

Title: Analysis of Growth Trajectory Classes of Crack-cocaine Use via Growth Mixture Modeling

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Objectives: This study is to examine the patterns and correlates of growth trajectory of crack-cocaine use over time. **Methods:** A sample of 430 crack-cocaine users interviewed at four consecutive time points with a 6-month interval in a natural history study in Dayton, Ohio was used for the study. Growth mixture modeling, which is a combination of conventional growth modeling and cluster analysis, was used to study the growth trajectory classes of crack-cocaine use over time. The number of trajectory classes was tested and individuals were classified into classes of the best-fitting model. The shape of growth trajectory of crack use was examined within each class. In addition, socio-demographic factors, such as gender, age, ethnicity, and education, were used to predict the class membership, as well as to predict the growth trajectory, within each class.

Results: With the sample under study, the best-fitting growth mixture model had two growth trajectory classes: Class 1 - high initial level of crack use and significant decline in crack use over time; and Class 2 - low initial level of crack use and no significant change in crack use over time. Based on posterior membership probability, about 51% of the subjects were classified into Class 1, and 49% into Class 2. The results show that black crack users were more likely to fall into Class 1, while other socio-demographic factors, such as gender, age, and education did not have significant effect on class membership. Within each class, the initial level of crack-cocaine use was not significantly associated with any of the socio-demographic factors. A nonlinear growth trajectory was detected in each class. Among the drug users in Class 1, older and black drug users were less likely to reduce their crack use over time, compared with others. Black drug users were also found less likely to reduce their crack use than others in Class 2, although the crack use in this class did not have significant change on average.

Conclusions: The growth mixture modeling not only allows the intra-individual changes in outcome measures to be analyzed together with inter-individual differences, it also captures the heterogeneity of growth by including a categorical latent variable (the latent class variable), therefore, allows different subgroups in the sample to follow different growth models. The study suggests the utility of the growth mixture modeling for better understanding of the growth trajectories of drug use in natural history studies.