

EXPLORING THE CONTRIBUTION OF PRENATAL STRESS TO THE
PATHOGENESIS OF AUTISM AS A NEUROBIOLOGICAL
DEVELOPMENTAL DISORDER: A DIZYGOTIC TWIN STUDY

by

MARLEEN CLAASSEN

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SUPERVISOR:

PROF. H. NAUDÉ (Department of Educational Psychology)

CO-SUPERVISORS:

PROF. E. PRETORIUS (School of Medicine, Faculty of Health Sciences)

PROF. M.C. BOSMAN (School of Medicine, Faculty of Health Sciences)

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This dissertation is dedicated to all parents who have children diagnosed with autism. May our Lord bless these families in many different ways.

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Psalm 119:130

*‘Wanneer U woord vir mense oopgaan; bring dit lig;
Dit gee insig aan die wat nog onervare is.’*

DECLARATION

I declare that **EXPLORING THE CONTRIBUTION OF PRENATAL STRESS TO THE PATHOGENESIS OF AUTISM AS A NEUROBIOLOGICAL DEVELOPMENTAL DISORDER: A DIZYGOTIC TWIN STUDY** is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.

.....
MARLEEN CLAASSEN

.....
DATE

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SUMMARY

Exploring the contribution of prenatal stress to the pathogenesis of autism as a neurobiological developmental disorder: a dizygotic twin study

This research project explores the contribution of prenatal stress to the pathogenesis of autism as a neurobiological developmental disorder. The neurobiological impact of stress prior to the 28th week of gestation might produce structural neural changes, specifically regarding the cerebellum, the brain stem and limbic pathways, including the hippocampal area, which concept relates closely to the pathogenesis of autism. In this research project a significant focus is placed on prenatal hypothalamic-pituitary-adrenal (HPA) activity due to the HPA axis' interactivity with cortisol, digoxin and serotonin, as these biochemicals are significantly implicated in programmed foetal development, postnatal cortical behaviour, postnatal learning, as well as in functional impairment of socialization, communication and imagery associated with autism. Based upon the rationale of this research project and the conceptualisation of the topic of interest, the **research problem** was formulated as follows: *In what unique ways does prenatal stress contribute to the pathogenesis of autism as a neurobiological developmental disorder?* **Sub questions** included: Did the mother of the dizygotic twins experience significant stress during the period of gestation? What structural brain differences can be observed among the dizygotic twins at hand of MR-imaging? To which periods of prenatal development can these structural differences be related? How do these differences account for sensory, motor, cognitive, and affective behavioural differences among the dizygotic twins? What plasma differences can be observed among the dizygotic twins at hand of blood sampling? How does elevation of pre- and postnatal

glucocorticoids relate to plasma difference among the dizygotic twins? How do these plasma differences account for sensory, motor, cognitive, and affective behavioural differences among the dizygotic twins? This research project represents **quantitative research**. The mode of inquiry is non-experimental at hand of a single dizygotic twin study. The following **data generating strategies** were employed: clinical intake interviews, administration of a diagnostic stress inventory and the 16-PF Questionnaire, MR-imaging, and the collection of blood plasma pathology results.

Key words: autistic disorder, prenatal stress, neurobiological developmental disorder, glucocorticoids, serotonin, digoxin, HPA-axis, intra-uterine deprivation, sub-optimal placental nutrient supply.

In order to simplify the reading task the masculine gender is used within the text. This type of referencing should not be seen as a form of gender discrimination, since all references implicitly include the female gender, except if indicated otherwise.

CONTENTS

CHAPTER 1

INTRODUCTION, AWARENESS OF THE PROBLEM, RATIONALE FOR THE STUDY AND ANALYSIS OF THE RESEARCH PROBLEM, LITERATURE REVIEW, DEFINITION OF KEY CONCEPTS, PROBLEM STATEMENT, PURPOSE OF THE STUDY, THEORETICAL FRAMEWORK AND PARADIGMATIC PERSPECTIVE, RESEARCH DESIGN AND METHODOLOGY, ETHICAL CONSIDERATIONS AND CHAPTER OUTLINE.

1.1	INTRODUCTION	1
1.2	AWARENESS OF THE PROBLEM	3
1.3	RATIONALE FOR THE STUDY AND ANALYSIS OF THE RESEARCH PROBLEM	4
1.4	LITERATURE REVIEW	9
1.5	DEFINITION OF KEY CONCEPTS	13
1.6	PROBLEM STATEMENT	15
1.7	PURPOSE OF THE STUDY	16
1.8	THEORETICAL FRAMEWORK AND PARADIGMATIC PERSPECTIVE	16
1.9	RESEARCH DESIGN AND METHODOLOGY	18
1.10	ETHICAL CONSIDERATIONS	20
1.11	CHAPTER PLANNING	22
1.12	SYNOPSIS	22
1.13	LIST OF REFERENCES	23

CHAPTER 2

BIOCHEMICALS IMPLICATED IN PROGRAMMED FOETAL DEVELOPMENT

2.1	INTRODUCTION	30
2.2	NEUROTRANSMITTER, RECEPTOR SYNTHESIS AND NEUROCHEMICAL CODING	30
2.2.1	Small molecule neurotransmitters	34
2.2.2	Peptide neurotransmitters	35
2.2.3	Transmitter gases	36
2.3	DEVELOPMENT OF NEUROTRANSMITTER SYSTEMS DURING CORTICAL PERIODS	37
2.4	THE RELEVANCE OF THE HIPOTHALAMIC-PITUARY-ADRENAL(HPA) AXIS IN THE PATHOGENESIS OF AUTISM	39
2.4.1	Adrenaline	39
2.4.2	Noradrenaline	40
2.5	THE RELEVANCE OF SERUM CORTICOL LEVELS IN THE PATHOGENESIS OF AUTISM	42
2.6	THE RELEVANCE OF SERUM DIGOXIN LEVELS IN THE PATHOGENESIS OF AUTISM	43
2.7	THE RELEVANCE OF SERUM SEROTONIN LEVELS IN THE PATHOGENESIS OF AUTISM	45
2.8	SYNOPSIS	51
2.9	LIST OF REFERENCES	51

CHAPTER 3

NEUROANATOMIC OBSERVATIONS OF THE BRAIN IN AUTISM

3.1	INTRODUCTION	62
3.2	NORMAL BRAIN DEVELOPMENT	62
3.2.1	Neurogenesis and gliogenesis	65
3.2.2	Cell migration and differentiation	66
3.2.3	Cell maturation (dendrite and axon growth)	68
3.2.4	Synaptogenesis, programmed cell death and synaptic pruning	69
3.2.5	Myelogenesis	70
3.3	STRUCTURAL ABNORMALITIES OF THE BRAIN IN AUTISM	71
3.3.1	Enlarged brain size in autism	71
3.3.1.1	<i>Elevated cerebral volumes</i>	72
3.3.1.2	<i>Enlarged head circumference</i>	72
3.3.2	Reduction in the area of the corpus callosum	73
3.3.3	Abnormal patterns of cerebellar development	75
3.3.4	Abnormalities of the medial temporal lobe structures	77
3.4	THE IMPACT OF PRENATAL STRESS ON CORTICAL DEVELOPMENT AND AGENESIS	79
3.4.1	The Hipotalamic-Pituitary-Adrenal Stress Response	80
3.4.2	The link between glucocorticoids and the pathogenesis of autism	82
3.4.3	Autistic expression in handwriting	84
3.4.4	Autistic expression in auditory and spatial functioning	85
3.4.5	Autistic expression in attentional and emotional processes	86
3.5	SYNOPSIS	88
3.6	LIST OF REFERENCES	88

CHAPTER 4

EMPIRICAL STUDY

4.1	INTRODUCTION	97
4.2	PROBLEM STATEMENT	97
4.2.1	Sub questions	98
4.2.2	Research hypothesis	98
4.3	PURPOSE OF THE STUDY	98
4.4	METHODS, MATERIALS AND PROCEDURES	99
4.5	RESULTS OF THE CASE STUDY	100
4.5.1	Maternal clinical data	100
4.5.1.1	<i>Gestational period</i>	100
4.5.1.2	<i>Blood-pressure readings</i>	100
4.5.1.3	<i>Blood plasma pathology reports</i>	103
4.5.1.4	<i>Perinatal period</i>	106
4.5.1.5	<i>Recorded stressors</i>	108
4.5.2	Dizygotic twin obstetric and developmental data	112
4.5.2.1	<i>Magnetic resonance imaging (MR-imaging)</i>	113
4.5.2.2	<i>Blood plasma pathology</i>	113
4.6	DISCUSSION	114
4.7	REFLECTIVE VALIDATION OF RESEARCH HYPOTHESIS	116
4.8	SYNOPSIS	117
4.9	LIST OF REFERENCES	117

CHAPTER 5

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1	INTRODUCTION	23
5.2	OVERVIEW	23
5.3	FINDINGS	24
5.3.1	Significant findings related to biochemicals implicated in programmed foetal development	24
5.3.2	Significant findings related to neuroanatomical observations of the brain in autistic disorder	27
5.3.3	Significant findings related to the impact of prenatal stress on cortical development and agenesis	29
5.3.4	Significant findings related to the dizygotic twin study	30
5.4	CONCLUSIONS	32
5.5	RECOMMENDATIONS	32
5.5.1	Educational psychological training	33
5.5.2	Prenatal primary health care	33
5.5.3	Further research	33
5.6	LIMITATIONS TO THIS STUDY	34
5.7	CONCLUDING REMARK	34
5.8	LIST OF REFERENCES	34

LIST OF ANNEXTURES	xiv
LIST OF FIGURES	xv
LIST OF TABLES	xvi

LIST OF ANNEXTURES

Annexure A: Letter of Informed Consent

Annexure B: Diagnostic Criteria for Autistic Disorder (DSM-IV-TR 2000)

Annexure C: Ethics and Research Statement

LIST OF FIGURES

Figure 2.1	The removal of the carboxyl (COOH) group from glutamate procedures GABA	32
Figure 3.1	The anatomical and functional differences between the sympathetic and parasympathetic nervous systems	82
Figure 4.1	Table for tabulating maternal blood-pressure readings (BP/mmHg) during period of pregnancy	101

LIST OF TABLES

Table 1.1	Major premises of affective neuroscience	17
Table 1.2	Different modes of inquiry and research design	19
Table 2.1	Small molecule neurotransmitters	34
Table 2.2	Peptide neurotransmitters	35
Table 3.1	Potential neurotoxic agents and their teratogenic windows	65
Table 3.2	Possible sensorimotor learning deficits due to excess glucocorticoids during gestation	87
Table 4.1	Table for summarizing maternal blood-pressure values (units mmHg) during period of pregnancy	101
Table 4.2	Table for classifying blood-pressure values (units mmHG) according to World Health Organization	102
Table 4.3	Results of blood plasma analyses for Rubella antibodies during the 6th week of gestation	103
Table 4.4	Results of blood plasma analyses for Rubella antibodies during the 7th week of gestation	104
Table 4.5	Results of the Rubella affinity index during the 8th week of gestation	105
Table 4.6	Results of maternal blood plasma analyses during the 32nd week of gestation	106
Table 4.7	Table for summarizing maternal 16-PF standardized sten scores	110
Table 4.8	Table for summarizing dizygotic twins' blood plasma pathology reports	113