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The effect of complex environmental enrichment on locomotor, memory and affective function following dopamine receptor antagonism in adult rats with an investigation into a model of early-stage Parkinson's disease in aged rats

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## **Abstract**

Parkinson's disease (PD) is a neurodegenerative disease that impairs motor movement and is associated with cognitive and affective disturbances. Rodent models of PD demonstrate that complex environmental enrichment (CEE) can protect against motor dysfunction and improve neural survival in these dopaminergic-lesioned rodents. A few studies show that cognitive deficits can be observed in early-stage PD rats, but to date, no intervention has attempted to treat these induced deficits. Aim: In preparation for developing an early-stage PD rat model, this paper explored whether CEE could alleviate induced motor, cognitive or mood dysfunction as induced by the transient effects of dopamine antagonism on Sprague Dawley rats. Specifically, Study 1 (Chapter 2) explored whether brief CEE was effective in protecting against locomotor, memory or depressive symptoms in rats administered dopamine antagonists (either SCH23390 or pimozone). Results demonstrated that CEE differentially protected against attenuation of spontaneous locomotor activity and improved motivated exploratory behaviour, of enriched rats challenged with the D<sub>1</sub> receptor antagonist SCH23390, but did not prevent attenuation of sucrose consumption induced by the D<sub>2</sub> receptor antagonist pimozone. Study 2 (Chapter 3) explored whether memory or affective disturbances could be produced in an early-stage PD rat model, using 6-OHDA to induce dopaminergic cell loss within the substantia nigra of the brain in aged rats. Neither memory nor anhedonic disturbances were evident in the early-stage PD rats. Subsequently, a CEE intervention was not introduced to these animals. Methodological alterations are discussed to improve both cognitive and affective testing of early-stage PD rats.



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## **Statement of authorship and ethical approval**

I, Louise Ruby Hunt, declare that the work submitted in this thesis is my own original work. The submission, to the best of my knowledge, does not present the views or works of others except where duly acknowledged in the text. This work has not been submitted for a higher degree to any other university or institution.

Ethics approval to conduct this research was obtained from:

Macquarie University Animal Ethics Committee

Protocol numbers:

ARA 2007/039

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Signature: \_\_\_\_\_

Louise Hunt

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