

Seasonal effects on energy requirements in young cats in a temperate environment

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Introduction Recently, Bermingham *et al.* (*Bri J Nutr accepted*) carried out a meta-analysis of the available data concerning the energy requirements in cats. Obesity levels and related illnesses (e.g. diabetes, joint problems etc.) are increasing in companion animal populations (Scarlett *et al.*, 1994; German 2006), so it is important that the true energy requirements of cats are established. The National Research Council (2006) highlighted the energy requirements for cats at high (36°C) or room temperatures (25°C), however, no information exists on energy requirements in temperate climates, such as those experienced in New Zealand where cats typically have outdoor access all year round. Therefore, this study aimed to determine the difference in maintenance energy requirements of healthy young cats (c. 2 years of age), housed in metabolic cages, in an outdoor environment during summer and winter compared to cats kept in similar cages in an indoor environment during the same two periods.

Materials and methods Eight mixed-sex, neutered cats (c. 2 years of age) were housed in individual outdoor pens (80cm x 80cm x 110cm) for 5 weeks (1 week adaptation, 4 week trial) during summer (SO; 18.5 ± 0.5 °C) and winter (WO; 8.5 ± 0.4 °C). Eight full siblings of the first group were kept in similar indoor pens at the same time during summer (SI; 22.4 ± 0.3 °C) and winter (WI; 17.8 ± 0.2 °C). Cats were kept in visual contact with each other, and were familiar with the pens. The cats were fed *ad libitum* AAFCO tested, commercially available fresh wet food daily, had fresh water available at all times and were exposed to natural light regimes. Energy expenditure and body composition were determined using doubly-labelled water over 12 days from the beginning of week 4 of each trial period. During the same two 12 day periods activity monitors (Actical[®], Mini Mitter Company Inc, Oregon, USA) were fitted to the collars of two cats (one indoor, one outdoor). Data were analysed using a Repeated Measures procedure of SAS (version 11) and results are reported as mean and standard error of difference (SED).

Results Season had no effect on the bodyweight of the cats kept either inside (SI: 3.97 vs WI: 4.02 (SED 0.15) kg; P>0.05) or outside (SO: 3.94 vs WO: 4.04 (SED 0.15) kg; P>0.05). The activity levels of the cats were also similar in both groups between summer (SI: 2272 vs SO: 2469 (SED 178.9) counts/hr) and winter (WI: 2385 vs WO: 2385 (SED 197.0) counts/hr). However, there was a strong seasonal rhythm (P<0.001) of food intake in the cats housed in the indoor environment, with higher intakes observed in the summer (SI: 297.5 vs WI: 258.2 (SED 7.5) kJ/kg BW/d). In contrast, cats kept in an outdoor environment showed more uniform feed intake between the two periods (SO: 299.2 vs WO: 286.2 (SED 7.5) kJ/kg BW/d; P<0.05), but significantly higher intakes (P<0.001) during the winter period. The cats in this study had higher energy requirements than those reported in the literature (213.8 kJ/kg BW/d; Bermingham *et al.*, 2009) which may reflect differences between cats kept outside in temperate climates compared to cats studied in indoor environments. Results on energy expenditure and body composition are being completed and will also be reported.

Conclusions An effect of housing was observed in winter when animals housed outdoors consumed 28.0 kJ/kg BW/d more food than their siblings housed indoors. Activity levels and bodyweight remained constant in both groups throughout this period, suggesting that this difference in intake reflected a difference in maintenance energy requirements over the five week winter period. Interestingly, energy intake was higher in summer in both groups (housed inside and outside) compared to winter. This finding may reflect the increased insulatory capacity of the winter versus summer coat, although actual energy expenditure data when it becomes available will begin to answer these questions.

References

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