on an autism spectrum (ASD). The clinical understanding of the language and communication skills associated with AS and HFA, however, may not be an accurate reflection of the difficulties experienced by individuals with the diagnoses due to three methodological limitations of research to date.

Firstly, the extent of language assessment used in studies to date has been restricted. Considerable research has investigated basic linguistic abilities only, such as semantic and syntactic development. This focus reflects *DSM-IV*'s interest in early semantic and syntactic development as the differential diagnostic criterion between AS and AD. Subsequent development of communicative competence is not a *DSM-IV* diagnostic issue. Nevertheless, an accurate definition of the communicative difficulties experienced by individuals with a diagnosis of either AS or HFA is a clinical issue if intervention and support are to be specific to the individual's communicative needs.

Secondly, research to date has focused predominantly on children. Long-term studies of adults with developmental histories of language impairment, but not

necessarily ASD, have demonstrated that communication difficulties may contribute to poor psychosocial and vocational outcomes in adulthood. It has been suggested, moreover, that the language and communication difficulties associated with ASD may contribute to reduced psychosocial outcomes in adults with the disorder. Despite this, there is a dearth of information regarding the communicative skills in this population. Clinically relevant research findings are needed to define the language and communication skills in adults with ASD to determine if intervention and support for adults is warranted.

Thirdly, researchers have argued that there may be a female phenotype of autism, where females have better language and social skills. Females with a diagnosis of ASD have been included in many studies, but no study to date has undertaken comparative analyses of the communication skills for the two genders. The absence of clinically useful information regarding the language and social skills in females with ASD convinces of the need for investigation.

The overall aim of the thesis was, therefore, to provide clinically relevant findings to extend the understanding of the communicative needs of children, adults, and females with a diagnosis of ASD and no documented intellectual impairment by comprehensively investigating language and communicative abilities that emerge subsequent to the initial onset of basic semantic and syntactic structures. Where possible, the three theoretical perspectives of previous research provided the framework for the investigations.

To this end, a group of 20 children (16 males and 4 females), aged 9 years 0 months – 17 years 1 month, and a group of 17 adults (9 females and 8 males), aged 18 years – 67 years with a diagnosis of AS, HFA, or ASD and no documented intellectual impairment were investigated using a range of objective and subjective assessments. Chapters 2, 3, 4, and 5 of this thesis report on investigations into the linguistic, metalinguistic, pragmatic, and social problem solving abilities of the children with the diagnoses. Chapters 6, 7, and 8 focus on these skills in the adults.

Findings from the child studies suggest that children reclassified as AS or HFA,

based on reported developmental language history, could be differentiated on tasks requiring the resolution of ambiguity and the interpretation of metaphors presented pictorially. A weakness of this approach was the reliance on retrospective recall of developmental language history. When grouped as a single experimental group of ASD participants, the children presented with linguistic deficits in core language, receptive language, expressive language, language content, and language memory. Metalinguistic deficits were identified in resolving ambiguity, understanding inferential language, and in the ability to provide logical, meaningful, and contextually-appropriate sentences. Pragmatic deficits were identified, encompassing the production of emphatic stress to convey meaning in speech and lexical-semantic flexibility. Based on subjective Informant ratings of pragmatic skills, there were significant differences between the ASD group of children and the control group on coherence, inappropriate initiation, stereotypical use of language, use of context, and nonverbal communication skills. When the language effect was removed from the analysis, the ASD group was identified as having deficits in social problem solving relative to the control group of typically developing children. A limitation of combining all participants into a single experimental group was the noted heterogeneity of skills within the non-differentiated experimental group. The range of skills within the ASD group of children was subsequently examined through cluster analysis. Subgroups were described, with performance across the assessments ranging from average performance to severe difficulties. Viewing AS and HFA as disorders on an autism spectrum and examining within-group differences provided clinically useful information for intervention planning.

When grouped as a single experimental ASD group, the adults were less proficient than the control group of adults with a typical developmental history on a range of linguistic skills, including overall linguistic ability, auditory verbal comprehension, and naming skills. Pragmatic deficits included difficulties with inferential and figurative language, linguistic flexibility, and the production of variations in emphatic stress. Social problem solving difficulties, when the effect of language skill was removed, were likewise evident in the adults relative to typical peers. Heterogeneity was noted, but not further examined in the combined experimental adult group. An investigation of

subgroups of adults within the autism spectrum revealed the heterogeneity of the skills associated with the disorder. Performance of the adults across the assessments ranged from average skills to severe difficulties.

Chapter 9 reports on a comparative analysis of language and social pragmatic skills in female and male adults with a diagnosis of ASD. The findings propose that neither language skills nor pragmatic social skills differentiated the females from the males.

The overall findings of the thesis suggest that the language and communication skills within the non-intellectually impaired ASD presentation are heterogeneous. Reduced competence may be evident throughout childhood and extend into adulthood. In adulthood, the language and social skills of females are not significantly different to males with the disorder.

Based on the series of studies presented in this thesis, conceptualising AS and HFA as presentations on a spectrum of autistic disorders provides the most reliable and clinically applicable descriptions of the language and communication strengths and weaknesses of individuals presenting with the diagnoses. These findings should be considered in intervention planning, and hence, are relevant to speech pathologists, educators, and vocational support workers involved in providing services to the ASD population. General limitations of the study and suggestions for future research are presented in the final chapter.

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List of Abbreviations

AD = Autistic Disorder

ADI-R = Autism Diagnostic Interview-Revised

ADOS-G = Autism Diagnostic Observation Schedule-Generic

Amb Sent = Ambiguous Sentences subtest from the TLC-E

A H = Appreciation of Humour test from the RHLB

AS = Asperger syndrome/Asperger Disorder

ASD = Autism Spectrum Disorder

CCC-2 = Children's Communication Checklist-Second Edition

CELF-4 = Clinical Evaluation of Language Fundamentals-Fourth Edition

C I M = Comprehension of Inferred Meaning test from the RHLB

Core Lge = Core Language Index score from the CELF-4

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition

Exp Lge = Expressive Language Index score from the CELF-4

Fig Lge = Figurative Language subtest from the TLC-E

HFA = High functioning autism

ICD-10 = International Classification of Mental and Behavioural Disorders (10th edition).

Lge Cont = Language Content Index score from the CELF-4

Lge Mem = Language Memory Index score from the CELF-4

List Comp = Listening Comprehension: Making Inferences subtest from the TLC-E

L S = Lexical Semantic Test from the RHLB

M P = Metaphor Picture Test from the RHLB

Oral Exp = Oral Expression: Recreating Sentences subtest from the TLC-E

P E S = Production of Emphatic Stress test from the RHLB

Rec Lge = Receptive Language Index score from the CELF-4

RHLB = Right Hemisphere Language Battery

RSPCS = Rating Scale of Pragmatic Communication Skills

RSPCS-SO = Rating by a Significant Other on the Rating Scale of Pragmatic Communication Skills

RSPCS-SR = Self-rating on the Rating Scale of Pragmatic Communication Skills

TLC-E = Test of Language Competence-Expanded Edition

TONI-2 = Test of Nonverbal Intelligence-Second Edition

TOPS-A = Test of Problem Solving-Adolescent

TOPS-E, R = Test of Problem Solving-Elementary, Revised

WAB = Western Aphasia Battery

WAB AQ = Western Aphasia Battery Aphasia Quotient

W M = Written Metaphor Test from the RHLB