

or in figures, and each part of the model is labeled. Also, instructions for adding predictors and outcomes to each type of model are provided, and the results are compared across different models. In the next section we discuss the study samples, data, and measures used in the examples throughout this book.

Adolescents' Internalizing Symptoms (IS) Trajectories

The example models presented are designed to capture dynamic patterns of change over time, and previous family and developmental studies have suggested that internalizing symptoms, such as anxiety (Nelemans et al., 2013), depressive symptoms (Wickrama, Conger, & Abraham, 2008), and hostility (Jester et al., 2005), are good exemplars. These variables are available in numerous previous studies, including the Iowa-based Family Transition Project (FTP) (Conger & Conger, 2002). We use data from the FTP to illustrate higher-order growth curves and higher-order growth mixture modeling. More specifically, our examples focus on modeling internalizing symptoms in adolescence along with a description of how to incorporate social and family predictors and outcomes into higher-order models, such as a CFM and FCM. First, we introduce the samples and measures for the datasets used in these illustrations.

Datasets used in Illustrations

The primary data source for illustrations in this book is the FTP which includes an “Iowa adolescent dataset” and an “Iowa parent dataset.” The adolescent dataset is used for the examples throughout the chapters. Additional illustrations and exercises utilize the parent dataset as a secondary data source. These datasets come from studies conducted from 1989 to 2001. While the project is collectively known as the “Family Transitions Project,” it is compiled from multiple studies including the Iowa Youth and Family Project (IYFP), the Iowa Single Parent Project (ISPP), the Family Transition Project (FTP), and the Midlife Project (MLP).

The FTP began as a longitudinal study that combined participants from two earlier research projects: the IYFP and the ISPP. These two earlier longitudinal studies were designed to study family functioning during the economic downturn that affected rural Iowa in the 1980s. The IYFP began in 1989 (Wave 1) and involved two-parent families with adolescent children (451 adolescents) from rural counties in Iowa. Families selected to participate in the study included a “target” seventh-grade child who lived with his or her two biological parents and had a sibling within four years of the target child's age (target adolescents' mean age = 12.7 years at Wave 1 in 1989, 53% female). The ISPP was initiated two years after the IYFP in 1991 and used the same procedures and measures as the IYFP. ISPP households were selected for the study because they had adolescents who were in the same grades (mean age = 14.3 years in 1991, 53% female) as those in the IYFP and were located in the same geographic location. Data

came from 107 mother-only families with adolescents. In 1995 (Wave 7), the IYFP and ISPP were combined and data collection continued under the FTP name with a shift in focus to emerging adulthood and the families the target adolescents were creating. The parents of these target adolescents were followed by another project, the Midlife Project (MLP) in 2001. Given the developmental changes of internalizing symptoms during adolescence and their influence on outcomes in young adulthood, FTP data from the IYFP and ISPP are used as the main data source for the illustrations in this book in order to capture the entire period of adolescence. More specifically, our analyses begin with measures included in 1991 (Wave 3 of the initial study or t1 for the purpose of our analyses, mean age: 14.59), 1992 (Wave 4 or t2, mean age: 15.58), 1994 (Wave 6 or t3, mean age: 17.69), 1995 (Wave 7 or t4, mean age: 18.52), 1997 (Wave 9 or t5, mean age: 20.52), and 2001 (Wave 13, mean age: 24.52).

For the supplemental illustrations in this book, the parent dataset (MLP data) was used. Additional information regarding the study procedures is available from Conger and Conger (2002). Across waves of data collection, 90% of the original FTP respondents participated, on average. In total, 537 individuals provided complete information for all of the study variables.

Measures

For measuring symptoms of depression, anxiety, and hostility in adolescence, the current study used 28 items from the SCL-90-R (Derogatis & Melisaratos, 1983), which were collected in 1991 (W3 of the overall project but t1 for the purpose of our analyses), 1992 (W4; t2), 1994 (W6; t3), 1995 (W7; t4), and 1997 (W9; t5). These three symptoms are conceptualized as components of a broader construct of internalizing symptoms (IS). The questionnaire self-reported data are not available for Wave 5 (1993) and Wave 8 (1996). Throughout the book, these three symptoms are used to demonstrate most of the longitudinal models we discuss (e.g., growth curve models, second-order growth curve models, growth mixture models). For our examples of how to assess predictors in second-order growth curves and second-order growth mixtures models, we utilize five indicators of early risk factors beginning in W3 (1991). The indicators include: family economic hardship, marital conflict, hostile parenting, school context, and social isolation. Similarly, for our examples of how to assess outcomes, or consequences, in second-order models five measures (i.e., romantic violence, civic involvement, financial cutbacks, income, and educational attainment) capture the social consequences of IS in adulthood (W13, 2001). All predictor and outcome measures were created by averaging or summing items so that high scores represent high levels of each variable. More details regarding study measurements are available in Table 1.1.

Each predictor and outcome measure was selected on the basis of prior research (with consideration given to its illustrative capability, not merely the strength of correlations) and theory linking it to elevated IS. The bivariate correlation

TABLE 1.1 Measures of Adolescent Risk Factors and Social Outcomes in Young Adulthood.

<i>Measures</i>	<i># of Items</i>	<i>Range of Scale</i>	<i>α</i>	<i>Example Items</i>
<u>Internalizing Symptoms (W3–W9)</u> <u>(for both adolescent and parent datasets)</u>				
Anxiety (SCL-90-R; Derogatis & Melisaratos, 1983)	10	1 (Not at all) – 5 (Extremely)	.83–.85	“Nervousness or shakiness inside”
Depressive Symptoms (SCL-90-R; Derogatis & Melisaratos, 1983)	13		.84–.91	“Feeling lonely” / “Blaming yourself for things”
Hostility (SCL-90-R; Derogatis & Melisaratos, 1983)	5		.80–.85	“Temper outbursts that you could not control”
<u>Early Family and Psychological Factors (W2)</u>				
Family Economic Hardship	4	1 (Never) – 5 (Always)	.73	“How often do you have enough money for things like clothes, school activities, or other things you need?”
Parents’ Marital Conflict	3	1 (Never) – 4 (Always)	.75	“How often your parents argue or disagree with each other”
Hostile Parenting	15	1 (Never) – 7 (Always)	.92	“Get angry at you” / “Criticize you or your ideas”
Negative School Context (Thornberry, 1989)	11	1 (No problems at all) – 4 (A very serious problem)	.86	“Frequent absence from classes”
Social Isolation (Hirsch & Rapkin, 1987)	3	1 (Not at all) – 4 (Always)	.79	“I am a shy person” / “It is a hard to make a new friend”
<u>Social Outcomes (W13)</u>				
Romantic Violence (BARS; Melby, Conger, Ge, & Warner, 1995)	21	1 (Never) – 7 (Always)	.84	“Hit partner” / “Shouted or yelled at partner”
Civic Involvement	3	0 (I don’t do this) – 3 (more than 30 hours)	.87	“Taking part in community activities like volunteer work, civic clubs, recreation program, and so on”
Financial Cutback	29	0=No / 1 = Yes		“Have you changed your residence to save money?”

coefficients between covariates (i.e., predictors and outcomes) and IS (i.e., depression, anxiety, and hostility) ranged from .03 to .29, $p < .05$. All growth curve and growth mixture models demonstrated throughout the book were estimated in *Mplus* version 7.4 (Muthén, & Muthén, 1998–2015) using all available data with full information maximum likelihood (FIML) estimation.

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