The assessment of activity in colony-housed domestic cats (*Felis catus*)

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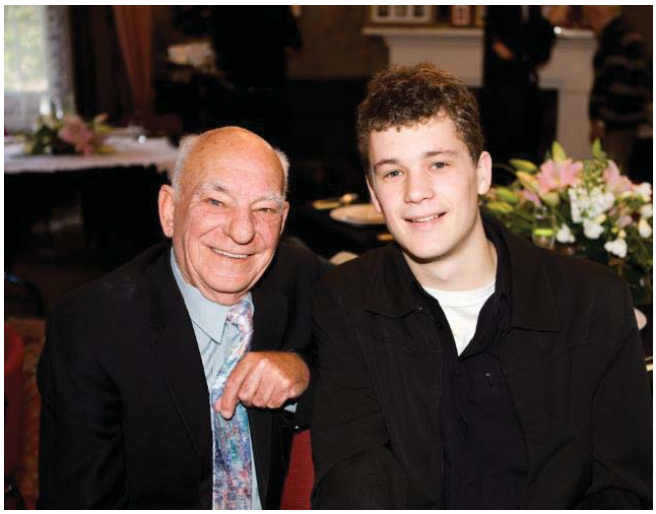
Dedication

This thesis is dedicated to my grandfather, Dale Petersen, who passed away half-way through this work. Poppa, you taught me to live life to the full and strive for success in all aspects of my life. Your unwavering belief in me gave me, and continues to give me, the confidence and determination to pursue all of my current and future goals and ambitions. For that I am eternally grateful. You set the standards pretty high for what can be achieved in a lifetime, but I am determined to give you a run for your money. Consider this thesis an official start to our little competition!

I will forever cherish the times we spent together. Love always.



Dale Petersen (18/12/1934 – 23/05/2014) (left) and Chris Andrews - Author (right).

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Synopsis

Monitoring and quantifying the overall physical activity (OPA) of cats can provide insight into their health, wellbeing, behaviour and physiology, but the accurate quantification of OPA is difficult without labour-intensive behavioural observation. Recent advances in remote sensing technologies such as accelerometry offer an automated method for continuously assessing OPA. A single study has validated Actical® 'MiniMitter' accelerometers (MMAs) to assess OPA in domestic cats (*Felis catus*), but their sample size precluded investigation of inter-individual variation. The first aim of this thesis (Chapter 2) was to compare the MMA and observed activity data of a larger number of cats (n = 12). While the MMA activity counts provided an accurate representation of observed activity for each cat, there was considerable variation between cats, so care is required when comparing the MMA activity data of different cats. Also the underlying factors affecting the OPA of individual animals need to be understood. The second aim (Chapter 3) investigated the effects of abiotic factors (day of the week, temperature, rainfall, and humidity) and one biotic factor (behavioural oestrus) on the OPA of domestic cats using MMAs. Day of the week did not appear to affect the activity of the cats despite lower levels of human interaction over weekends. This suggested that the group housing of the cats, with associated high intra-group interactions, outweighed human interactions. Temperature, rainfall and humidity all affected the OPA of the cats, but with considerable inter-cat variation. Reproductive state (anoestrus or oestrus) had a major effect on the OPA of the cats, with this study providing the first quantitative support for observations that cats are typically more active during oestrus. However, the behavioural detection of oestrus used in this thesis is challenging and may have led to the inaccurate categorisation of oestrus in some cats. Daily saliva samples were collected from all of the cats throughout the study, with the aim of using salivary oestradiol (E_2) concentrations to monitor ovarian activity and more accurately identify periods of oestrus in the cats. An addition study (Appendix 2) was conducted to validate a liquid chromatographic (LC) assay for salivary E_2, but further development of this assay is required to improve sensitivity. It is clear that the OPA of cats is affected by ovarian cyclicity, and that this should be considered and accounted for when conducting activity-based research in cats.

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