Table 1
Summary of statistical models available for addressing different hypotheses regarding change over time.

Number of Time points	Type of Within-Individual Change	Detectable Change	Available Statistical Models	Inferences	Cautions	Key References
One	None	Mean-level	Independent Samples T-test	Between-group mean differences	Confounded by cohort; no estimate of within-individual change	
			ANOVA	As above	As above	
			(Multiple) Regression, Generalized Linear Modeling	As above	As above	
Two	None	Rank-order	Repeated Measures ANOVA	Between-person change	Time treated as a fixed categorical (rather than continuous) predictor	
			(Multiple) Regression, Generalized Linear Modeling	Rank-order change	No estimate of within-individual change	
			Auto-regressive Panel	Rank-order change	No estimate of within-individual or average-level change	Selig and Little (2012)
			Latent Change Score	Latent rank-order change	"Stability" over time may not reflect a lack of change	Ferrer and McArdle, (2003, 2010), Grimm (2012), McArdle (2009)
Three	Linear	Rank-order	Repeated Measures ANOVA	Between-person change	Time treated as a fixed categorical (rather than continuous) predictor	
			Auto-regressive panel	Rank-order change	No estimate of within-individual or average-level change	Selig & Little (2012)
			Latent Change Score	Latent rank-order change		Ferrer and McArdle (2003, 2010), Grimm (2012), McArdle (2009)
		Within- and Between-individual	Multilevel Growth Curve	Between- and within-individual change	Residual variances of predictors at each time point are fixed	Bryk and Raudenbush (1987), Curran (2003), Schuster and von Eye (1998)
			Latent Growth Curve	Between and within-individual latent change; correlations between multiple growth processes		Bollen and Curran (2006), Curran and Hussong (2003)
			Latent Growth Mixture	Latent growth in multiple discrete populations	Sensitive to model specification	Bauer and Curran (2003), Muthén and Shedden (1999), Nagin (1999), Nylund et al. (2007), Ram and Grimm (2009)
			Trait-State	Continuous (trait) and discontinuous (state) change	Latent trait-models may be inappropriate when there is within-individual change over time	Cole et al., (2005), Kenny and Zautra (2001)
Four or more	Linear	Rank-order	Repeated measures ANOVA; auto-regressive panel; latent change score	Between-person and (latent) rank-change	True change process may be non-linear in form	
		Within- and Between-individual	Multilevel growth curve; latent growth curve; latent growth mixture; trait-state	Between and within-individual (latent) change; correlations between multiple growth processes; latent growth in multiple discrete populations; continuous (trait) and discontinuous (state) change	As above	
	Polynomial (e.g., Quadratic)	Non-linear	Multilevel growth curve; latent growth curve; latent growth mixture; trait-state	Non-linear within- and between-individual change		Biesanz et al. (2004), Grimm (2012)
	Piecewise	Discontinuous		Discrete patterns of within- and between-individual	Form of change may be unintuitive; more estimated parameters increases computational complexity of model	Flora (2008), McCoach and Kaniskan (2010)
	Latent basis ("free slope")	Freely-estimated		Model-derived form of within- and between-individual	As above	