Figure 7.5 Sample of 20 Predicted Growth Curves for Change in BMI Over 10 years.

incorporating correlated measurement residuals. This positive covariance between intercept and slope factors suggested that those who weighed more initially gained significantly more weight over time.

Homogeneity of variance was tested in a subsequent model. Correlated measurement residuals were removed so that this model could be compared to the initial model depicted in Figure 7.3 that allowed for heterogeneous variance. The model constraining measurement residual variances to be equal over time had a substantially higher chi-square than the first model, with $\chi^2(21) = 969.387$, CFI = .984, SRMR = .026, RMSEA = .092, although this model still had an acceptable fit according to several of the alternative fit indices. The difference in chi-square from the model with heterogeneous variance was significant and of moderate magnitude, with $\Delta\chi^2(5) = 345.510$, $p < .001$, $w = .347$, Δ Mc= .151. The results from this comparison and from the autocorrelation model suggest that the linear model may not be appropriate or that there are important omitted variables. Further investigation of the trajectories for this variable will be conducted in the next chapter on nonlinear growth curve models.

Comments

There are several features of the latent growth curve model that distinguish it from other longitudinal analysis methods. First, compared to trend analysis with repeated measures ANOVA, the growth curve model provides additional information. Not only do growth curve models provide information about average increase or decrease on the level of a variable over time, they also provide information about individual variation in changes. This is important for identifying the cases that are more likely to increase or decrease or change at different rates. Second, although the growth curve model is an extension of difference scores derived from two time points, change estimates based on three or more time points provide greater precision in estimating individual change than difference scores. Concerns about imprecision due to unreliability of difference scores or fallibility of individual scores become increasingly remote with more time points. Third, even