A major aim of longitudinal analyses of life course data is to describe the within- and between-individual variability in a behavioral outcome, such as crime. Statistical analyses of such data typically draw on mixture and mixed-effects growth models. In this work, we present a functional analytic point of view and develop an alternative method that models individual crime trajectories as departures from a population age-crime curve. Drawing on empirical and theoretical claims in criminology, we assume a unimodal population age-crime curve and allow individual expected crime trajectories to differ by their levels of offending and patterns of temporal misalignment. We extend Bayesian hierarchical curve registration methods to accommodate count data and to incorporate influence of baseline covariates on individual behavioral trajectories. Analyzing self-reported counts of yearly marijuana use from the Denver Youth Survey, we examine the influence of race and gender categories on differences in levels and timing of marijuana smoking. We find that our approach offers a flexible and realistic model for longitudinal crime trajectories that fits individual observations well and allows for a rich array of inferences of interest to criminologists and drug abuse researchers.

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