


# Chapter 13

## Estimating Latent Growth Curve Models: An Introduction

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### ABSTRACT

*Although LGC modeling is gaining popularity in some disciplines, it has not been widely employed in social-epidemiological studies. This paper presents an introduction to the latent growth curve (LGC) technique within a structural equation modelling (SEM) framework as a powerful tool to analyze change in individual attributes over time (e.g., behaviors, attitudes, beliefs, and health) and potential correlates of such changes. The rationale for LGC analysis and subsequent elaboration of this statistical approach are discussed. For illustrations, Mplus (version 8, Muthén & Muthén, 2012) software and depressive symptoms as the individual outcomes attribute are used. The limitations of traditional analytical methods are also addressed. Particularly, the chapter considers socio-contextual factors as correlates of change in the outcomes variable, and examines the dynamic systematic relationship with the socioeconomic factors (however, these correlates can also be factors other than social-context).*

### INTRODUCTION

Although LGC modeling is gaining popularity in some disciplines, it has not been widely employed in social-epidemiological studies. This paper presents an introduction to the latent growth curve (LGC) technique within a structural equation modelling

DOI: 10.4018/978-1-6684-6859-3.ch013

(SEM) framework as a powerful tool to analyze change in individual attributes over time (e.g., behaviors, attitudes, beliefs, and health) and potential correlates of such changes. The rationale for LGC analysis and subsequent elaboration of this statistical approach are discussed. For illustrations, Mplus (version 8, Muthén & Muthén, 2012) software and depressive symptoms as the individual outcomes attribute are used. The limitations of traditional analytical methods are also addressed. Particularly, the paper considers socio-contextual factors as correlates of change in the outcomes variable, and examines the dynamic systematic relationship with the socioeconomic factors (However, these correlates can also be factors other than social-context). It is assumed that reader of this chapter already has a basic understanding of structural equation modeling (SEM).

## **THE LIMITATIONS OF TRADITIONAL ANALYTICAL APPROACHES**

Traditional analytical approaches often used in social behavioral research are insensitive to within-individual changes of individual attributes over time. In particular, regression methods, mean comparisons, and repeated measures Manova are not sensitive to within-individual changes over time and, consequently, entail several related limitations. First, the non-dynamic nature of traditional analytical approaches views an individual attribute (e.g., depressive symptoms) which will be used for illustrations in this paper) as a status rather than a process that unfolds over time. Second, when individual change follows a non-linear trajectory, regression methods are unlikely to reveal intricacies of such change. Moreover, ‘Ignoring the continuous nature of change process, traditional methods prevent empirical researchers from entertaining a richer, broader spectrum of research questions, questions that deal with the nature of individual development’ (Willet, 1988, p. 347). Moreover, this change process may be systematically associated with socio contextual and other developmental processes.

## **THE NEED TO INVESTIGATE DIFFERENT GROWTH PARAMETERS**

Change entails different facets. Individual-specific growth parameters can capture different facets of change. These parameters include not only the intensity or severity (*level*) and but also the amount of growth or decline (*rate of change or slope*) in an outcome over time. Traditional methods are not sensitive enough to capture this difference and to distinguish the difference between these two courses

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