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

by

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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.

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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.
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