

# METHODS BRIEFING 9

## Multilevel Multiprocess Models for Partnership and Childbearing Event Histories

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### Background and aims of the research

Event history data provide a longitudinal record of the timing of events such as partnership formation and dissolution, births, and changes in employment and housing. Typically outcomes of one process will influence the occurrence of events in another process. For example the presence of children, prior outcomes of the fertility process, is often found to be negatively associated with the risk of partnership dissolution. Previous researchers have explored the relationship between childbearing and dissolution by including the number of children as an explanatory variable in a model for dissolution. This approach, however, ignores the possibility that decisions about childbearing and partnerships are subject to shared influences, some of which will be unobserved. For example, a US study (Lillard, L. and Waite, L. (1993) "A joint model of marital childbearing and marital disruption", *Demography*, 30: 653-681) found that some women are more likely than others to have unstable marriages (on some unmeasured characteristics), and that such women are less likely to have children during marriage. If ignored, this joint determination of the partnership and fertility processes could lead to biased estimates of the effects of having children on partnership transitions.

The project had several aims and objectives:

- To develop methodology for the analysis of event history data, where there are correlated histories, repeated events, multiple states and competing risks. Lillard and Waite (1993) used a simultaneous equations model to allow for correlation between marital instability and the chance of a conception during marriage. We extend their approach to include cohabitation.

- To apply these methods in a study of the interrelationships between transitions from cohabitation and marriage, and childbearing in Britain.
- To provide social scientists with the means to implement these methods in their own research.

### Methods

The methodological developments of the research were motivated by a substantive research question: what is the link between partnership transitions and childbearing among British women. Specifically, we were interested in examining the effects of pregnancy and the presence and characteristics of children on the chance that a marital or cohabiting partnership is dissolved, or cohabitation is converted into marriage. We use a simultaneous equations model, in which partnership transitions are modeled jointly with the probability of having a child. Correlation between the unobserved factors affecting the partnership and fertility processes is represented in the model as a correlation between the residual components of the simultaneous equations.

Other features which need to be considered when analyzing partnership histories are repeated events (multiple partnerships per woman), multiple states (cohabitation and marriage), and competing risks (a cohabitation may be dissolved or converted to marriage). We develop a general model which takes account of these features in addition to the potential correlation between the partnership and childbearing processes. After some restructuring of the data, this model may be fitted using existing estimation procedures. Macros for data preparation and model specification in *MLwiN* are available from the project website: <http://www.mlwin.com/team/mmmmpceh.html>

## Key substantive questions and findings

Three empirical studies were carried out as part of the research, using data from the National Child Development Study (NCDS) and the 1970 British Cohort Study (BCS70).

(i) The effect of fertility outcomes on partnership dissolution and the move from cohabitation to marriage (among the 1958 birth cohort between the ages of 16 and 42)

(ii) Changes in the relationship between the outcomes of cohabitation and fertility (a comparison of the 1958 and 1970 birth cohorts to age 30)

(iii) The formation and outcomes of cohabiting and marital partnerships among women of the 1970 birth cohort

Some key findings from these studies are:

- In the 1958 cohort, having preschool children reduces the risk of partnership dissolution between ages 16 and 42, with a somewhat weaker effect for cohabiting couples. The stabilizing effect of children weakens as they get older. In a comparison of the 1958 and 1970 cohorts to age 30, we find that having preschool children with a cohabiting partner reduces the risk of separation for the 1970 cohort but not for the 1958 cohort.
- Pregnancy precipitates marriage among cohabitators, particularly among the earlier cohort, but following a birth the marriage rate declines to below the pre-pregnancy level.
- The presence of children from a previous co-residential partnership has no effect on the risk of dissolution.
- Allowing for correlation between the unmeasured determinants of fertility and partnership outcomes has little effect on our substantive conclusions.

## Project datasets

A major part of the first year of the project was devoted to preparing the NCDS partnership history data for analysis. Partnership histories were collected retrospectively when the cohort members were age 33 and 42, and these had to be linked to form a continuous history for ages 16-42. This involved resolving

inconsistencies such as differences in the date of marriage reported at each age. The linked, cleaned NCDS histories, together with the cleaned BCS70 histories, are available on-line from the UK Data Archive, and can be accessed from the following locations:-

[www.data-archive.ac.uk/findingData/ncdsTitles.asp](http://www.data-archive.ac.uk/findingData/ncdsTitles.asp)

[www.data-archive.ac.uk/findingData/bcsTitles.asp](http://www.data-archive.ac.uk/findingData/bcsTitles.asp)

## Training materials

Methodology developed under the project was disseminated in a two-day workshop on Multilevel Event History Analysis, held at the Institute of Education, 10-11 February 2005. All materials from the workshop – slides, computer exercises, *MLwiN* macros, and datasets (via the Data Archive) – are available for download from the project website. These aim to guide researchers through the processes of data preparation, analysis and interpretation of results, starting with simple event history analysis, and gradually building up to multiprocess models for correlated histories.

## Project website

All research papers and training materials are downloadable from:

[mlwin.com/team/mmmmpceh.html](http://mlwin.com/team/mmmmpceh.html)

## Key publications

Steele, F., Goldstein, H. and Browne, W. (2004) “A general multistate competing risks model for event history data, with an application to the study of contraceptive use dynamics”, *Statistical Modelling*, 4: 145-159.

Steele, F., Kallis, C., Goldstein, H. and Joshi, H. (2005) “The relationship between childbearing and transitions from marriage and cohabitation in Britain”, *Demography*, 42 (to appear in November issue).

## Further work

Further work on this project will be conducted as part of the LEMMA node of the National Centre for Research Methods.

[www.ncrm.ac.uk/nodes/lemma/about.php](http://www.ncrm.ac.uk/nodes/lemma/about.php)

**The Centre for Multilevel Modelling has moved to Bristol, where Fiona Steele is now based**

Further details are available from:

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