# STATISTICAL ANALYSIS OF OLFACTOMETER DATA

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We introduce a new method for dealing with overdispersion seen in data drawn from some experiments with an olfactometer, relative to standard multinomial and Dirichlet multinomial models. The data comprise numerous clusters of small count data, corresponding to the choices made by wasps in response to stimuli given to them under a carefully planned experimental design. Standard methods of analysis for overdispersed clustered counts can be applied, but may lose precision relative to more specialised techniques. An inhomogeneous Markov chain model for wasp behaviour has been developed which allows the application of rather complex experimental designs using a regression approach, and the comparison of the statistical efficiency of different sampling schemes. Our results suggest that the new approach to treating the existing data can give efficiency gains of 10-20 % relative to the standard method, but that relatively small further gains would be achieved by adopting a continuous-time sampling procedure.