Comparative judgement modelling to map violence against women and girls (VAWG) in the West Midlands

Developing a mathematical model to map where VAWG is happening at a ward level in the West Midlands.

Key details

Lead institution	University of Birmingham
Principal researcher(s)	Charlotte Norridge cfn432@student.bham.ac.uk
Police region	West Midlands
Level of research	PhD
Project start date	January 2025
Date due for completion	July 2025

Research context

Law enforcement and safeguarding professionals need to identify where abuses are happening in their local community to best support those at risk of these crimes and take preventive action. However, there is little local data about these kinds of crime. To tackle this problem, we are running comparative judgement surveys to map abuses at the local level, where participants are shown pairs of wards and asked which had a higher rate of female genital mutilation.

The end result of our project will be a heat map of the West Midlands colour coded by risk of female genital mutilation.

Research methodology

Current methods require studies to have a large number of participants, so we are developing a comparative judgement model that provides a more flexible spatial modelling structure and a mechanism to schedule comparisons more effectively. The methods reduce the data collection burden on participants and make a comparative judgement study feasible with a small number of participants.

Underpinning these methods is a latent variable representation that improves on the scalability of previous comparative judgement models. In previous comparative judgement studies, participants reported fatigue associated with comparisons between areas with similar levels of abuse. Allowing for tied comparisons reduces fatigue, but increase the computational complexity when fitting the model.

We have designed an efficient Markov Chain Monte Carlo algorithm to fit a model with ties, allowing for a wide range of prior distributions on the model parameters.