

## Estimating functions for repeated measures with incidental parameters

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Received: 31 March 2008 / Revised: 10 November 2008 / Published online: 4 June 2009  
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**Abstract** Repeated measures, or longitudinal data, are considered. The statistical characteristics for each individual case are supposed to be governed by a structural parameter, common to all, and an incidental parameter, specific to the individual. Introducing this terminology, Neyman and Scott studied the properties of estimators in a likelihood framework. In this paper the model specification is taken to be more limited, not sufficient to construct a proper likelihood function. The proposal here is to seek an estimating function, based on the data and the structural parameter alone, whose maximum has an identifiable limit as the sample size grows. Then a transformation of the maximum is sought so that the modified version is a consistent estimator. Some examples are worked through and asymptotic distributions of the resulting consistent estimators are outlined to enable tests and confidence regions to be derived. Relative efficiency of competing estimators is also considered.

**Keywords** Estimating functions · Incidental parameters · Neyman–Scott problem · Repeated measures · Structural parameters