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Self-Esteem and Mastery Trajectories in High School by Social Class and Gender

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Abstract

Using longitudinal data from 769 white adolescents in the Midwest, this research applies a social structure and personality perspective to examine variation in self-esteem and mastery trajectories by gender and SES across the high school years. Analyses reveal that high SES adolescents experience significantly steeper gains in self-esteem and mastery compared to low SES adolescents, resulting in the reversal of SES differences in self-esteem and the emergence of significant SES differences in mastery. Pre-existing gender differences in self-esteem narrow between the 9th and 12th grade because self-esteem increases at a faster rate among girls than boys during high school. These SES and gender differences in self-concept growth are explained by changes in parent-adolescent relationship quality and stress exposure. Specifically, boys and adolescents with lower SES backgrounds experienced steeper declines in parent-adolescent relationship quality and steeper gains in chronic work strain compared to girls and low SES adolescents, respectively.

Keywords

self-esteem; mastery; gender; socioeconomic status; parent-adolescent relationship; work strain; academic strain

1. Introduction

Adolescence is a critical time for self-concept development. Two important evaluative dimensions of the self-concept are mastery (a sense of personal control deriving from the belief that actions will produce desired ends) and self-esteem (perceived self-worth). The level of mastery and self-esteem attained in adolescence constitute the foundation for these personal resources in adulthood (Pearlin et al., 2007). Self-esteem and mastery are also linked to socio-economic status attainment (Wang et al., 1999), nonmarital or early pregnancy (Lewis, Ross and Mirowsky, 1999), and mental health (Ross and Sastry, 1999). For these reasons it is crucial to develop a sense of mastery and positive self-esteem in adolescence.

Adolescent developmental theorists argue that the increasing cognitive and physical competence that accompanies adolescent maturation should lead to gains in self-esteem and

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mastery throughout adolescence (Harter, 1999; Gecas, 2004). However, empirical research on middle school students finds that self-esteem declines, particularly among white adolescents (McLeod and Owen, 2004; Rhodes, Roffman, Reddy and Frederiksen, 2004; Scheier et al., 2000). Surprisingly, less longitudinal research on self-esteem has focused specifically on the high school years (see Greene and Way, 2005 for an exception), and scant adolescent research has focused on mastery development (see Chubb, Fertman and Ross, 1997 for exception). During high school, I expect self-esteem and mastery to increase; however, the rate of increase will vary by gender and socioeconomic status (SES).

Symbolic interactionism argues that self-perceptions, such as self-esteem and mastery, arise through social interactions with other individuals during the course of every-day social experiences. For example, Mead (1934) thought that self-concept formation begins by taking the role of the other or the ability to see the self from another individual's perspective. A social structure and personality perspective (grounded in symbolic interactionism) emphasizes that social interactions among individuals within a society are organized and patterned by social positions (House 1981; McLeod and Lively 2003). In other words, the average social experience of being an adolescent will differ depending on an adolescent's gender and SES. These differentiated social interactions should lead to variation in self-esteem and mastery trajectories across social positions during high school.

Empirical evidence suggests that adolescence is the phase in the life course when gender and SES differences in self-esteem and mastery appear to emerge. Boys and adolescents with higher socioeconomic status report higher self-esteem and mastery in adolescence (Bergman and Scott, 2001; Chubb et al., 1997; Kling, Hyde, Showers and Buswell, 1999; Wiltfang and Scarbecz, 1990). The purpose of this research is to identify how gender and SES differences in self-esteem and mastery *change* (e.g., grow larger or shrink) during high school, and to evaluate the factors which may contribute to these changes. The specific proximal social experiences under investigation are exposure to chronic strain from school or work and parent-adolescent relationship quality. Gender and SES are expected to shape an adolescent's proximal social experiences within family, school, and work environments leading to variation in mastery and self-esteem trajectories across these social positions.

2. Background

2.1 Social Positions and Self-Concept Trajectories

Gender is a salient social position at a very young age and previous research finds significant gender differences in self-esteem prior to entry into high school (see Kling et al. 1999 for a meta-analysis). The current study will assess if the growth rate in self-esteem varies by gender during high school. Research on middle school students found the growth rate in self-esteem declined for girls but increased for boys (McLeod and Owen, 2004). Beyond the high school years, however, self-esteem is shown to increase at a faster rate for girls than boys (Galambos, Barker and Krahn, 2006). These contrasting gender trajectories imply that high school may be a pivotal period for changes in the growth rate of self-esteem by gender.

In contrast to gender, SES becomes an increasingly salient status distinction in high school as adolescents assess their options and contemplate what to do after graduation. Significant SES differences in self-esteem may emerge in high school. A series of empirical studies found the effect of socioeconomic status on self-esteem to be strong among adults, modest among adolescents and insignificant among children (Demo and Savin-Williams, 1983; Rosenberg and Pearlin, 1978; Wiltfang and Scarbecz, 1990). These studies suggest that self-esteem may increase at a faster rate among adolescents with higher socioeconomic status

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during high school. Among middle school students, a history of poverty is associated with less rapid growth in self-esteem (McLeod and Owen, 2004).

In contrast to self-esteem, little research has focused on mastery. One longitudinal study on a related construct, locus of control, found that mean gender differences in locus of control between the 10th and 12th grade grew larger (Chubb et al., 1997). A cross-sectional study found higher mastery in older compared to younger adolescents, especially when parents had high educational attainment (Lewis et al., 1999). Clearly, more research on mastery development in adolescence is warranted. It is also important because mastery improves an adolescent's self-esteem (Gecas and Schwalbe, 1983) and promotes the construction of desired life course pathways (Clausen, 1991; Gecas, 2004). Finally, investigating both mastery and self-esteem allows for insight into which types of proximal social experiences are most important for the development of each evaluative dimension of the self-concept.

2.2 Self-Concept Formation

Self-esteem and mastery, like other dimensions of the self-concept, develop through three primary processes: reflected appraisals, social comparisons, and self-attributions. Essentially, we form perceptions about the self by seeing the self as we think others see us, by comparing the self to others, and by making inferences about the self through observation of one's own behavior and monitoring thoughts or feelings (Gecas, 1982). Foundational works by prominent social psychologists are clearly connected to these three processes. For example, Cooley's (1902) looking-glass self theory argued that individuals come to think about their self based on their perceived appraisals of the self by others. Others emphasize that individuals acquire knowledge about the self by self-monitoring (self-perception theory) and by making comparisons to specific and generalized others (Bem 1972; Festinger, 1954; Mead, 1934).

More recent social psychological work focuses specifically on the development of self-esteem and mastery. While each self-concept formation process will contribute to the development of self-esteem, reflected appraisals are the primary route of self-esteem development (Jaret, Reitzes and Shapkina, 2005; Rosenberg, 1979). The self-concept formation process most important for mastery development is engaging in successful performance accomplishments. A performance accomplishment is a particular kind of self-attribution characterized by the belief that one's efforts have led to a successful outcome (Bandura, 1997). Adolescents with positive reflective appraisals and successful performance accomplishments should develop high levels of self-esteem and mastery during high school.

3. Proximal Social Experiences and Self-Concept Formation

3.1 Self-Esteem

Parent-adolescent relationships are consistently found to be an important influence on adolescent self-esteem (e.g., Bolognini, Plancherel, Bettschart and Halfon, 1996; Demo, Small and Savin-Williams, 1987; Gecas and Schwalbe, 1986). Yet, parent-adolescent relationships transform during adolescence. The normative changes that accompany adolescent development disrupt parent-adolescent relations (Steinberg and Silk, 2002). Previous research on these changes focuses on conflict (see Laursen, Coy and Collins 1998 for a meta-analysis). Surprisingly, little longitudinal research has investigated changes in other dimensions of parent-adolescent relationships. The results of two studies, however, suggest that parent-adolescent relationship quality may decline during high school. Among Dutch adolescents, attachment to parents decreased between the ages of 11 and 17 (Buist, Deković, Meeus and van Aken, 2002), and intimacy and companionship decreased during middle school among Finish adolescents (Sallienen, Ronka, Kinnunen and Kokko, 2007).

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For several reasons, declines in parent-adolescent relationship quality might be more drastic in *father*-adolescent relationships than *mother*-adolescent relationships. First, mothers tend to provide emotional nurturing, whereas fathers focus on instrumental aid (Starells, 1994). It is not surprising, then, that interactions with fathers focus on leisure pursuits, whereas youth feel more comfortable talking to mothers about personal problems (Collins and Russell, 1991). Second, as adolescents mature, mothers perceive increasing levels of closeness to their offspring, whereas fathers negatively view their gains in independence and egocentrism (Shearer, Crouter and McHale, 2005). Finally, throughout adolescence offspring and parents tend to spend less time together, but this is especially true for fathers (Larson and Richards, 1991).

An adolescent's perception of decline in either type of parent-adolescent relationship quality will have important implications for growth in self-esteem. Specifically, perceived declines should impede self-esteem development by diminishing positive reflected appraisals. Exposure to chronic role strain may also be important to self-esteem development. Previous research shows that stressful life-events (Baldwin and Hoffman, 2002) and academic strain (Hoge, Smith and Crist, 1995) associate with lower self-esteem. Yet, if reflected appraisals are the primary source of self-esteem development, then chronic role strain seems less directly relevant to this self-concept formation process compared to parent-adolescent relationship quality. Therefore, changes in chronic strain are not expected to provide as much explanation for self-esteem growth compared to parent-adolescent relationship quality.

3.2 Mastery

Chronic role strain from school or work may impede mastery development by reducing an adolescent's ability to perform well at school or work thereby diminishing successful performance accomplishment in these domains. School strain compromises academic achievement (De Bruyn, 2005). Previous research also finds that dropping out of high school slows mastery growth during the transition to young adulthood (Lewis et al., 1999), and negative adolescent work experiences are generally associated with less positive outcomes (Vondracek and Porfeli, 2003). Like parent-adolescent relationships, exposure to chronic role strain may change across the high school years. Specifically, school and work strain may increase as adolescents face escalating pressure to earn good grades (Lee and Larson, 2000) or increase their work hours (Yamoor and Moritmer, 1991; Staff, Mortimer and Uggen, 2004).

Parent-adolescent relationship quality may also influence mastery development. Verbal persuasions are an additional source of mastery development (Bandura, 1997). They occur when we receive information from others about our competence. Adolescents who have affirming verbal persuasions should develop high levels of mastery. An adolescent's view of their parents' beliefs about the adolescent's academic competence predicts the adolescent's self-perception of their academic competence (Bouchey and Harter, 2005). Provide affirming verbal persuasions may be more common in high quality parent-adolescent relations. Since verbal persuasions are closely connected to performance accomplishments, high quality parent-adolescent relationships may be as important to mastery development as stress exposure.

4. Social Positions and Self-Concept Formation

4.1 Gender of the Adolescent

The changes in parent-adolescent relations and increased exposure to chronic role strain described above may vary by gender of the adolescent. Specifically, declines in parent-adolescent relationship quality may be steeper for boys than girls. The cultural assumptions

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of masculinity and femininity elicit different socialization practices from parents for sons and daughters. For example, mothers speak to daughters more often and in more supportive tones than sons (Leaper, Anderson and Sanders, 1998). Mothers also encourage more autonomy and independence in their sons than daughters (Pomerantz and Ruble, 1998). Outside of the family, adolescent boys often face pressure from peers to adhere to masculine norms of independence and detachment (Basow, 1992; Chu, 2005). Thus, both parent and adolescent play a role in the potentially greater distancing between sons and parents than daughters and parents during adolescence. Gender of the parent is also an important factor to consider. Previous research finds that mother-daughter dyads form the closest relations (closer than father-son dyads) and father-daughter relations are the most distant (Russell and Saebel, 1997; Starrels, 1994; Steinberg and Silk, 2002). The current study will explore variation in parent-adolescent relationship quality trajectories by gender across four possible parent-adolescent gender combinations.

An adolescent's choice of which course to enroll in or what type of job to apply for will also vary by gender. High school coursework selection falls within traditional gender lines, and girls want courses that expand their knowledge and challenge them, whereas boys select courses they think they will excel in (Wilson, Stocking and Goldstein, 1994). A challenging course load may increase academic stress for girls relative to boys. Also, parents place higher academic expectations on daughters than sons (Carter and Wojtkiewicz, 2000). Like school, adolescent work experiences are likely to vary by gender. Girls are more likely to work in private households, whereas boys hold jobs in formal business settings (Yamoor and Moritmer, 1991). The more formal jobs held by boys may expose them to more work strain compared to girls. Boys also enter the work force at a faster rate than girls during high school (Yamoor and Moritmer, 1991), thereby increasing their possibility of exposure to work strain relative to girls.

4.2 Socioeconomic Status in Family of Origin

Change in parent-adolescent relations and exposure to chronic role strain may also vary by SES. Middle-class parents are more likely to follow the characteristics of an authoritative parenting style (characterized by warmth, appropriate demandingness, and inductive reasoning) than poor or working-class parents (Kohn and Schooler, 1983; Lareau, 2002). An authoritative parenting style may be more conducive to maintaining close parent-adolescent relationships as they transform. In contrast, the harsher punishment practices more often utilized by working-class parents (Whitbeck et al., 1997) might exacerbate parent-adolescent conflict. Parent-adolescent relationship quality may decline more for low SES adolescents compared to high SES, which will differentially shape self-concept development. High SES adolescents have higher mastery than low SES adolescents due to parents promoting effective problem solving skills (Conger et al., 2009) and using inductive reasoning with discipline (Whitbeck et al., 1997).

Adolescents with low SES may also be disadvantaged with regard to stress exposure at work. Previous research finds that work strain is more common among low SES adolescents (Mortimer, Harley and Staff, 2002). This research will explore if these differences grow larger over time. Also, low SES adolescents might be more likely to work than high SES adolescents in order to provide financial support to their family, thereby increasing their possibility of exposure to work strain relative to high SES adolescents. In contrast to work strain, academic strain may increase more for adolescents who are able to and plan on going to college, such as high SES youth (NCES 2006). Also, low SES youth are more likely to drop-out of high school (U.S. Department of Education 2005). Once an adolescent no longer occupies the role the demands of the role, such as homework and studying, disappear.

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5. The Current Study

The current study explores how and why growth in self-esteem and mastery vary across gender and SES during high school. Self-esteem is expected to increase at a faster rate for girls and adolescents with high SES, because boys and low SES adolescents will experience steeper declines in parent-adolescent relationship quality. Predicting variation in mastery growth is less straightforward, because the expected changes in chronic strain are divergent across social positions. Steeper gains in school strain for girls and high SES youth would diminish their growth in mastery relative to boys and low SES youth, but steeper gains in work strain for boys and low SES youth should diminish their growth in mastery relative to girls and high SES youth. Boys and low SES youth have the additional disadvantage of steeper declines in parent-adolescent relationship quality, which may tip the scale to less rapid growth in mastery for them.

6. Methods

6.1 Sample

The Youth Development Study (YDS) is a longitudinal probability sample of adolescents attending public high schools within one large city in the Midwest. The self-administered questionnaire had a 64% response to invitation rate. In 1988, 849 white adolescents in the 9th grade participated in the first wave of data collection and 96% of respondents had at least one parent fill out a parent questionnaire. Adolescents were interviewed each subsequent year in high school (1989, 1990 and 1991). The present study only uses data from white adolescents for the following reasons. First, Hmong respondents (N= 129) do not interpret the survey questions for self-esteem and mastery in a manner consistent with non-Hmong youth (Dunnigan, Miles and Mortimer, 1993). Second, previous research shows significant variation in the size and direction of gender differences in self-esteem and mastery within ethnic groups (Buchanan and Selmon, 2008; Greene and Way, 2005). Although similar trends are found in the YDS, the number of Latino (n=45) and black (n=98) participants in this sample is too low to split these categories further by gender and draw sound conclusions.

YDS is an ideal dataset for this study because it contains four waves of data for all primary concepts of interest (self-concepts, parent-adolescent relations and chronic role strain), and it has high sample retention across the first four waves of data collection (93%). The analytic sample for this research is limited to 769 white respondents. Respondents were lost due to attrition (i.e., having 2 or fewer waves of data, n=54) or having too much missing data (n=26).[1] Based on a logistic regression analysis (not shown), adolescents who are male, have low SES, and are not an intact family structure are more likely to be lost from the analytic sample. Having high school strain is also associated with a lower probability of being in the analytic sample. In spite of this, there is no evidence of bias in the findings of this study. First, baseline cross-sectional associations did not differ between the analytic sample used in this study and a sample of wave one respondents (Fitzgerald, Gottschalk and Moffit 1998). Second, the probability of remaining in the analytic sample (based on the Mills inverse ratio from a probit analysis) did not significantly predict growth in self-esteem or mastery.

[1]Ninety-six respondents had valid data on all concepts of interest, except for parent relationship quality. These respondents either never lived with their father, for example, or did not report on the same parental figure (e.g., biological father) in at least three time-points. In order to retain this unique subgroup of adolescents, missing data on parent-adolescent relationship quality was imputed. Several study and auxiliary variables were used in the imputation process. Sensitivity analyses did not reveal meaningful differences in analyses completed on imputed data compared to analyses based on listwise deletion.

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6.2 Measures

Self-concept—*Self-esteem* was measured with seven questions from the Rosenberg Self-Esteem Scale: I have a number of good qualities, I take a positive attitude toward myself, I am satisfied with myself, I certainly feel useless at times, I do not have much to be proud of, I wish I could have more respect for myself, and at times I think I am no good at all. Summing these items created the index, with higher values indicating higher self-esteem. The response choices for these items ranged from strongly disagree (coded 1) to strongly agree (coded 4) and negative items were reverse coded. Factor and reliability analysis indicate a unidimensional index with good reliability (Cronbach's alpha= .82 or above across all four time points).

The *mastery* index pertained primarily to feelings representing a lack of control. The five indicators for mastery are: I feel I am being pushed around in life, I have little control over the things that happen to me, I often feel helpless in dealing with problems in life, there is little I can do to change many of the important things in my life, and there is really no way I can solve some of the problems I have. The response choices for all of these items ranged from strongly disagree (coded 1) to strongly agree (coded 4). All five items were reverse coded and summed, with higher values indicating higher mastery. Factor and reliability analysis indicate a unidimensional index with good reliability (Cronbach's alpha= .71 or above across all four time points).

Parent-adolescent relationship quality—Parent relationship quality was measured separately for mothers and fathers using identical survey questions. YDS collects parent-adolescent information on up to four parental figures: residential fathers, residential mothers, nonresidential fathers and nonresidential mothers. For each parent, adolescents were asked four questions: how close they felt, how often their parent talked over important decisions with them, how often their parent listened to their side of an argument, and how often they talked over personal concerns and decisions with their parent. Each question had four response categories with varying response choices (extremely close to not close at all; never to often). Items were not standardized prior to scale construction, as recommended by Singer and Willett (2003) because the standard deviation varied from wave to wave.

Parent-adolescent relationship quality indices were constructed from these five items for four sets of parent-adolescent relationships (i.e., for residential and non-residential mothers and fathers). Factor and reliability analysis indicated a unidimensional index with good reliability (Cronbach's alpha= .81 or above across all types of parent-child relationships for all four time points). These four indices were used to create two measures of parent-adolescent relationships, one for mothers and the second for fathers, according to the following decision rules. If the respondent reported on the quality of a residential mother and/or father, then the residential mother and/or father quality indices, respectively, were used as the parent-adolescent relationship quality measures, regardless of the kinship relationship between the parent and adolescent (whether biological parent, stepparent, adoptive parent or guardian). If adolescents did not have a residential mother or father, then the non-residential mother or father quality measure, respectively, was used as the parent quality measure. The quality of residential parent-adolescent relations was given precedence in the parent quality measures because residential parents have a more consistent and pervasive influence on adolescent outcomes than non-residential parents (Falci 2006). The mother and father quality indices were created by summing the items, with higher values indicating a better quality parent-adolescent relationship.

Chronic role strain—Chronic role strain was measured in two life domains: school and work. *School strain* was a single-item measure. Respondents were asked "how often are

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there time pressures when you do your school work." Response choices ranged from never (coded 1) to almost always (coded 5). *Work strain* is measured using a six-item index: having too much work, having to work very hard, feeling drained after work, having to upset some to please others, having unclear tasks and being held responsible for things outside of your control. For five of these items the response choices ranged from not true (coded 1) to very true (coded 4). For the held responsible item, the response choices ranged from never (coded 1) to almost always (coded 5). Since the work strain index is a time-varying variable, the items were not standardized prior to summing the six items for the index (Singer and Willett 2003). Exploratory factor analysis identified two factors in the chronic strain index: stress and alienation. As a result, Cronbach's coefficient alpha is an inappropriate measure of reliability (Rogers et al. 2002), but a confirmatory factor analysis showed a good fit for the two-factor model (GFI=.977; AGFI=.940; Chi-Square =26.46, p=.007; RMSEA= .076).

The chronic strain measures assess the level of strain experienced by the adolescent from their role as a student or worker; however not all respondents occupied these roles at every time-point in the study. Beginning in the third wave of data collection (11th grade), the response choices for the survey questions about school experiences allowed respondents to select the following response choice: "I am not in school." Respondents who selected this option were given the value of one for the time-varying dummy variable *not in school*. For wave one and two (9th and 10th grade), all respondents are given the value of zero for not attending school. Although all adolescents should have been attending school, 81 respondents were not attending school in at least one time point in the 11th or 12th grades. As might be expected, not all adolescents were employed each year in high school. In this sample, roughly 12% never reported working 23% always reported working at the time of survey administration. The remaining 65% reported working in some but not all time-points. Among the on-again off-again workers, almost half reported working in three time-points or more. The time-varying dummy variable, *not working*, distinguishes workers (coded 0) from non-workers (coded 1) in each wave.

Adolescents who are not in school and who are not working are given the value of zero on the respective school or work strain index. In the data analysis, several steps are taken to avoid conflating role strain with role occupancy. First, when strain is the dependent variable separate models are estimated for role occupancy and role strain, with the latter only containing the observations from respondents only when they occupied the role. Second, when strain is the independent variable time-varying indicators for role occupancy (i.e., not in school and not working) are included in the analysis. Sensitivity analyses (not shown) were run using only observations from respondents when they occupied the role. In these analyses, the associations for role strain with the self-concept did not differ from the results reported in this paper.

Gender and SES—*Gender* is a dummy variable with boy=1. Forty-eight percent of the analytic sample was male. The parent survey of the YDS had information on socioeconomic status (SES). Socioeconomic status for the family of origin was measured by a composite of parental income and education gathered in the first year of data collection. Parental income (ranging from 1 for "$5,000 or less" to13 for "$100,000 or more") was determined by the fathers' report of family income. If the father's report was not available, then the mother's report was used. Parental education (ranging from 1 for "less than high school" to 8 for "Ph.D. or professional degree") was determined by averaging the reported education of the two parents in the household, or by the education of the sole parent. Background SES was created by summing the Z-scores for household income and parents' education (mean= 0.22, std. dev. = 1.60, min= −3.29, and max= 5.33).

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Control Variables—There are two time-invariant control variables. *Educational promise* is a three-item scale from wave one that assesses the adolescents' perception of their own intelligence, reading skills, and overall school ability compared to their peers. The response choices ranged from far below average (coded 1) to far above average (coded 5). Items were summed to create an index of educational promise with higher values on the index indicating greater educational promise (Cronbach's alpha=.72). *First two-parent family* is a dummy variable where a one indicates that the respondent lived with their biological (or adoptive) mother *and* father each year in high school. Adolescents are coded zero if they lived in any other family structure (e.g., never-married, divorced, remarried) or if they experienced a change in family structure across the study time period (e.g., from first-married to divorced).

6.3 Data Analysis Strategy

Growth curve models are used to investigate within and between person change in parent-adolescent relationship quality, stress exposure and the self-concept during high school. Growth curve analysis identifies a unique intercept and slope (or growth rate) for each respondent. In this study, the intercept is reported for two time-points (9th and 12th grade) and represents the mean of the dependent variable for that grade. The slope shows expected yearly change in the dependent variable across each wave of data collection. All time-varying independent variables are included as fixed effects. Time-varying independent variables are group mean-centered and the grand mean-centered group means are included in the level-2 equation for the intercept. In so doing, I assess the effect of within-person change in the time-varying independent variable on change in the dependent variable (Halaby 2003; Horney, Osgood and Marshall 1995).

The possibility of non-linear growth was explored for self-esteem and mastery by including squared terms for time. Mastery, results not shown, did not manifest any signs of nonlinear growth. Self-esteem showed a slight trend (p=.101 of squared term) for non-linear growth in the form of accelerated growth. Specifically, gains in self-esteem were steeper between the 11th and 12th grade than between the 9th and 10th grade. This accelerated growth pattern did not vary by gender or SES and the main findings of the study do not differ between modeling growth in self-esteem as a linear or non-linear effect. For ease of interpretation and because the study has few data points (Singer 1998) self-esteem is modeled as a linear effect.

Model fit across several different variance-covariance structures (e.g., autoregressive with a lag of one) for the mixed models were assessed (Wolfinger 1996). For both self-esteem and mastery, the best fitting and most parsimonious structure was the variance components structure, which estimates two variance parameters (one for the intercept and one for the slope) and a covariance parameter for the intercept and slope. Finally, analyses on this research contain contemporaneous information about time-varying independent variables and outcome variables; therefore, the problem of reciprocal causation is a concern (Singer and Willett 2003). In analyses not shown, the data were collapsed into three waves of data. The independent time-varying covariates were based on the first three waves of data (i.e., 1, 2, & 3) and the outcome measures were based on the last three waves of data (i.e., 2, 3 & 4; N= 583). With one exception, the lagged analysis showed reduced strength of association between the time-varying independent covariates and the dependent time-vary covariates (mastery and self-esteem), but the overall results did not meaningfully differ from what is reported in the tables. The one exception is that parent-adolescent relationship quality (mothers or fathers) did not significantly predict mastery in the lagged analysis.

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7. Results

7.1 Descriptive Statistics

Appendix A contains univariate statistics for all variables. Focusing on the demographic characteristics, boys comprise 48% of the sample and 50% remain in their first two-parent household throughout high school. For the items in the composite SES measure, parental income falls between $30,000 and 40,000 and the average educational attainment is "some college." Very few measurement occasions show respondents not attending school (120 total observation points, 4% of all observation points). This translates into 74 adolescents (10% of the sample) not attending school at some point in high school. In analysis not shown, there was no significant gender differences in a respondent being identified as not attending school at some point in high school (9.9% of girls compared to 10.3% of boys; chi-square= .04, ns). Background SES is significantly correlated with not attending school, with lower SES adolescents having a higher likelihood of not attending school ($r = -.174$, $p<.001$). Race and class difference in not working will be discussed based on results from Table 2.

7.2 Self-Concept Trajectories by SES and Gender

Table 1 shows self-concept trajectories during high school. As expected, the unconditional models (1 and 3) show that each year in high school self-esteem increases by .215 ($p<.001$) and mastery increases by .242 ($p<.001$) on average. The random effects portion of the models further show that there is significant variably in the slope of self-esteem (rate = .395, $p<.001$) and mastery (rate= .171, $p<.001$). Thus, most adolescents will experience positive gains, but some gains will be steeper than others and some adolescents experience a loss or no change in self-concepts. The fixed effects portion of Models 2 and 4 in Table 1 show that these self-concept trajectories vary by SES and gender.

Gains in self-esteem and mastery are significantly steeper for higher SES adolescents ($\beta= .060$, $p<.05$ and $\beta= .050$, $p<.05$). These differences are graphically displayed in the upper portion of Figure 1. The lines of high SES, marked with a diamond "◆", are steeper compared to the low SES lines. The difference represents about a 1/3 of a standard deviation of the growth rate for self-esteem [.060/(.395/2)=.304] and well over 1/2 of a standard deviation of the growth rate for mastery. This variation results in meaningful changes in SES differences in self-concepts during high school. In the 9th grade the direction of association for self-esteem and SES is negative ($\beta= -.131$, $p<.10$), with low SES adolescents reporting somewhat higher self-esteem. In the 12th grade, however, SES differences in self-esteem are reversed ($\beta= .048$, ns). Furthermore, significant SES differences in mastery emerge by the 12th grade ($b=.160$, $p<.01$), with higher SES youth reporting higher mastery than low SES youth. These SES differences in mastery are not present in the 9th grade ($\beta= .009$, ns). During high school, adolescents with high SES surpass the self-esteem and mastery levels of low SES youth.

Gender differences in self-concept trajectories are displayed in the bottom portion of Figure 1; the lines for boys are marked with a circle "●". The fixed effects portion of Model 2 in Table 1 show that girls experience significantly steeper gains in self-esteem than boys during high school ($\beta= -.192$, $p<.05$), producing a 34% reduction in the size of the gender gap in self-esteem between the 9th and 12th grade [(1.682 – 1.105)/1.682= .343]. However, boy still report higher levels of self-esteem than girls in both the 9th and 12th grades ($\beta= 1.682$, $p<.001$; and $\beta= 1.105$ $p<.001$). Boys also report higher levels of mastery in the 9th and 12th grade ($\beta= .535$, $p<.01$ and $\beta= .662$ $p<.001$) than girls. The rate of growth in mastery did not significantly vary by gender ($\beta= .034$, ns). It is important to note, however, that small yearly changes in growth rates can accumulate into meaningful differences over time. For example, gender differences in mastery increased by 24% during high school and the

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significance level changed from p<.01 in the 9th grade to p<.001 in the 12th grade. In sum, the gender gap in self-esteem is reduced, whereas the gender gap in mastery somewhat increases.[2]

7.3 Parent-Adolescent Relations and Chronic Role Strain by SES and Gender

Unconditional growth models (analysis not shown) were run to identify overall changes in parent-adolescent relations during high school. On average, the quality of mother-adolescent relations remain unchanged (slope = −.019, ns), whereas father-adolescent relations appeared to decline (β = −.077, p<.10) on average. Both growth rates significantly varied across respondents (rate= .388, p<.001 and .435, p<.001); thus, some adolescents gained quality, some lost, and some had no change. The fixed effects portion of Models 1 and 2 in Table 2 show that parent-adolescent relationship quality trajectories vary by SES and gender (also see Figure 2). [3]

First, boys experience declines in mother-son (predicted growth rate = −.091) [4] and father-son (predicted growth rate= −.189) relationship quality. In contrast, girls make gains in mother-daughter relations (predicted growth rate= .043) and have no change in father-daughter relations on average. These opposing gender trajectories (β = −.134, p<.10 and β = −.189, p<.05) result in the emergence of higher quality mother-daughter relations compared to mother-son by the12th grade (β = −.394, p<.10) and a 56% reduction in the gender gap for father-adolescent relationship quality between the 9th and 12th grade. Boys, however, still report significantly higher father-adolescent relationship quality in the 12th grade (β = .451, p<.05) than girls.

Second, mother-adolescent (predicted growth rate = −.100) and father-adolescent (predicted growth rate= −.177) relationship quality declines among low SES youth, whereas high SES youth make gains in mother-adolescent relations (predicted growth rate = .056) and have no change in father-adolescent relations on average. This variability in the growth rate by SES (β = .049, p<.10 and β = .054, p<.05) results in the emergence of higher mother-adolescent quality relations among high SES youth in the 12th grade (β = .134, p<.10) and an increase in SES differences in father-adolescent quality relations (from β = .155, p<.05 to β = .317, p<.001) between the 9th and 12th grade.

As some adolescents experience declines in parent-adolescent relationship quality their chronic strain exposure is likely to increase. Results from unconditional growth models (not shown in Table 2) indicate significant gains in school strain (slope=.058, p<.001) and declines in the number of non-working students (slope = −.295, p<.001); the slope for chronic work strain is positive but not statistically significant (slope =.066, ns). Unconditional models also show clear variability in growth for work strain (rate = .345, p<.01) and school strain (rate = .025, p<.01). In contrast to parent-adolescent relationship quality trajectories, the fixed effects portion of Models 3 and 4 in Table 2 show less growth rate variability in chronic strain by gender and SES. The amount of exposure to chronic strain clearly varies by gender and SES. Furthermore, it is important to recognize that small

[2]Gender and class interactions on self-concept growth were tested and not found. This contradicts previous research (McLeod and Owen 2004). The sample for the current study, however, is less ethnically diverse, spans an older age range, and uses a continuous composite measure of SES (compared to a binary poverty measure based on household income).

[3]The parent-adolescent quality trajectory models in Table 2 were also run using the imputed data (all 769 respondents and 3039 observations) and the results did not differ.

[4]An illustration for calculating a predicted growth rate by gender:

$$\text{boys}=-.009+-.134(1)+.049(.13)+.004(8.50)+.014(.50)=-.091\ [\text{slope}+\text{gender differences in slope}^{*}\text{one for boys (or zero for girls)}+\text{SES differences in slope}^{*}\text{SES mean}+\text{educational promisecoefficient}^{*}\text{educational promise mean}+\text{family coefficient}^{*}\text{family mean}]$$

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and non-significant differences across social positions in yearly changes can accumulate into meaningful mean differences over a four year time period.

First, boys experience higher work strain in the 9th (β= .670, p<.05) and 12th (β= 1.108, p<.001) grade than girls. The differences are notably larger in the 12th grade even though gender difference in the growth rate for work strain are not statistically significant (β= .146, ns). Model 5 further shows that boys enter the work force at a faster rate than girls during high school (β= −.132, p<.05); thereby increasing their potential exposure to work strain over time relative to girls. Second, high SES adolescents experience more school strain than low SES adolescents in the 9th (β= .059, p<.01) and 12th (β= .050, p<.05) grades, but the gap is somewhat reduced and drops in statistical significance. In contrast, the SES gap in work strain increases during high school. By the 12th grade, low SES youth experience more work strain than high SES youth (β= −.155, p<.10). Among workers, then, work strain is increasing at a faster rate for low SES youth.

In sum, proximal social experiences with parents, at school, and in working conditions vary across gender and SES. Declines in parent-adolescent relationship quality and gains in work strain are more common among boys and low SES youth compared to girls and high SES youth, respectively. Boys also enter the work force at a faster rate than girls. In contrast, high SES youth report more school strain compared to low SES youth, but these differences slightly decline during high school.

7.4 Self-Esteem: Why the SES Gap Reverses and the Gender Gap Declines

Table 3 shows how proximal experiences at home, school and work are associated with growth in self-esteem. Gains in school (Model 1: β= −.237, p<.001) or work strain (Model 2: β= −.048, p<.05) are associated with less steep growth in self-esteem. Declines in parent-adolescent relationship quality are also associated with less steep growth in self-esteem (Model 3: β= .142, p<.001 and β= .053, p<.05). Comparing these models in Table 3 to Model 2 in Table 1 reveals the extent to which variation in proximal social experiences by gender and SES can account for self-esteem growth rate variability across these social positions.

First, the faster rate of growth in self-esteem among high SES adolescents relative to low SES adolescents is reduced and decreases in statistical significance when accounting for the steeper declines in parent-adolescent relationship quality among low SES youth (from β= .060, p<.05 in Model 2, Table 1 to β= .050 p<.10 in Model 3, Table 3). Second, the faster rate of growth in self-esteem among girls relative to boys is slightly reduced when accounting for work strain and work status (from β= −.192 in Model 2, Table 1 to β= −.185 in Model 2, Table 3). This occurs as a result of boys entering the workforce at a faster rate and experiencing more, and increasing levels of, work strain than girls. A larger gender reduction and a decrease in statistical significance (β= −.166, p<.10) occurs when the steeper declines in parent-adolescent relations among boys are controlled in Model 3, Table 3. In contrast, accounting for school strain slightly increases gender differences in the self-esteem growth rate (to β= −.196 Model 1, Table 3), because girls had a slightly faster growth in school strain than boys during high school.

Controlling for all proximal experiences (see Model 4, Table 3) results in the largest reduction in gender differences (16%) in the self-esteem growth rate [(−.161 – −.192)/−.192=.161], but does not fully account for the gender differences (β= −.161, p<.10). Proximal experiences combined explain approximately 21% of self-esteem growth rate variation during high school [(.375–.295)/.375= .213]. Parent-adolescent relationship quality accounts for the largest portion of unique variance (12%), whereas role strain from school or work uniquely explains 7% of the variance. Thus, parent-adolescent relationship quality has a

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slightly more pervasive effect on self-esteem development than chronic strain exposure. In sum, slower self-esteem growth for boys and low SES youth compared to girls and high SES youth during high school results primarily from their substantial declines in parent-adolescent relationship quality.

7.5 Mastery: Why the SES Gap Emerges

Table 4 shows that gains in school (Model 1: $\beta = -.164$, $p<.01$) and work strain (Model 2: $\beta = -.051$, $p<.01$) are associated with a slower rate of growth in mastery during high school. Declines in parent-adolescent relationship quality are also associated with less steep growth in self-esteem (Model 3: $\beta= .109$, $p<.001$ and $\beta= .048$, $p<.05$). In the three-wave lagged analysis described earlier and not shown in Table 4, however, parent-adolescent relationship quality was not significantly associated with mastery development. All proximal social experiences explained 17% of the growth rate in mastery during high school [(.167–.139)/.167= .168]. In contrast to self-esteem, chronic role strain from school or work accounted for the majority of unique variation explained (10%) compared to 6% for parent-adolescent relationship quality.

Assessing how the SES slope coefficient changes across the models in Table 4 identifies the extent to which SES variation in proximal experiences can account for the emergence of significant SES differences in mastery by the 12th grade. The faster rate of growth in mastery among high SES youth relative to low SES youth is reduced when accounting for parent-adolescent relationship quality (from $\beta= .050$, $p<.05$ in Model 4, Table 1 to $\beta= .043$ $p<.10$ in Model 3, Table 4). This occurs because low SES youth experience steeper declines in parent-adolescent relationship quality. Even though the differences are reduced, parent-adolescent relationship quality cannot account for the emergence of significant SES differences in mastery by the 12th grade ($\beta= .123$ $p<.05$).

Surprisingly, accounting for the faster increase in work strain among low SES youth fails to explain SES differences in mastery growth or mediate the significant SES differences in mastery that emerge in grade 12. Looking back at Table 2, however, shows that entry into the work force is slightly steeper for high SES youth. Thus, high SES youth had an increasingly greater opportunity to experience work strain relative to low SES youth. Importantly, this slight SES difference could have a substantial influence on the results reported in Table 4, because the work strain values for high SES youth are more likely to go from zero (the value for non-workers) to a much higher number; 7.25 is the mean for work strain.

Since only a quarter of the sample reported working each year in high school role occupancy may be distorting the ability of work strain to mediate SES difference in mastery growth shown in Table 4. For this reason, mastery models are re-estimated on a sample where non-working observations for each respondent are dropped and only respondents who reported working at least once during high school remain in the sample (see Table 5; 1,715 observations on 664 respondents). The results from this analysis show a small drop in SES growth rate differences for mastery upon controlling for work strain (from $\beta= .056$, $p<.10$ in Model 1, Table 5 to $\beta= .054$ $p<.10$ in Model 3, Table 5). Importantly, high SES youth no longer report significantly higher mastery levels compared to low SES youth in the 12th grade, upon controlling for differences in work strain ($\beta= .095$, ns).

For several reasons, then, it appears as though chronic role strain has a more pervasive effect on mastery development than parent-adolescent relationship quality and differences in work strain primarily account for SES differences in mastery development. First, chronic role strain explained the most variability in mastery growth. Second, work strain accounted for the emergence of significant SES variation in mastery by the 12th grade in analyses on the

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subsample of workers. Finally, the results of the lagged three-wave analysis showed that parent-adolescent relationship quality did not have a significant association with mastery development.

8. Discussion and Conclusion

Symbolic interactionism provides the framework for understanding how self-concepts are shaped through daily social interaction. A social structure and personality perspective places further attention on how social experiences systematically vary across social positions leading to variation in self-concept formation by gender and socioeconomic status. During high school there is significant positive growth in both self-esteem and mastery, but adolescents from higher socioeconomic status backgrounds enjoy a faster rate of growth in both self-esteem and mastery compared to low SES adolescents and girls make steeper gains in self-esteem compared to boys. The gender and SES differences are shaped by changes in their proximal social experiences during high school; specifically, declines in parent adolescent relationship quality and gains in chronic role strain. For low SES youth, their steeper declines in parent-adolescent relationship quality and gains in work strain account for their slower rate of growth in mastery and self-esteem relative to high SES youth. For adolescent boys, steeper declines in parent-adolescent relationship quality account for their slower rate of growth in self-esteem relative to girls.

The findings from this research expand our current social scientific knowledge in numerous ways. First, they identify the emergence of significant SES differences in mastery during the high school years. Second, this study highlights the benefits of using longitudinal data to investigate how the magnitude of gaps across social positions change over time. Although boys consistently reported higher levels of self-esteem in high school, the gender differences in self-esteem are reduced between the 9th and 12th grade. Overall, high school is a critical phase in the life course for understanding changes in self-concepts by gender and SES. Third, previous empirical research finds that parental support declines during adolescence (Buist et al. 2002; Sallienen et al. 2007), but the current study shows that parental support only declines among boys and low SES youth. Clearly, it is important to consider both the gender of the parent and offspring when investigating how relationships with parents transform during adolescence.

Finally, parent-adolescent relationship quality provides more insight into understanding self-esteem development than chronic role strain, whereas chronic role strain provides greater comprehension of mastery development than parent-adolescent relationships. This provides indirect evidence that declines in the parent-adolescent relationship quality impede growth in self-esteem by diminishing positive reflective appraisals, whereas gains in chronic role strain hinder growth in mastery by diminishing an adolescent's ability to attain successful performance accomplishments within these domains. The empirical evidence provided less support for the idea that parents can promote mastery development in their offspring by providing their adolescent with affirming verbal persuasions about their competence.

The findings from this research should be considered in light of sample characteristics. The results are primarily generalizable to non-Hispanic white adolescents living in the Midwest. The gender and socioeconomic status differences in the self-concept found in this research might not hold up across other racial/ethnic categories (Greene and Way 2005; Buchanan and Selmon 2008). Future research should investigate if SES differences in the self-concept emerge during high school across all racial/ethnic groups. Another limitation of this study is having only a single-item measure for academic strain (time pressures when doing school work). There are other sources of academic strain and the potential source of the time pressure is unknown. The rigors of an adolescent's academic curriculum or the

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responsibility for the care of one's siblings (or offspring) are both plausible explanations, for example.

The findings from this research can inform the direction of future research. First, how do differences in parenting styles across gender and social class contribute to the divergent parent-adolescent relationship quality trajectories during high school? Second, comprehensive measures of role occupancy and strain may uncover more variability in chronic role strain trajectories across social positions, which should also improve our understanding of variation in mastery growth across social positions. Finally, the proximal social experiences under investigation in this study accounted for about twenty percent of the variation in self-concept growth rates. Future research should explore additional types of social experiences that may also shape self-concept trajectories and vary across social positions. For example, peer friendships and romantic relationships may be particularity important for self-esteem development. At the same time, additional domains in which adolescents may experience chronic role strain or successful performance accomplishments, such as athletics or fine art performances, could also be incorporated into future studies.

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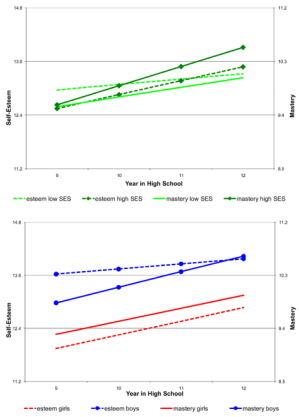

Figure 1. Self-concept growth by SES and gender [a]

[a] The height of each graph represents 1/2 of a standard deviation for the dependent variable.

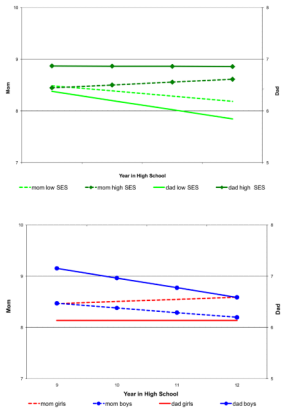

Figure 2. Parent-adolescent relationship quality by gender and SES [a]

[a] The height of each graph represents 1/2 of a standard deviation for the dependent variable.

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Table 1

Growth curves assessing gender and SES variation in the self-concept (N=769)

	Self-Esteem				Mastery			
	Model 1		Model 2		Model 3		Model 4	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Intercept *(9 th grade)*	12.757 ***	.13	9.005 ***	.59	9.557 ***	.09	7.401 ***	.43
Gender (boy=1)			1.682 ***	.24			.535 **	.18
Background SES			−.131 †	.08			.009	.06
Educational promise			.323 ***	.07			.213 ***	.05
First two-parent family			.433 †	.24			.169	.18
Slope *(yearly change)*	.215 ***	.04	.639 **	.21	.242 ***	.04	.531 **	.17
Gender (boy=1)			−.192 *	.09			.042	.07
Background SES			.060 *	.03			.050 *	.02
Educational promise			−.033	.02			−.033 †	.02
First two-parent family			−.111	.09			−.071	.07
Intercept *(12 th grade)*	13.398 ***	.13	10.921 ***	.63	10.280 ***	.10	8.994 ***	.46
Gender (boy=1)			1.105 ***	.25			.662 ***	.19
Background SES			.048	.08			.160 **	.06
Educational promise			.223 **	.07			.114 *	.05
First two-parent family			.101	.26			−.044	.19
Random Effects								
Initial Status	8.315 ***	.63	7.209 ***	.58	3.445 ***	.33	3.220 ***	.32
Rate	.395 ***	.08	.375 ***	.08	.171 ***	.06	.167 ***	.05
Level 1 error	5.074 ***	.19	5.083 ***	.19	3.684 ***	.14	3.684 ***	.14
Deviance	15049		14995		13676		13659	
AIC	15057		15003		13684		13667	
BIC	15076		15021		13702		13685	

† p<.10,

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* p<.05,
** p<.01,
*** p<.001 (two-tailed)

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Table 2

Growth curves assessing gender and SES variation in proximal social experiences [a]

	Mother Quality		Father Quality		School Strain		Work Strain		Not Working[b]	
	Model 1		Model 2		Model 3		Model 4		Model 5	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Intercept *(9 th grade)*	8.539 ***	.52	4.264 ***	.53	2.864 ***	.15	8.916 ***	.76	−.010	.38
Gender (boy=1)	.008	.21	1.017 ***	.22	.011	.06	.670 *	.30	.998 ***	.15
Background SES	−.013	.07	.155 *	.07	.059 **	.02	−.106	.10	.039	.05
Educational promise	−.030	.06	.185 **	.06	.032 *	.02	−.206 *	.08	−.043	.04
First two-parent family	.356 †	.22	.762 ***	.22	−.102 †	.06	−.487 †	.30	−.057	.16
Slope *(yearly change)*	−.009	.18	.077	.20	−.123 †	.07	−.583 †	.33	−.138	.17
Gender (boy=1)	−.134 †	.07	−.189 *	.08	−.013	.03	.146	.13	−.132 *	.07
Background SES	.049 †	.02	.054 *	.03	−.003	.01	−.016	.04	−.004	.02
Educational promise	.004	.02	−.016	.02	.020 *	.01	.053	.04	−.003	.02
First two-parent family	.014	.08	.100	.08	.035	.03	.250 †	.13	−.137 *	.07
Intercept *(12 th grade)*	8.513 ***	.53	4.494 ***	.57	2.495 ***	.17	7.168 ***	.66	−.424	.39
Gender (boy=1)	−.394 †	.22	.451 *	.23	−.028	.07	1.108 ***	.26	.601 ***	.16
Background SES	.134 †	.07	.317 ***	.08	.050 *	.02	−.155 †	.09	.025	.05
Educational promise	−.016	.06	.138 *	.06	.091 ***	.02	−.046	.07	−.052	.04
First two-parent family	.399 †	.22	1.062 ***	.24	.002	.07	.262	.27	−.468 **	.16
Random Effects										
Initial Status	6.286 ***	.45	6.013 ***	.46	.280 ***	.04	4.632 ***	.77	1.589 ***	.16
Rate	.391 **	.06	.419 ***	.07	.025 **	.01	.345 **	.16		
Level 1 error	3.066 ***	.36	3.213 ***	.13	.571 ***	.02	6.469 ***	.36	.776 ***	.02
N (# of Observations)	767 (2926)		738 (2688)		769 (2863)		664 (1715)		769 (2983)	

† p<.10,

* p<.05,

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** p<.01,

*** p<.001 (two-tailed)

Notes:

[a] For all time-varying covariates in each model, the grand mean centered group mean of the time varying covariates is included in the level-2 equation for the intercept. Also, the N varies across model because only cases with valid values on the dependent variable are included.

[b] Not working is a dichotomous outcome and modeled using a hierarchical generalized linear growth curve model with a Bernoulli Distribution. For this type of model, the intercept is modeled as a random effect, but the growth rate is fixed by the link function.

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Table 3

Self-Esteem growth curve on demographics and proximal social experiences (N=769) [a]

	Self-Esteem							
	Model 1		Model 2		Model 3 [b]		Model 4 [b]	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Intercept *(9 th grade)*	8.753 ***	.59	9.082 ***	.59	9.284 ***	.58	9.171 ***	.58
Gender (boy=1)	1.684 ***	.24	1.791 ***	.25	1.594 ***	.23	1.695 ***	.24
Background SES	−.094	.08	−.143 †	.08	−.165 *	.08	−.147 †	.08
Educational promise	.354 ***	.07	.308 ***	.07	.308 ***	.06	.317 ***	.06
First two-parent family	.377	.24	.412 †	.25	.208	.24	.149	.24
Slope *(yearly change)*	.586 **	.22	.625 **	.21	.631 **	.21	.566 **	.21
Gender (boy=1)	−.196 *	.09	−.185 *	.09	−.166 †	.09	−.161 †	.08
Background SES	.061 *	.03	.059 *	.03	.050 †	.03	.051 †	.03
Educational promise	−.027	.02	−.032	.02	−.033	.02	−.026	.02
First two-parent family	−.094	.09	−.103	.09	−.114	.09	−.089	.09
School strain	−.237 ***	.07					−.230 ***	.07
Not in school	−.469	.39					−.436	.38
Work strain			−.048 *	.02			−.042 †	.02
Not working			−.297	.21			−.220	.21
Mother quality					.142 ***	.03	.139 ***	.03
Father quality					.053 *	.03	.059 *	.03
Intercept *(12 th grade)*	10.511 ***	.64	10.957 ***	.66	11.177 ***	.61	10.869 ***	.62
Gender (boy=1)	1.097 ***	.25	1.236 ***	.28	1.096 ***	.25	1.213 ***	.25
Background SES	.089	.09	.034	.09	−.014	.08	.006	.08
Educational promise	.272 ***	.07	.212 **	.07	.209 **	.07	.239 ***	.07
First two-parent family	.094	.26	.103	.27	−.133	.25	−.119	.25
Random Effects								
Initial Status	6.876 ***	.56	7.188 ***	.58	6.488 ***	.54	6.255 ***	.53

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	Self-Esteem							
	Model 1		Model 2		Model 3 [b]		Model 4 [b]	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Rate	.346 ***	.08	.369 ***	.08	.327 ***	.08	.295 ***	.08
Level 1 error	5.093 ***	.19	5.084 ***	.19	5.051 ***	.19	5.059 ***	.19
Deviance	14968		14993		14901		14879	
AIC	14976		15001		14909		14887	
BIC	14994		15020		14928		14905	

† p<.10,

* p<.05,

** p<.01,

*** p<.001 (two-tailed)

Notes:

[a] For all time-varying covariates in each model, the grand mean centered group mean of the time varying covariates is included in the level-2 equation for the intercept.

[b] Coefficients based on combined results from 10 imputed datasets.

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Table 4

Mastery Growth Curves on demographics and proximal social experiences (N=769) [a]

	Mastery							
	Model 1		Model 2		Model 3 [b]		Model 4 [b]	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Intercept *(9 th grade)*	7.128 ***	.43	7.513 ***	.42	7.535 ***	.43	7.462 ***	.42
Gender (boy=1)	.536 **	.17	.665 ***	.18	.488 **	.17	.611 ***	.17
Background SES	.047	.06	−.017	.06	−.006	.06	−.002	.06
Educational promise	.248 ***	.05	.192 ***	.05	.207 ***	.05	.210 ***	.05
First two-parent family	.115	.18	.161	.18	.047	.18	−.007	.17
Slope *(yearly change)*	.482 **	.17	.515 **	.17	.524 **	.17	.462 **	.17
Gender (boy=1)	.040	.07	.053	.07	.064	.07	.074	.07
Background SES	.052 *	.02	.050 *	.02	.043 †	.02	.043 †	.02
Educational promise	−.028	.02	−.031	.02	−.033 †	.02	−.026	.02
First two-parent family	−.057	.07	−.061	.07	−.074	.07	−.050	.07
School strain	−.164 **	.05					−.157 **	.05
Not in school	−.238	.32					−.225	.32
Work strain			−.051 **	.02			−.047 *	.02
Not working			−.245	.18			−.186	.17
Mother quality					.109 ***	.02	.107 ***	.02
Father quality					.048 *	.02	.053 *	.02
Intercept *(12 th grade)*	8.572 ***	.46	9.059 ***	.44	9.106 ***	.45	8.848 ***	.44
Gender (boy=1)	.655 ***	.18	.824 ***	.18	.682 ***	.18	.832 ***	.18
Background SES	.202 ***	.06	.132 *	.06	.123 *	.06	.129 *	.06
Educational promise	.164 ***	.05	.098 *	.05	.109 *	.05	.132 **	.05
First two-parent family	−.057	.19	−.022	.18	−.175	.19	−.157	.18
Random Effects								
Initial Status	2.972 ***	.31	2.930 ***	.31	2.972 ***	.30	2.532 ***	.28

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	Mastery							
	Model 1		Model 2		Model 3 [b]		Model 4 [b]	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Rate	.155 **	.05	.160 **	.05	.155 **	.05	.139 **	.05
Level 1 error	3.687 ***	.14	3.683 ***	.14	3.639 ***	.13	3.636 ***	.13
Deviance	13615		13602		13592		13500	
AIC	13623		13610		13600		13508	
BIC	13641		13628		13618		13527	

† p<.10,

* p<.05,

** p<.01,

*** p<.001 (two-tailed)

Notes:

[a] For all time-varying covariates in each model, the grand mean centered group mean of the time varying covariates is included in the level-2 equation for the intercept.

[b] Coefficients based on combined results from 10 imputed datasets.

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Table 5

Mastery growth curves for workers (N=664) [a]

	Mastery							
	Model 1		Model 2		Model 3		Model 4	
Fixed Effects	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*	*estimate*	*se*
Intercept *(9 th grade)*	7.270 ***	.59	6.963 ***	.59	7.555 ***	.58	7.311 ***	.58
Gender (boy=1)	.203	.23	.198	.23	.401 †	.23	.385 †	.23
Background SES	−.034	.08	.008	.08	−.066	.07	−.030	.08
Educational promise	.236 ***	.07	.278 ***	.07	.194 **	.06	.229 **	.06
First two-parent family	.136	.23	.075	.23	.092	.23	.039	.23
Slope *(yearly change)*	.618 **	.24	.548 *	.24	.547 *	.23	.478 *	.24
Gender (boy=1)	.130	.09	.118	.09	.152	.09	.139	.09
Background SES	.056 †	.03	.056 †	.03	.054 †	.03	.054 †	.03
Educational promise	−.048 †	.03	−.040	.03	−.041	.03	−.034	.03
First two-parent family	−.033	.09	−.015	.09	−.016	.09	.000	.09
School strain			−.183 *	.07			−.165 *	.07
Not in School			.172	.50			.262	.50
Work strain					−.049 *	.02	−.044 †	.02
Intercept *(9 th grade)*	9.124 ***	.55	8.608 ***	.56	9.195 **	.53	8.744 ***	.54
Gender (boy=1)	.592 **	.22	.551 **	.22	.856 ***	.22	.803 ***	.21
Background SES	.134 †	.08	.176 *	.08	.095	.07	.132 †	.07
Educational promise	.093	.06	.157 *	.06	.071	.06	.128	.06
First two-parent family	.037	.23	.029	.23	.043	.22	.039	.22
Random Effects								
Initial Status	3.507 ***	.48	3.338 ***	.46	3.007 ***	.45	2.905 ***	.44
Rate	.110 †	.08	.119 †	.08	.084	.08	.095	.08
Level 1 error	3.540 ***	.20	3.505 ***	.20	3.579 ***	.20	3.540 ***	.20
Deviance	7923		7891		7868		7846	

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	Mastery							
	Model 1		Model 2		Model 3		Model 4	
Fixed Effects	***estimate***	***se***	***estimate***	***se***	***estimate***	***se***	***estimate***	***se***
AIC	7931		7899		7876		7854	
BIC	7949		7917		7894		7872	

† p<.10,

* p<.05,

** p<.01,

*** p<.001 (two-tailed)

Notes:

[a] For all time-varying covariates in each model, the grand mean centered group mean of the time varying covariates is included in the level-2 equation for the intercept.

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Appendix A

Descriptive statistics for time-invariant and time-varying variables

	mean	st.dev.	min	max	n [a]
Time-invariant variables					
Gender (boy=1)	.48		0	1	769
Background SES	.14	1.6	−3.3	5.3	769
Educational promise	8.52	1.9	2	13	769
First two-parent family	.50		0	1	769
Time-varying dependent variables					
Mastery	9.92	2.7	1	16	2983
Self-esteem	13.07	3.7	1	21	2983
Mother Quality	8.43	3.0	1	13	2926
Father Quality	6.71	3.1	1	13	2688
School Strain *(excluding non-students)*	3.19	1.0	1	5	2863
Work Strain *(excluding non-workers)*	7.25	3.3	1	19	1715
Time-varying independent variables					
Mother Quality *(imputed)*	8.43	3.0	1	13	2983
Father Quality *(imputed)*	6.64	3.2	1	13	2983
School Strain	3.06	1.1	0	5	2983
Not in school	.04	.2	0	1	2983
Work Strain	4.17	4.4	0	19	2983
Not working	.43	.5	0	1	2983

Notes:

[a]For time-invariant variables n represents the number of respondents in the sample. For the time-varying variables n represents the number of observations across the four waves of data.