The Interplay of Social Competence and Psychopathology over 20 Years:
Testing Transactional and Cascade Models

Keith B. Burt
University of Vermont

Jelena Obradović
Jeffrey D. Long
Ann S. Masten
University of Minnesota, Twin Cities

Authors’ note: This article is based on data collected as part of the Project Competence longitudinal study, which has been supported through grants to Ann Masten, Auke Tellegen, and Norman Garmezy from the William T. Grant Foundation, the National Science Foundation (SBR-9729111), the National Institute of Mental Health (R01MH33222), and the University of Minnesota. The authors express their deep appreciation to the participants for their many contributions to this endeavor over more than twenty years. Please address correspondence concerning this article to Keith Burt, Department of Psychology, University of Vermont, 2 Colchester Drive, Burlington, VT 05405. Email: burt0136@umn.edu.

In press, Child Development
Abstract

Associations among internalizing, externalizing, and social competence were examined in a longitudinal cohort \((N = 205)\) of 8-12 year old children reassessed after 7, 10, and 20 years. Theoretically-informed nested structural equation models tested interconnections among broad multi-informant constructs across four developmental periods. Follow-up analyses examined gender invariance, measurement and age effects, and putative common causes. Key model comparisons indicated robust negative paths from social competence to internalizing problems from childhood to adolescence and from emerging adulthood to young adulthood. Social competence and externalizing problems showed strong initial associations in childhood but no longitudinal cross-domain paths. Using a developmental psychopathology framework, results are discussed in relation to cascade and transactional effects and the interplay between competence and symptoms over time.
The Interplay of Social Competence and Psychopathology over 20 Years: Testing Transactional and Cascade Models

The interplay of competence and psychopathology, intriguing to developmental and clinical researchers for decades, has come under increased scrutiny with the emergence of developmental psychopathology, resilience theory, positive psychology, and prevention science (Masten, Burt, & Coatsworth, 2006). There is growing recognition that cross-domain effects may reflect processes with significance not only for understanding the etiology and consequences of mental health problems, but also for intervening to promote competence and prevent or ameliorate symptoms of psychopathology (Masten et al., 2006; Rutter, Kim-Cohen, & Maughan, 2006). Nonetheless, few empirical studies have examined such effects, particularly with informative longitudinal designs. The present study addresses gaps in the extant literature by examining longitudinal links among social competence, externalizing problems, and internalizing problems across four developmental periods (childhood to young adulthood) in a longitudinal school-based sample using latent variable methods.

Social competence—how well one functions in relation to other people, particularly with respect to getting along with others and forming close relationships—has been a frequent target of research on connections between competence and psychopathology. From early dyadic relationships with caregivers, to play and social interaction with peers in the preschool years, to the formation of peer networks, close friends, and romantic relationships, social competence is viewed as a primary component of healthy functioning and development (Sroufe, Egeland, & Carlson, 1999; Ladd, 1999; Parker, Rubin, Erath, Wojslawowicz, and Buskirk, 2006; Rubin, Bukowski, & Parker, 2006), and occupies a central role in developmental task theory (Havighurst, 1948/1972; Masten & Coatsworth, 1998; Sroufe, 1979). At the same time, social
problems are salient in the diagnostic and impairment criteria for many mental disorders (American Psychiatric Association, 2000).

There are several major reasons why social competence and psychopathology (including externalizing and internalizing problems) might become associated over time. Symptoms of mental health problems could undermine social competence, while failures or achievements in the social domain could alter symptoms in numerous ways (Hinshaw, 1992; Masten et al., 2005, 2006; Patterson, Reid, & Dishion, 1992). Difficulties processing social information, as well as socially inappropriate behavior resulting from mental health symptoms could disrupt development of social skills and successful peer relationships. On the other hand, experiences of social rewards or rejection could produce a variety of emotional, cognitive, and behavioral responses that in turn influence the course of psychopathology. Alternatively, associations could be the result of powerful third variables, particularly including parenting quality, cognitive skills, and socioeconomic status, each of which has a well-established history of predictive significance for multiple aspects of social competence and psychopathology (Masten et al., 2006). Also important, though less substantive in nature, is the possibility of measurement artifacts (such as overlapping items) that produce spurious associations (Masten et al., 2006; Rubin et al., 2006).

Despite strong theoretical connections between social competence and behavioral and emotional symptoms, and a large empirical literature documenting associations within and across time, there are few studies in which it is possible to differentiate among the competing explanations noted above. As Rubin & colleagues (2006) have noted, there is a paucity of studies on associations of peer experiences with psychological adjustment that control for initial levels of adjustment in relevant domains, address issues related to overlapping constructs and measures or potential third variables, employ multiple methods of assessment, or consider effects beyond
two or three years. Few studies include measures of at least three constructs across at least three time intervals, arguably the optimal conditions for testing mediation (Cole & Maxwell, 2003) or effects that “spill over” or progress from one domain to multiple others, also known as cascade models (Masten et al., 2006). Even studies considering only two domains of adaptation rarely control for stability in both domains.

This study was designed to test for cross-domain effects among social competence, internalizing and externalizing symptoms by differentiating among likely explanatory models. Constructs were assessed by multiple informants and measures and the methodology allowed for examination of long-term longitudinal cross-domain paths while controlling for both cross-domain within-time associations and rank-order stability of each domain over time. Follow-up analyses also addressed key issues of overlapping measures and third-variable causes.

Social Competence and Internalizing Problems

A large body of theory and research supports cross-sectional and longitudinal connections between social competence and internalizing problems from childhood to adolescence (Masten et al., 2006; Parker et al., 2006; Rubin et al., 2006). For example, Cole’s (1990, 1991) competency-based model of depression proposed that feedback from others (peers, parents, and teachers) across various domains of performance (including social competence) would affect subsequent depressive symptoms. Cole and colleagues (Cole, Martin, Powers, & Truglio, 1996) subsequently documented short-term effects for social competence predicting changes in depressive symptoms among middle-school-aged youth but not the reverse: initial depressive symptoms did not predict changes in competence.

Other studies have shown that social isolation and incompetence in second grade are linked to increased internalizing problems three years later (Hymel, Rubin, Rowden, & LeMare,
1990), that anxious solitude and peer rejection in kindergarten predict increases in teacher-reported depressive symptoms across a subsequent four-year interval (Gazelle & Ladd, 2003), and that increased social isolation is associated with depressed mood for boys aged 12-15 years (Larson, Raffaelli, Richards, Ham, & Jewell, 1990). In addition, tests of mediation models implicate social competence as an intervening link between popularity and depression (Nangle, Erdley, Newman, Mason, & Carpenter, 2003) and between maltreatment and internalizing symptoms (Kim & Cicchetti, 2004; Shonk & Cicchetti, 2001). There is also some evidence for social competence as an intervening link between externalizing problems and internalizing problems, both short-term in elementary-school-aged children (Panak & Garber, 1992) and longer-term from preschool through early adolescence (Mesman, Bongers, & Koot, 2001). Data spanning adolescence and early adulthood are rare, although Capaldi & Stoolmiller (1999) found that depressive symptoms assessed in grades 6-8 had unique significance for self-reported relationships with friends when youth were 12th graders, over and above both early conduct problems and controlling for earlier social functioning.

Based on existing theory and research, we hypothesized that social competence would be related (negatively) to internalizing problems at the outset of the study and show unique predictive effects for internalizing problems (also negative) during the first longitudinal window of the study, over the transition to adolescence. This period marks a time of increasing salience and interpersonal sensitivity accorded peer relationships, when social difficulties would be expected to increase internal distress (Rubin et al., 2006; Steinberg et al., 2006). Exploratory analyses tested whether these effects occurred later in development, or in the reverse directions, with internalizing symptoms having unique and negative effects on social competence.

*Social Competence and Externalizing Problems*
Literature linking social competence problems to externalizing symptoms presents a complex picture across development. Among young school children, data consistently implicate externalizing symptoms, and aggressive behavior in particular, as likely contributors to peer difficulties, and especially to peer rejection among normative or prosocial peers (Hinshaw & Lee, 2003). Theory and empirical studies on coercive models of antisocial behavior emphasize how rejected youth may self-select into antisocial peer networks which then encourage further antisocial behavior, as well as set the stage for friendships with deviant peers (Dishion, French, & Patterson, 1995; Dishion & Patterson, 2006; Patterson et al., 1992). Rejected status among normative peers can be quite stable (Ollendick, Greene, Francis, & Baum, 1991), and childhood peer rejection has been shown to predict externalizing problems both longitudinally in the school-age years (e.g., Hymel et al., 1990) and into adolescence (e.g., Coie, Terry, Lenox, & Lochman, 1995). Fewer studies on rejection and behavior problems have extended into adulthood, although Reinherz, Giaconia, Hauf, Wasserman, and Paradis (2000) found evidence that peer rejection in childhood was a predictor of drug use in adulthood. Capaldi & Stoolmiller (1999) also found conduct problems in early adolescence to predict increasing substance abuse problems in 12th grade, controlling for earlier substance abuse, conduct and depressive symptoms. As noted above, in this study only depressive symptoms held unique predictive significance for social relationships with friends.

Given this complex literature, we expected externalizing symptoms to show an initial within-time association with social competence (reflecting the consistent literature linking externalizing behavior to peer problems in elementary school), and also for externalizing symptoms to show very high stability over the shorter intervals of this study and moderately high even over the longer (ten year) intervals. Given the expected stability of externalizing behavior,
the scarcity of effects spanning the older developmental periods, and the complexity of peer affiliations among deviant peers, it was not clear what to expect for cross-domain effects among externalizing symptoms and social competence. Exploratory models of such effects were tested.

Co-occurrence of Externalizing and Internalizing Problems

Investigations of connections between social competence and psychopathology must also address the covariation widely observed between internalizing and externalizing problems, both within and across time. Both dimensional and categorical research has documented the extensive co-occurrence of problems across these two broad symptom dimensions (Angold, Costello, & Erkanli, 1999; Caron & Rutter, 1991). Internalizing and externalizing problems have complex longitudinal relations; while robustly correlated within particular time points, they have differential relations across time. More specifically, some evidence indicates that externalizing problems may contribute to increases in internalizing symptoms over time (Capaldi, 1992; Kiesner, 2002; Lahey, Loeber, Burke, Rathouz, & McBurnett, 2002; Panak & Garber, 1992). However, there is also evidence that once one controls for concurrent externalizing problems, internalizing symptoms sometimes predict relatively lower risk for later externalizing problems, perhaps due to influences of behavioral inhibition on risk-taking behavior or involvement with deviant peers (Farrington, 1995; Kellam, 1990; Kerr, Tremblay, Pagani, & Vitaro, 1997; Masten et al., 2005; Moffitt, Caspi, Harrington, & Milne, 2002; Pine, Cohen, Cohen, & Brook, 2000). Given that prior study of externalizing, internalizing, and academic competence in the same sample with similar measures found a unique negative path for internalizing in adolescence on externalizing in young adulthood (Masten et al., 2005), we expected that this earlier finding would be robust in a new analytic context (i.e., modeling the social rather than the academic domain). Thus, while we expected internalizing and externalizing domains to show positive
associations within time, and longitudinal continuity, we expected internalizing symptoms to show a similar unique negative effect on externalizing symptoms across the same period.

Assessment of Social Competence

The definition of social competence in the present study was guided by a developmental tasks perspective (Masten et al., 2006; Pulkkinen & Caspi, 2002; Roisman et al., 2004; Sroufe, 1979). Social competence was assessed more broadly than the distinct but related concept of peer rejection (Volling, MacKinnon-Lewis, Rabiner, & Baradaran, 1993). We treated social competence as an individual differences variable, albeit one encompassing information from several sources. Self-perceptions, peer report, parent report, and interviewer ratings were treated as fallible indicators of targeted latent constructs (but see Cole, 1990, 1991). In addition, operational definitions of social competence reflected developmental changes in the nature of peer relationships. Thus, for example, indicators of social competence in childhood emphasized acceptance by school classmates and having friends, whereas in adulthood, indicators focused on having close and supportive friendships. Finally, we also were sensitive to issues that could be raised about differentiating social competence from related concepts of social withdrawal, isolation from peers, and behavioral inhibition (e.g., Gest, 1997). It was particularly important to demonstrate in this study that any linkages observed between social competence and internalizing symptoms did not result solely from overlapping concepts, and specifically from inclusion of social withdrawal in the internalizing measures. Therefore, we conducted follow-up analyses excluding indicators of social withdrawal from internalizing constructs.

Goals and Hypotheses of the Present Study

A series of nested structural equation models was examined to test major questions of the present paper involving timing and direction of cross-domain effects. Each successive model
incorporates all paths of the prior models while estimating a set of additional paths guided by the literature reviewed above (i.e., stronger effects between social competence and internalizing and stronger effects earlier in development). We included all three domains of focus at each time point, not only to test for cascade effects, but also because the most informative research on the predictive significance of internalizing and externalizing symptoms (e.g., Capaldi & Stoolmiller, 1999), have underscored the importance of controlling for the other domain at each time point to avoid potentially misleading results of either domain considered in isolation.

Cross-sectional associations and stability. Based on extensive prior research linking psychopathology and social competence as early as preschool (Campbell, 1994; Olson & Hoza, 1993), we hypothesized moderate to high correlations \( r = .30 \) to \(.60\) among constructs at the time of the initial assessments (in late childhood). In addition, we expected to find significant stability across the study time span, with externalizing problems showing the largest stability coefficients (Koot & Verhulst, 1992). Because of the somewhat lengthy time intervals used in the present study, we explored the possibility of additional within-time correlations beyond the first assessment, although we did not have specific predictions in this area.

Longitudinal cross-domain paths. Generally, in the present study, we expected to find stronger longitudinal cross-domain effects between social competence and internalizing symptoms than social competence with externalizing symptoms. This was due to the timing of the study (beginning later than some effects expected from the literature, such that of aggressive behavior on early social competence in school, might have happened); the high stability of externalizing symptoms expected (likely to reduce the available “predictable” variance); and the relative consistency of findings implicating social competence effects in the literature. Based on Mesman et al. (2001)’s finding of link from aggression in preschool through social competence
in middle childhood to internalizing problems in early adolescence, we proposed a similar cascade effect in the present study across the first three time points. However, this path was exploratory for two reasons: the substantially longer time intervals employed in the present study and the use of latent variable methods to minimize method covariance. Finally, we expected that after controlling for initial covariance and longitudinal continuities, internalizing would show a negative predictive effect on later externalizing symptoms; we expected to corroborate the path identified by Masten et al. (2005) in this new analytic context.

**Follow-up analyses.** The robustness of findings for our final model were put to the test in four key respects. First, we conducted follow-up analyses that removed withdrawn indicators from our internalizing latent construct and retested any cross-domain link between social competence and internalizing behavior. Second, we examined whether three leading candidates for “third variable causes” implicated in our own and other studies could account for any observed cross-domain effects. To do so, we added parenting quality, IQ, and socioeconomic status (SES) to the final model, with the expectation that any cross-domain effects would prove robust to the inclusion of these control variables. Third, given evidence that social competence and externalizing may show stronger links for males (Coie & Dodge, 1998) whereas social competence and internalizing may show stronger links for females (Crick & Zahn-Waxler, 2003), we also tested each significant cross-domain path for gender invariance. Finally, because our study included a range of cross-sectional ages at each time point, we included age as an observed covariate in a fourth follow-up analysis.

**Method**

*Sample and Procedure*
The sample consisted of 205 children (56% female, 29% ethnic minority) participating in a longitudinal study of competence and resilience (Masten et al., 1995, 1999, 2005). The sample was recruited from two elementary schools in a diverse urban neighborhood, when children were 8 to 12 years old (T1, childhood). The sample was followed up 7 years (T2, adolescence), 10 years (T3, emerging adulthood), and 20 years (T4, adulthood) after the onset of the study. Socioeconomic status among participating families ranged from 7 to 92 on the 100-point Duncan index, with a mean of 43 (equivalent to skilled labor or clerical position). Ethnic minority breakdown of the sample, including biracial children, was 18% African-American, 7% American Indian, 3% Hispanic, and 1% Asian. The sample also included data from 26 sibling pairs.

Assessments at each time point included multimethod and multi-informant data from interviews, questionnaires, school records, and test sessions. Follow-up information was obtained for 88% of the sample at T2, 98% at T3, and 90% of the known living sample (two male participants had died) at T4. At each time point, assessments included important developmental competence domains as well as behavioral and emotional problems. Measures for each construct are described in brief below and in more detail in prior publications (Masten et al., 1995, 1999, 2005).

Measures

Social competence. Table 1 presents a summary list of indicators with number of items, reliability and content information. T1 social competence was assessed using the Popular-Leader and Peer-Isolation subscales of the Revised Class Play (RCP) peer-nomination procedure (Gest, Sesma, Masten, & Tellegen, 2006; Masten, Morison, & Pellegrini, 1985) and a composite of two clinical ratings of child’s global social acceptance, close friendships, and getting along well with others based on participant and parent interviews.
T2 social competence was assessed using ratings based on Status Questionnaires (SQ) completed by parents and participants and also parent reports on a Competence Rating Scales (CRS) instrument adapted from the preliminary version of the Self Perception Scale for Adolescents (Harter, 1982) set of competence scales. Two independent clinical judges rated participants’ active/positive social life based on adolescent or parent SQ using a 5-point Likert scale. Parent ratings of adolescents on the CRS assessed close relationships and peer acceptance.

T3 social competence included three scores derived from parent information and two scores derived from participant information. Parent information included a composite of CRS scores of participant’s close friendship and social acceptance; SQ ratings of participant’s positive, active social life and close, confiding relationships; and interview ratings of participant’s positive and active social life. Participant information included an average SQ rating of the same two items as above for parents, and an 8-item interviewer rating composite concerning close friendship and general social acceptance.

In young adulthood, having a close friend was considered a more central aspect of social competence, and indicators were adjusted accordingly (cf. Roisman et al., 2004). T4 social competence thus included a clinical rating of close friendship presence and quality based on parallel self- and parent-report SQ items assessing judgment of whether the participant’s close friends were good for him or her, a composite of five target SQ items assessing close friendship quality and support, and target and parent CRS items from the close friendship subscale.

Externalizing problems. T1 externalizing problems were assessed via parental report on a symptom measure containing much overlap with the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983) and a similar three-categorical response format. Two indicators of externalizing problems, aggression (α = .76; e.g., “bullies other children”) and delinquency (α
Social competence and psychopathology

Externalizing problems. T1 externalizing problems were assessed using aggression and delinquency narrowband scales from the CBCL (Achenbach, 1991a) and Youth Self Report (YSR; Achenbach, 1991b). At T3, the cohort was too old for Achenbach measures available at the time, and externalizing problems were assessed using six broad indicators: clinical ratings of parent and participant SQs for “seriousness of trouble with the law” (intraclass correlations = .77, .92, respectively), a composite of three antisocial ratings based on a parent interview (α = .80; e.g., “trouble with the law”), a composite of five ratings on aggressive-disruptive peer interactions based on participant interview (α = .83; e.g., “gets into fights and quarrels with peers”), and a composite of two aggression items from the CRS (see Masten et al., 1995; e.g., “rarely gets into fights with others their age” reverse-scored). At T4, externalizing problems were again assessed by aggression and delinquency scales of Achenbach (1997) measures, the Young Adult Behavior Checklist (YABCL) and Young Adult Self Report (YASR).

Internalizing problems. T1 internalizing problems were assessed via parental report on the same checklist described above for externalizing. Three indicators were computed to parallel the CBCL factor structure: anxious/depressed (α = .80), withdrawn (α = .42), and somatic complaints (α = .78). At T2, self- and parent-report subscales of the same three subscales from the CBCL/YSR were used. At T3, internalizing problems were assessed with the Symptom Checklist-90-R (SCL-90-R; Derogatis, 1983). Three subscales of anxiety (α = .88), depression (α = .89), and somatization (α = .82) were taken from this measure. At T4, scores on anxious/depressed and withdrawn scales from Achenbach’s (1997) YABCL and YASR questionnaires were used in accordance with their published factor structure. Internalizing and externalizing measures at all four time points were identical to those used in Masten et al. (2005).
Control variables. Control variables were analogous to the set used in Masten et al. (2005) and are described in more detail in that publication. At T1 and T3, general intellectual functioning (IQ) was estimated based on scores from the vocabulary and block design subtests of the WISC-R (Wechsler, 1974) and WAIS-R (Wechsler, 1981). Parenting quality in childhood was indexed on the basis of global composite scores from independent interviews of parent (12 items, $\alpha = .94$) and child (10 items, $\alpha = .89$), focusing on closeness, warmth and structure (Masten et al., 1988, 1999). Parenting quality at T3 focused on closeness and warmth as the quality of structure was no longer age-appropriate. Four composites with high internal consistency ($\alpha = .84$ to $.94$) were included, based on participant and parent interview and SQ. Latent variable measurement models were employed for both IQ and parenting quality. SES was indexed by a single indicator, the Duncan Socioeconomic Index (Hauser & Warren, 1997), calculated based on occupation of head of household (whichever parent had a higher index).

Statistical Analyses

Statistical analyses for the present study were conducted using Mplus version 3.12 (Muthén & Muthén, 2004). Percentage of missing data ranged across indicators and time with a mean of 9.5%. Due to power considerations, the missing data were treated as ignorable (missing at random) and a variant of maximum likelihood estimation was used that allowed for the total sample of 205 to be analyzed. To account for missing data and positive skew of some indicators, we used the Maximum Likelihood-Robust (MLR) estimator in Mplus. Dependency of observations among the 26 sibling pairs was addressed by an embedded cluster model; under this scenario, MLR is robust to nonindependence of observations (Muthén & Muthén, 2004).

For all models, three fit indices are presented for comparison: the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root-mean-square error of approximation.
(RMSEA). For the CFI and TLI, we used cutoff values of .90 or greater for acceptable fit, and .95 or greater for good fit (McDonald & Ho, 2002; but see Hu & Bentler, 1999). Conversely, we considered RMSEA values between .05 and .08 as an acceptable fit and values less than .05 as a good fit, consistent with common practice (McDonald and Ho, 2002). However, for the present study, the major focus of our analyses was on relative fit of nested models rather than absolute model fit, as it is unclear what the absolute fit reference standard should be when a robust estimator is used with the present sample size (Hu & Bentler, 1998, 1999; Marsh, Hau, & Wen, 2004). Relative fit was tested with a scaled chi-square difference test for nested models (Satorra, 2000), with each more parsimonious model being compared with the next most complex model.

**Measurement models.** Before testing our main hypotheses using structural equation models, we examined the fit of our observed variables as indicators of our targeted latent constructs. All latent variables were freely intercorrelated within each measurement model. Prior work with this dataset suggested that within-informant aggregation for T2 and T4 internalizing and externalizing was necessary due to misfit resulting from CBCL items (Masten et al., 2005). In addition, preliminary measurement models for the present study suggested that within-informant aggregation at T3 was also necessary due to lack of fit of individual social competence indicators. Therefore, for all T2 to T4 constructs that had multiple informants, composites were computed for each informant (such as self-report or parent-report) and composites representing the same source were allowed to have correlated residuals across constructs. Rater information was aggregated with information from the informant in question, with the exception of social competence at T4 where SQ ratings was employed as a separate indicator to increase the number of manifest variables. The final measurement model indicators, including the aggregation
process described above, are shown in Table 2. Standardized factor loadings and observed variable $R^2$ are presented for the final cross-domain model.

**Cross-domain models.** A series of nested structural equation models was examined to test major questions of the present paper involving timing and direction of cross-domain effects. All models included within-time correlations among constructs; for example, intercorrelations among Ext1, Soc1, and Int1 were freely estimated. Due to considerations of power and total number of parameters, longitudinal paths were only estimated between adjacent time points.

Model 1, the baseline model, included continuity paths between adjacent time points for each construct (e.g., Ext1 $\rightarrow$ Ext2, Ext2 $\rightarrow$ Ext3). Model 2 included a negative Int2 $\rightarrow$ Ext3 cross-domain path identified in Masten et al. (2005). The sequence of subsequent models reflected our hypotheses that cross-domain effects were most likely to be found earlier in development and between social competence and internalizing problems. Model 3 allowed two cross-domain paths to vary: reciprocal paths between social competence and internalizing from T1-T2. Model 4 allowed the remaining Soc-Int cross-domain paths to vary (i.e., those from T2-T4). Model 5 allowed all Soc-Ext cross-domain paths to vary. Finally, Model 6 freed all remaining cross-domain paths across a single time interval by including five additional paths between Ext and Int. Freed paths for key models are displayed in Figure 1.

**Additional models: Social withdrawal, age, gender, and control variable tests.** First, we examined whether the paths for the final model remained significant when internalizing indicators measuring social withdrawal were removed from the measurement model. Withdrawn subscales from the DQ (T1, parent report) and Achenbach scales (T2 and T4, parent and self report) were removed and Model 5 was re-run. Second, we tested whether observed cross-domain paths remained significant after accounting for the shared influence of intellectual
functioning, parenting quality, and SES. Statistically, this was accomplished by including these controls as additional variables in the structural equation model that influenced each component of a cross-domain path. Masten et al. (2005, Figure 2) provide additional details of this analytic procedure. To examine the robustness of cross-domain paths under different analytic conditions, we tested potential common causes in three ways: as a set of correlated variables, each entered separately, and as indicators of a single latent variable.

We also tested the final model for gender invariance by placing a series of equality constraints on model parameters and examining change in fit. These constraints consisted of first equating factor loadings in the measurement model, followed by equating continuity paths within each domain, and finally equating all estimated cross-domain paths. Finally, we included age as an observed covariate in a multiple-indicator multiple-cause (MIMIC; Muthén, 1989) variant of Model 5 to assess whether variability in age within each assessment period would affect results.

Results

Descriptive Statistics

Scores on the CBCL/YABCL and YSR/YASR reflected the normative makeup of the sample: mean self-report externalizing $T$ scores were 54.1 ($SD = 10.0$) at T2 and 49.3 ($SD = 9.3$) at T4. For internalizing, mean self-report $T$ scores were 51.5 ($SD = 9.4$) at T2 and 49.5 ($SD = 9.9$) at T4. Because social competence was assessed with varying instruments and informants and was based on developmental task considerations, standardized comparison data are not readily available. Correlation and covariance matrices of all indicators are not presented due to space considerations but are available from the first author on request. However, standardized path coefficients for latent variables in our measurement model are presented as Appendix A.

Cross-Domain Models
Absolute and relative fit. Results from the cross-domain nested model comparisons are presented in Table 3. The measurement model (not shown) appeared to have good fit, CFI = .950, TLI = .926, RMSEA = .045. The baseline continuity model (Model 1) had relatively poor fit, CFI = .895, TLI = .868, RMSEA = .060, and successive models showed incrementally better fit as additional parameters were estimated. Models 4, 5, and 6 showed marginal fit with CFI > .90, TLI > .90, and RMSEA < .06. However, for the present study models were evaluated primarily based on relative fit.

The c coefficient in Table 3 represents the scaling constant used in the chi-square difference test for non-normally distributed indicators (Satorra, 2000). A significant chi-square difference implies rejection of the more parsimonious model in favor of the model with more parameters. Inspection of the right-hand side of Table 3 shows that each successive model showed a significant increase in fit, except for the final comparison (Model 6 did not fit significantly better than Model 5 despite five added parameters, p = .28). Therefore, Model 5 was selected as the overall most plausible model of the models considered in this paper.

Within-time correlations. Figure 2 shows the standardized path coefficients for the significant paths of Model 5 (standardized path coefficients are reported because indicators varied across time points and standardization of scales was required.) Indicators and factor loadings for this model are presented in Table 2 (all loadings were statistically significant at α = .05). Inspection of Figure 2 shows that at initial assessment, externalizing and internalizing were positively correlated and both negatively correlated with social competence. Additional within-time correlations between externalizing and internalizing were present at T2 (.37) and T3 (.24).

Longitudinal stability. All within-domain continuity paths were positive and statistically significant. Consistent with prior research (e.g., Koot & Verhulst, 1992), externalizing problems
showed substantially higher continuity across time compared with internalizing. Follow-up analyses (not presented) constraining stability paths to be equal within each time interval resulted in significantly poorer model fit. Stability estimates for social competence were somewhat higher than those for internalizing but generally lower than those for externalizing.

**Cross-domain prediction.** Three cross-domain paths were negative and statistically significant. First, the “constraining” negative longitudinal path from Int2 to Ext3 initially reported in our prior work was also established in this analytic context. In the present model, that path was estimated at -.70, somewhat larger than in our original report of -.44. To test the robustness of this finding in a simplified analytic context, we computed composite observed variables from indicators of Int2, Ext2, and Ext3. We then compared the zero-order correlation of Int2 and Ext3 (.17, n.s.) with the partial correlation of Int2 and Ext3 removing variance of Ext2. The partial correlation was negative and statistically significant (-.30, p < .001), consistent with our latent variable modeling results. In addition to the Int2 $\rightarrow$ Ext3 path, two paths from social competence to internalizing were statistically significant, reflecting an increasingly strong link across time: Soc1 $\rightarrow$ Int2 (-.35) and Soc3 $\rightarrow$ Int4 (-.60).

**Social Withdrawal Analysis**

Following establishment of Model 5 as the most plausible structural model, we were interested in testing to what extent the path magnitudes would change if indicators of withdrawn behavior were removed from internalizing. This analysis involved removal of only one of three indicators at T1, one indicator from broad composites at T2 and T4, and no change in the measurement model at T3. The new model had slightly better absolute fit than the original Model 5, CFI = .933, TLI = .910, RMSEA = .050. In this model, the standardized magnitude of cross-domain paths was reduced slightly; Soc1 $\rightarrow$ Int2 from -.35 to -.30, Int2 $\rightarrow$ Ext3 from -.70 to -.56,
and Soc3 $\rightarrow$ Int4 from -.60 to -.48. All paths remained significant and no additional significant paths were found.

**Gender and Age Analyses**

Our next set of analyses examined to what extent Model 5 was invariant across gender, and whether including age would affect results. None of the gender invariance tests had acceptable absolute fit by our cutoffs. However, in these analyses we were most interested in whether the magnitudes of significant paths were invariant across the two gender groups. Starting with the invariant measurement model as a baseline, fixing continuity paths to be equal across gender did not result in a significant decrease in fit, $\Delta \chi^2(9) = 8.79, p = .46$. Equating all cross-domain paths also did not result in a significant decrease in fit, $\Delta \chi^2(13) = 17.59, p = .17$.

As noted above, age of participants varied at each assessment wave. Therefore, it was important to establish that observed effects did not vary by age within time point. As noted above, we ran a MIMIC model (Muthén, 1989) identical to Model 5 but including age as a covariate. This model fit the data very closely to the original Model 5, CFI = .922, TLI = .896, RMSEA = .052. More important, nearly all structural parameters were very close to their original values (all standardized parameter estimates were within .02, except for Ext2 $\rightarrow$ Ext3, which changed from 1.25 to 1.28, and Soc1 $\rightarrow$ Soc2, which changed from .85 to .89.)

**Control Variable Analysis**

Our final set of analyses examined to what extent the significant cross-domain paths of Model 5 would remain when the control variables of intellectual functioning, parenting quality, and socioeconomic status were added to the model. We re-ran Model 5 three times, separately testing the robustness of each significant cross-domain regression path by adding the set of control variables (from the nearest assessment, either T1 or T3) representing potential common
causes. At this step, IQ and parenting quality were entered as multiple-indicator latent variables (see Method section), and SES was entered as a single-indicator latent variable (Duncan Socioeconomic Index). For Soc1 $\rightarrow$ Int2, the path magnitude increased to -.43 but dropped to marginally significant ($p = .053$) with the control variables in the model due to increased standard error. For Int2 $\rightarrow$ Ext3, the path magnitude decreased to .69 ($p < .01$). For Soc3 $\rightarrow$ Int4, the path magnitude increased to -.76 ($p < .05$).

Because the Soc1 $\rightarrow$ Int2 cross-domain path dropped below statistical significance in these analyses, we examined the contribution of the control variables to that path in more detail. The purpose of these analyses was to help clarify conceptually the processes involved with our putative control variables. First, we examined the effect of adding each control variable separately. SES increased the Soc1 $\rightarrow$ Int2 path magnitude to -.38 ($p < .01$), while parenting quality increased the path magnitude to -.51 ($p < .05$). With solely IQ in the model, the Soc1 $\rightarrow$ Int2 path dropped out (-.07, $p > .05$) and IQ itself predicted Int2 (-.28, $p < .05$). Since the control variables themselves were highly intercorrelated at T1 (ranging from .4-.7), this may have contributed to inflated standard errors in the model. To account for this, we ran all T1 control variables as indicators of a single latent variable. With this single “common cause” latent variable in the model, the Soc1 $\rightarrow$ Int2 path increased in magnitude to -.44 ($p < .05$).

Discussion

Consistent with one of the main principles of developmental task theory (Sroufe, 1979), results of this study demonstrate continuity within domains of adaptive functioning assessed by developmentally appropriate indices across time. In addition, we found evidence for longitudinal spillover effects across domains of adaptation. Social competence in childhood showed negative longitudinal links to internalizing symptoms in adolescence, congruent with the possibility that
success or failure in the major developmental task of social competence may induce changes in psychopathology over and above prior levels of symptoms. As suggested by competency-based models of depression and internalizing problems, social problems may contribute to internalizing problems (Cole, 1990, 1991). However, it is important to keep in mind that this finding is equally consistent with the possibility that effective social competence with peers reduces the likelihood of internalizing problems (Masten et al., 2006).

The present study also indicates that the possible influences of social competence on internalizing problems may extend into adulthood. Our final model showed a negative link between social competence in emerging adulthood and internalizing problems ten years later. This finding highlights the potential power of social competence to engender change in internalizing over and above continuity in symptoms. It also underscores the significance that social competence in emerging adulthood may have for later development, consistent with recent perspectives on the importance of these transitional years (Arnett & Tanner, 2006).

Longitudinal connections between social competence and externalizing were not found in the present study. Their absence may reflect the high initial association between these variables (-.48) already present at the beginning of the study, as well as the extremely high rank-order stability of externalizing problems (cf. Cole, 2006). Thus, our exploratory hypothesis of a cascade effect beginning with externalizing problems, through social competence at a later time point, to internalizing problems at a final time point, was not supported. However, it is conceivable that the first stage of this cascade had already occurred before our study began (hence the substantial association of social and externalizing symptoms at Time 1). Mesman et al. (2001) found evidence for an Ext (aggression) → Soc → Int effect, but their study began following children much earlier in time. It is possible that our later start and longer spacing
between assessments made it less likely that this effect would be replicated, but the possibility of an early onset Ext $\rightarrow$ Soc $\rightarrow$ Int cascade, predicted by coercion theory (Patterson et al., 1992), is an intriguing avenue for additional study with informative designs.

Results also confirmed a negative longitudinal effect of internalizing symptoms on externalizing symptoms (T2 to T3), apparently reflecting a suppressor effect that emerged only when earlier externalizing symptoms were controlled. Other studies (noted in the introduction) have found similar results, sometimes attributed to constraining effects of inhibition on risky behavior or the “benefit” of social isolation from deviant peers who tend to accelerate externalizing behavior during adolescence. This result does not suggest that a combination of externalizing and internalizing problems is desirable, but suggests different patterns of risk for young people who vary in their patterns of symptoms, as well as social competence. This finding, particularly if it continues to be observed in future studies, underscores the complexity of labeling domains as uniformly positive or negative, as well as the need for additional and more differentiated research on the longitudinal interconnections among internalizing and externalizing behavior, social behavior and inhibition.

Because measurement artifacts are a frequent and vexing source of confounds in studies linking normative constructs with psychopathology (e.g., Frick, 2004), we tested the effect of a common component of social competence and internalizing problems – withdrawn behavior – on observed associations by running additional models with such indicators of internalizing (e.g., CBCL/YSR Withdrawn scales) removed from the analysis. We found little change in model path estimates using this strategy: the significant longitudinal links between social competence and internalizing discussed above remained, as did the negative path from internalizing to externalizing. The magnitude of path coefficients tended to be slightly reduced, suggesting that
measurement overlap may have played some role in associations. This analysis highlights the need for researchers to continually test the boundaries of their constructs, especially those ostensibly from different research traditions (i.e., competence and psychopathology) that nonetheless might overlap.

The observed continuity and cross-domain associations in this study were also tested for differential gender and age effects. Our age covariate analyses suggested that variability in ages within time point largely did not affect the model results. For gender, we were rather surprised to find invariance for both continuity and cross-domain paths, suggesting observed effects were operating similarly across females and males in this sample. Our broad focus of measurement may have influenced these analyses. In addition, it should be reiterated that this study was focused entirely on continuous associations across constructs without concern for overall level of problems. It is possible that level of problems may not only differ across gender but also may interact with these associations in complex ways.

Our “common cause” analyses explored how inclusion of IQ, parenting quality, and SES in the structural models would affect the observed cross-domain paths. As we were also interested in clarifying methodological aspects of such control-variable analyses using an SEM framework, we conducted this analysis in multiple ways. Overall, inclusion of broad individual and family resource variables did not have any effect on links between internalizing and externalizing in emerging adulthood, or between social competence and internalizing in young adulthood. Rather, common cause effects seemed to play a greater role in the childhood to adolescence time interval (T1-T2). Follow-up analyses suggested that among the correlated control variables, IQ was the primary factor in partially accounting for the social competence to internalizing link. This finding likely reflects the pervasive and complicated connections between
the social and academic domains, as IQ can be seen in some ways as a proxy for academic competence, which has been linked to changes in internalizing symptoms (Masten et al., 2005).

Overall, our series of control analyses suggests that the key cross-domain findings in this study are robust to several competing explanations. In addition, however, they highlight the need to examine in more detail the connections among social and academic competence domains and distinct aspects of psychopathology. Our prior research aimed to analyze these effects in more detail for academic competence, and the present study aims to do so for social competence. Clearly, there is a need for future work, utilizing methodological strategies similar to the present paper, but including both academic and social competence together in theoretically-based models. Although that tactic was not possible in the current framework due to sample size and model estimation constraints, we are conducting continued investigations on academic and social competence that will allow us to test influences of both in greater detail.

Limitations

One clear limitation of the present study is its “big picture” focus on wide-span longitudinal relations among broad constructs. Much of the literature on social competence and behavior problems has benefited from examining such links in more detail than possible here. Also, the relatively wide spans between assessment periods in the present study do not allow us to draw firm conclusions about exactly when or how in development observed cross-domain links come about. In addition, due to concerns of model complexity, a number of additional third variables and interacting constructs, such as academic competence or failure, were not included. Finally, the present study was conceptualized from a variable-focused perspective and focused on standardized associations among competence and symptoms across a normative sample. It is possible that the effects observed here might differ in clinical or at-risk samples or at particular
points in a symptom distribution, for example at high levels of symptoms where interference in social competence is more likely. More specifically, it was not possible to determine in this study whether the high stability of externalizing problems over time or the normative nature of the sample (restricting the range of problem severity) may have obscured additional longitudinal effects between externalizing and social competence.

Conclusions

The present study provides strong evidence for the pervasive linkages between social competence and internalizing problems, from elementary school into adulthood. In addition to the oft-cited advantages of structural equation modeling (accounting for informant effects, correction for unreliability of measurement) our nested model comparisons allowed tests of theoretical propositions on the timing and domain-specificity of effects. Given the central path from social competence in childhood to internalizing problems in adolescence, our results are broadly consistent with competence-based models of internalizing problems. Findings also suggest that such links do not end in adolescence, but may continue to influence functioning into young adulthood. Results were robust to removal of social withdrawal indicators from internalizing and also in large part to inclusion of intellectual functioning, parenting, and SES as potential common factors.

Overall, findings call attention to the broad importance and timing of developmental task expectations in society. Social competence in the childhood years, as indexed by both peer acceptance and ability to maintain close friendships, clearly has major implications for positive adaptation across future periods of development (cf. Roisman et al., 2004). Ideally, future work on the interplay of social competence and psychopathology should blend advantages of the present study (inclusion of multiple constructs of interest at each time point) with more fine-
grained analysis of developmental processes, using the broader linkages established here and elsewhere to guide the design of more detailed studies and analyses.
References


multivariate statistical analysis: A festschrift for Heinz Neudecker (pp. 233-247).


Appendix A

Latent variable associations: Standardized path coefficients for the unconstrained measurement model

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ext1</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Ext2</td>
<td>.82***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Ext3</td>
<td>.69***</td>
<td>.86***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Ext4</td>
<td>.53***</td>
<td>.76***</td>
<td>.77***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Soc1</td>
<td>-.52***</td>
<td>-.46***</td>
<td>-.31**</td>
<td>-.36**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Soc2</td>
<td>-.12</td>
<td>.05</td>
<td>.01</td>
<td>.02</td>
<td>.73***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Soc3</td>
<td>-.21*</td>
<td>-.20</td>
<td>-.19*</td>
<td>-.25**</td>
<td>.54***</td>
<td>.71***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Soc4</td>
<td>-.26*</td>
<td>-.03</td>
<td>-.19</td>
<td>-.27</td>
<td>.22</td>
<td>.30*</td>
<td>.28*</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Int1</td>
<td>.74***</td>
<td>.39**</td>
<td>.22*</td>
<td>.20</td>
<td>-.31**</td>
<td>-.12</td>
<td>-.13</td>
<td>-.02</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Int2</td>
<td>.37***</td>
<td>.55*</td>
<td>.21</td>
<td>.46*</td>
<td>-.54***</td>
<td>-.43*</td>
<td>-.56**</td>
<td>.02</td>
<td>.48***</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Int3</td>
<td>.09</td>
<td>.21</td>
<td>.25*</td>
<td>.26</td>
<td>-.22*</td>
<td>-.23*</td>
<td>-.19*</td>
<td>-.19*</td>
<td>.09</td>
<td>.49*</td>
<td>---</td>
</tr>
<tr>
<td>12.</td>
<td>Int4</td>
<td>.20</td>
<td>.70**</td>
<td>.34*</td>
<td>.67*</td>
<td>-.58***</td>
<td>-.50*</td>
<td>-.55**</td>
<td>-.34</td>
<td>.35**</td>
<td>1.03**</td>
<td>.43*</td>
</tr>
</tbody>
</table>

Notes. *p < .05. **p < .01. ***p < .001. Numbers denote time point of data collection. Ext = externalizing; Int = internalizing; Soc = social competence. Standardized path coefficients are not bounded by +/-1.0.
Table 1

Measurement of Social Competence

<table>
<thead>
<tr>
<th>Time Point / Measure</th>
<th>Informant</th>
<th>No. of Items</th>
<th>Reliability&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Description / Sample Item(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T1 – Childhood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCP – Popular-Leader</td>
<td>Peers</td>
<td>6</td>
<td>.93</td>
<td>Someone everyone likes to be with</td>
</tr>
<tr>
<td>RCP – Peer Isolation (rev.)</td>
<td>Peers</td>
<td>2</td>
<td>.80</td>
<td>Has trouble making friends</td>
</tr>
<tr>
<td>Target interview ratings</td>
<td>Rater-S</td>
<td>9</td>
<td>.95</td>
<td>Develops genuine, close, and lasting relationships</td>
</tr>
<tr>
<td><strong>T2 – Adolescence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent SQ rating</td>
<td>Rater-P</td>
<td>1</td>
<td>.84</td>
<td>Extent to which has active/positive social life</td>
</tr>
<tr>
<td>CRS – Close Friendship / Social Acceptance</td>
<td>Parent</td>
<td>7</td>
<td>.85</td>
<td>Popular with others; has a close friend to share with</td>
</tr>
<tr>
<td>Target SQ rating</td>
<td>Rater-S</td>
<td>1</td>
<td>.84</td>
<td>Extent to which has active/positive social life</td>
</tr>
<tr>
<td><strong>T3 – Emerging Adulthood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent SQ ratings</td>
<td>Rater-P</td>
<td>2</td>
<td>.81</td>
<td>Has positive/active social life; has close relationships</td>
</tr>
<tr>
<td>Measure</td>
<td>Rater</td>
<td>n</td>
<td>Reliability</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------</td>
<td>----</td>
<td>-------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Parent interview ratings</td>
<td>Rater-P</td>
<td>2</td>
<td>.85</td>
<td>Has positive/active social life</td>
</tr>
<tr>
<td>CRS – Close Friendship / Social Acceptance</td>
<td>Parent</td>
<td>4</td>
<td>.87</td>
<td>Popular with others; has a close friend to share with</td>
</tr>
<tr>
<td>Target SQ ratings</td>
<td>Rater-S</td>
<td>2</td>
<td>.76</td>
<td>Has positive/active social life; has close relationships</td>
</tr>
<tr>
<td>Target interview ratings</td>
<td>Rater-S</td>
<td>8</td>
<td>.94</td>
<td>Relationship with best friend is close &amp; reciprocal bond</td>
</tr>
</tbody>
</table>

**T4 – Young Adulthood**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Rater</th>
<th>n</th>
<th>Reliability</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target SQ rating</td>
<td>Rater-S</td>
<td>1</td>
<td>.76</td>
<td>Extent to which has close, confiding relationships</td>
</tr>
<tr>
<td>CRS – Close Friendship</td>
<td>Parent</td>
<td>2</td>
<td>.86</td>
<td>Has a close friend to share things with</td>
</tr>
<tr>
<td>Parent SQ</td>
<td>Parent</td>
<td>1</td>
<td>N/A</td>
<td>Is friend good for target?</td>
</tr>
<tr>
<td>CRS – Close Friendship</td>
<td>Self</td>
<td>2</td>
<td>.82</td>
<td>Has a close friend to share things with</td>
</tr>
<tr>
<td>Target SQ</td>
<td>Self</td>
<td>5</td>
<td>.78</td>
<td>Satisfaction with friend; reciprocal emotional support</td>
</tr>
</tbody>
</table>

**Notes.** CRS = Competence Rating Scales; Rater-P = rating based on parent information; Rater-S = rating based on target information; RCP = Revised Class Play; SQ = Status Questionnaire. * Reliability coefficients are intraclass correlations for single-item indicators, and coefficient $\alpha$ for multi-item indicators. Rev. = reversed.
### Table 2

*Descriptions, informants, factor loadings, and variance explained for indicators used in the final model (Model 5)*

<table>
<thead>
<tr>
<th>Factor / Indicators</th>
<th>Informant</th>
<th>$\lambda$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Externalizing – Time 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DQ – Aggression scale</td>
<td>Parent</td>
<td>.80</td>
<td>.64</td>
</tr>
<tr>
<td>DQ – Delinquency scale</td>
<td>Parent</td>
<td>.72</td>
<td>.51</td>
</tr>
<tr>
<td><strong>Social Competence – Time 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCP – Popular/Leader peer nominations</td>
<td>Peers</td>
<td>.57</td>
<td>.32</td>
</tr>
<tr>
<td>RCP – Peer Isolation peer nominations (reversed)</td>
<td>Peers</td>
<td>.58</td>
<td>.33</td>
</tr>
<tr>
<td>CI – Social acceptance, close friendships, gets along well with others</td>
<td>Rater-S</td>
<td>.51</td>
<td>.26</td>
</tr>
<tr>
<td><strong>Internalizing – Time 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DQ – Anxious/Depressed scale</td>
<td>Parent</td>
<td>.99</td>
<td>.99</td>
</tr>
<tr>
<td>DQ – Withdrawn scale</td>
<td>Parent</td>
<td>.59</td>
<td>.35</td>
</tr>
<tr>
<td>Measure</td>
<td>Rater</td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>DQ – Somatic Problems scale</td>
<td></td>
<td>.40</td>
<td>.16</td>
</tr>
<tr>
<td><strong>Externalizing – Time 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL – Aggression &amp; Delinquency scale composite</td>
<td>Parent</td>
<td>.86</td>
<td>.74</td>
</tr>
<tr>
<td>YSR – Aggression &amp; Delinquency scale composite</td>
<td>Self</td>
<td>.52</td>
<td>.27</td>
</tr>
<tr>
<td><strong>Social Competence – Time 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRS/SQ – Close friends, active social life, &amp; acceptance composite</td>
<td>Parent*</td>
<td>.60</td>
<td>.36</td>
</tr>
<tr>
<td>SQ – Active/positive social life</td>
<td>Rater-S</td>
<td>.78</td>
<td>.61</td>
</tr>
<tr>
<td><strong>Internalizing – Time 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL – Anxious/Depressed, Withdrawn, &amp; Somatic scale composite</td>
<td>Parent</td>
<td>.82</td>
<td>.68</td>
</tr>
<tr>
<td>YSR – Anxious/Depressed, Withdrawn, &amp; Somatic scale composite</td>
<td>Self</td>
<td>.51</td>
<td>.26</td>
</tr>
<tr>
<td><strong>Externalizing – Time 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PI, CRS, &amp; SQ – Antisocial / aggressive/ disruptive composite</td>
<td>Parent</td>
<td>.87</td>
<td>.76</td>
</tr>
</tbody>
</table>
Social competence and psychopathology

AI, CRS, & SQ – Aggression / trouble with law composite

| Self | .79 | .63 |

Social Competence – Time 3

CRS, PI, & SQ – Close friends, active social life, & acceptance comp.

| Parent* | .85 | .73 |

AI & SQ – Close friends, active social life, & acceptance composite

| Rater-S | .59 | .35 |

Internalizing – Time 3

SCL-90 – Anxiety scale

| Self | .95 | .90 |

SCL-90 – Depression scale

| Self | .81 | .66 |

SCL-90 – Somatization scale

| Self | .74 | .54 |

Externalizing – Time 4

YABCL – Aggression, Delinquency, & Intrusive scale composite

| Parent | .53 | .28 |

YASR – Aggression, Delinquency, & Intrusive scale composite

| Self | .71 | .51 |

Social Competence – Time 4
| Clinical ratings – Close, confiding friend | Rater-S | .92 | .84 |
| CRS & SQ – Close friendship and friend good for son/daughter | Parent | .34 | .11 |
| CRS & SQ – Close friendship and friendship quality | Self | .85 | .72 |

**Internalizing – Time 4**

| YABCL – Anxious/Depressed & Withdrawn scale composite | Parent | .43 | .19 |
| YASR – Anxious/Depressed & Withdrawn scale composite | Self | .65 | .42 |

**Notes.**  AI = Adolescent Interview; CBCL = Child Behavior Checklist; CI = Child Interview; CRS = Competence Ratings Scales; DQ = Developmental Questionnaire; PI = Parent Interview; Rater-P = rating based on parent information; Rater-S = rating based on target information; RCP = Revised Class Play; SCL-90 = Symptom Checklist-90-R; SQ = Status Questionnaire; YABCL = Young Adult Behavior Checklist; YASR = Young Adult Self Report; YSR = Youth Self Report. * = includes ratings based on informant in question.
Table 3

*Fit Statistics and Model Comparisons for Hierarchically Nested Structural Equation Models*

<table>
<thead>
<tr>
<th>Model</th>
<th># Cross-domain paths</th>
<th>df</th>
<th>c</th>
<th>$\chi^2$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>Model Comparison</th>
<th>cd</th>
<th>$\Delta\chi^2$</th>
<th>$\Delta df$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>301</td>
<td>1.014</td>
<td>525.30</td>
<td>0.895</td>
<td>0.868</td>
<td>0.060</td>
<td>2 vs. 1</td>
<td>N/A*</td>
<td>30.09</td>
<td>1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>300</td>
<td>1.030</td>
<td>495.22</td>
<td>0.909</td>
<td>0.885</td>
<td>0.056</td>
<td>3 vs. 2</td>
<td>0.881</td>
<td>8.81</td>
<td>2</td>
<td>0.012</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>298</td>
<td>1.031</td>
<td>487.21</td>
<td>0.911</td>
<td>0.888</td>
<td>0.056</td>
<td>4 vs. 3</td>
<td>0.737</td>
<td>42.56</td>
<td>4</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>294</td>
<td>1.035</td>
<td>455.02</td>
<td>0.925</td>
<td>0.903</td>
<td>0.052</td>
<td>5 vs. 4</td>
<td>0.987</td>
<td>13.85</td>
<td>6</td>
<td>0.031</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>288</td>
<td>1.036</td>
<td>441.38</td>
<td>0.928</td>
<td>0.906</td>
<td>0.051</td>
<td>6 vs. 5</td>
<td>1.885</td>
<td>6.23</td>
<td>5</td>
<td>0.284</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>283</td>
<td>1.021</td>
<td>436.36</td>
<td>0.928</td>
<td>0.904</td>
<td>0.051</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes. $c =$ weighting constant for computing the chi-square statistic using robust estimation method; $cd =$ weighting constant for the difference between two chi-square values using robust estimation. CFI= comparative fit index; TLI = Tucker-Lewis Index; RMSEA = root-mean-square error of approximation. * = scaling correction produced negative chi-square difference, therefore standard chi-square difference test is reported for this analysis.
Figure Captions

Figure 1. Summary of analyses showing freely estimated paths for nested models. Ext = externalizing problems; Soc = social competence; Int = internalizing problems. Model 2 adds path from Int2 → Ext3. Model 6 adds five additional first-lag paths between Ext and Int (Ext1 → Int2, Int1 → Ext2, Ext2 → Int3, Ext3 → Int4, and Int3 → Ext4). All models include within-time correlations (not shown) and paths from prior models. See text for additional details.

Figure 2. Standardized path coefficients for significant paths of final structural model (Model 5). $R^2$ values are in parentheses. Numbers denote time point of data collection. Continuity and within-time paths are shown in gray. All displayed paths are significant at $p < .05$. Measurement model includes within-informant aggregation for T2 to T4 (see text for details). Ext = externalizing problems; Soc = social competence; Int = internalizing problems. $\chi^2(288, N = 205) = 441.4; \Delta \chi^2(5, N = 205) = 6.23, n.s.;$ comparative fit index = .93; Tucker-Lewis Index = .91; root-mean-square error of approximation = .05.
Figure 1

Ext1 → Ext2 → Ext3 → Ext4
Soc1 → Soc2 → Soc3 → Soc4
Int1 → Int2 → Int3 → Int4

Model 1
Model 2 (see below)
Model 3
Model 4
Model 5
Model 6 (see below)
Figure 2

Age 10: Ext1, Soc1, Int1
Age 17: Ext2, Soc2, Int2
Age 20: Ext3, Soc3, Int3
Age 30: Ext4, Soc4, Int4

Ext1: .72
Soc1: .65
Int1: .35
Ext2: .37
Soc2: .57
Int2: .32
Ext3: 1.25
Soc3: .63
Int3: .38
Ext4: .72
Soc4: .26
Int4: .28
Ext3: .24
Soc4: -.60
Int4: -.29
Ext1: -.48
Soc1: -.35
Int1: -.29
Soc2: .37
Ext2: .85
Int2: .32
Soc3: -.70
Int3: .18
Ext4: .59
Soc4: .10
Int4: .50

Correlations and variances are shown in the diagram.