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A Developmental Shift in Black-White Differences in Depressive Affect across Adolescence and Early Adulthood: The influence of early adult social roles and socio-economic status

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Abstract

This study examined black-white differences in growth of depressive affect using a longitudinal sample of middle-class, suburban US subjects (n = 956) that spanned from adolescence to early adulthood. Specifically, this study examined whether black-white differences in growth of depressive affect shift over time, and the extent to which that shift, if any, was associated with racial differences in the rate and mental health consequences of early adult social roles (e.g., living arrangements, work/college status, and single-parenthood) and socio-economic status (SES). As expected, growth in depressive affect pivoted around the onset of early adulthood, with the trajectory pivoting upward for Black Americans and downward for White Americans. Due to deficits in SES, the relation between challenging early adult social roles - under/unemployment in particular - and growth in depressive affect was more positive for Black Americans. This differential "vulnerability" appears to underlie racial differences in early adult growth (and by connection contribute to racial differences in growth pivot). The extent to which Black Americans were at a greater risk (relative to White Americans) for an upward pivot increased as the number of challenging roles increased. Black Americans facing only optimal early adult social roles were not at a greater risk, while those facing only challenging social roles were at the greatest risk.

Keywords

mental health; race; early adulthood; cumulative risk

Among the non-clinical population, levels of depressive affect (i.e., depressive symptoms that do not meet psychiatric diagnostic criteria for a depressive or other mood disorder) are linked to noticeable deficits in psychosocial functioning and physical health (Farmer et al., 1988; Gotlib, Lewinsohn, & Seeley, 1995; Kernis et al., 1998), to behavioral and substance use disorders (Gotlib et al., 1995; Poulin, Hand, Brock, Boudreau, & Santor, 2005), and to the eventual development of mood disorders including clinical depression (Aalto-Setala, Marttunen, Tuulio-Henriksson, Poikolainen, & Lonnqvist, 2002; Graber & Sontag, 2009). Though not meeting the requirement for psychiatric disorder, clearly elevated levels of depressive affect are harmful for adjustment over the short- and long-term.

Research exploring Black-White differences in depressive affect has consistently linked racial differences in depressive affect to social and economic factors (Schulz, Williams, Israel, Becker, Parker, James, & Jackson, 2000; Williams & Williams-Morris, 2000; Williams, Yu, Jackson, & Anderson, 1997). However, regarding who is at greater risk, this

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line of research has yielded mixed or inconsistent results. For example, research on adults generally indicates that relative to White Americans, Black Americans report higher levels of depressive affect (Hughes & Thomas, 1998; National Center for Health Statistics, 1980; Schulz et al., 2000; Taylor & Turner, 2002; Vega & Rumbaut, 1991; Warheit & Auth, 1986; Williams, Yu, & Jackson, 1997), and anxiety (NCHS, 1980; Schulz et al., 2000). Research on adolescents is far less consistent however, with some research indicating that Black Americans report lower levels of depressive affect (Dornbusch, Mont-Reynaud, Ritter, Chen, & Steinberg, 1991; McLeod & Owens, 2004; Waschbusch, Sellers, LeBlanc, & Kelley, 2003), some indicating that White Americans report lower levels of depressive affect (Adkins, Wang, Dupre, van den Oord, & Elder, 2009; Garrison, Jackson, Marsteller, McKeown, & Addy, 1990; Steele, Little, Ilardi, Forehand, Brody, & Hunter, 2006; Taylor & Turner, 2002), and some indicating that both races report equivalent levels of depressive affect (Gore & Aseltine, 2003; Twenge & Nolen-Hoeksema, 2002).

Opposed to reflecting an inconsistency, the different pattern of findings among adolescents and adults may reflect a developmental shift in Black-White mental health disparities, with Black-White differences in depressive affect stabilizing during adulthood such that Black Americans consistently report higher depressive affect. On the surface, this shift, even if real, may seem inconsequential. After all, the shift is in non-clinical levels of depressive affect and it is not as if it renders Black American adults as a group at greater risk for clinical depression or other mood disorders since existing research clearly indicates that Black American adults are not, relative to the general population, at greater risk for these disorders (Breslau, Aguilar-Gaxiola, Kendler, Su, Williams, & Kessler, 2005; Williams & Earl, 2007). However, if real, the shift may not generalize equally to all Black Americans but instead disproportionately apply to a vulnerable sub-set, among whom levels of depressive affect increase more substantially. Therefore, the possibility of such a shift should not be disregarded outright and warrants a close examination. Though when such a shift, if any, occurs is unclear, there is good reason to focus on early adulthood since it is a period marked by transition and opportunities for turning points and discontinuity (Schulenberg & Maggs, 2002), and emerging research indicates that following the end of high-school depressive affect increases at a faster pace among Black Americans relative to White Americans (Gore & Aseltine, 2003). Using longitudinal data that span from adolescence to early adulthood, the present study examines if Black-White disparities in depressive affect shift around the onset of early adulthood. Finally, if there is such a shift, also examined is the extent to which the shift is the result of Black-White differences in the distribution and mental health consequences of early adult social roles.

Early adulthood as a pivot point in depressive affect

Generally speaking, growth in depressive affect and other forms of sub-clinical negative affect (negative mood, dysphoria, etc.) across middle- to late-adolescence is flat for boys (Angold & Rutter, 1992; Angold, Erkanli, Silberg, Eaves, & Costello, 2002; Twenge & Nolen-Hoeksema, 2002; Weinstein, Mermelstein, Hankin, Hedeker, & Flay, 2007) and slightly positive for girls (Angold & Rutter, 1992; Angold et al., 2002; Twenge & Nolen-Hoeksema, 2002). Though some studies find that growth is flat for both genders (Weinstein et al., 2007) and others find that growth is positive for both genders (Ge, Conger, & Elder, 2001), no study indicates that depressive affect decreases for either gender across middle to late adolescence. However, regardless of gender, at the onset of early adulthood (i.e., around age 18) depressive affect decreases and continues to decrease through at least the early 20's (Arnett, 2007; Curran, Hussong, Cai, Huang, Chassin, Sher, & Zucker, 2008; Galambos, Barker, & Krahn, 2006; Ge, Natsuaki, & Conger, 2006). Consistent with this pattern, researchers have found that indices of positive affect (self-esteem, well-being) increase during early adulthood as well (Galambos et al., 2006; Schulenberg & Zarrett, 2006). Pieced

together, these studies suggest that, regardless of gender, there is discontinuity in the developmental course of depressive affect with the developmental trajectory on average pivoting downward at the onset of early adulthood.

In part, these decreases in depressive affect (and increases in mental health more generally) are linked to early adult contextual transitions, such as (1) moving away from home and (2) leaving high-school to either transition into work or college (Dubas & Petersen, 1996; Galambos et al., 2006; Schulenberg, O'Malley, Bachman, Johnston, 2005). Likely underlying this relation is the fact that these transitions are associated with increased autonomy and freedom, and provide increased opportunities for personal exploration (Arnett, 2000). This may also be why single-parenthood during early adulthood, which leads to reduced educational and occupational opportunity (Hynes & Clarkberg, 2005; Kokko, Pulkkinen, & Mesiainen, 2009), is associated with depressive affect more generally (Deal & Holt, 1998; Lanzi, Bert, & Jacobs, 2009) and with less of a decrease in depressive affect during early adulthood (Booth, Rustenbach, & McHale, 2008).

Does race moderate “pivot” in depressive affect?

Though the developmental course of depressive affect pivots downward *on average* at the onset of early adulthood, it does not necessarily do so for everyone (Arnett, 2007). Relative to White Americans, Black Americans may be at risk for an *upward* pivot in growth of depressive affect due to their being (1) overrepresented among those facing challenging early adult social roles, and (2) potentially more vulnerable to the negative effects of challenging social roles.

Overrepresentation—Relative to early adult White Americans, early adult Black Americans are more likely to transition directly into work (opposed to college) (Department of Health and Human Services, 1997; Charles; Roscigno, & Torres, 2007; Halperin, 1998; Jin Jez, 2008; Kane, 1994); to be underemployed or unemployed (Holzer, Offner, & Sorensen, 2005; Kallenberg, Reskin, & Hudson, 2000; Stratton, 1993); to continue living at home (Goldscheider & DaVanzo, 1989; Hogan, Hao, & Parish, 1990; White, 1994); and to be single-parents (Booth et al., 2008; Chen & Morgan, 1991). Living at home, unemployment, and single-parenthood during early adulthood are all are associated with increased anxiety (Dooley, Prause, & Ham-Rowbottom, 2000; Fergusson, Horwood, & Lynskey, 1997; Halperin, 1998; Klerman & Karoly, 1994) and depressive affect (Dawson, Grant, Stinson, & Chou, 2005; Dubas & Petersen, 1996; Schulenberg et al., 2005). To a lesser extent full-time employment (versus going to college) is also related to increased anxiety and depressive affect during early adulthood (Galambos et al., 2006; Schulenberg et al., 2005). Because Black Americans are overrepresented among those facing these early adult obstacles, the downward pivot in depressive affect growth may be muted among Black Americans relative to White Americans. Consistent with this prediction, Gore and Aseltine (2003) found among a sample of transitioning adults from the Northeastern United States that depressive affect increased among Black Americans relative to White Americans between the senior year of high-school and two years after high school, and that racial differences in the rates of early adult social roles, specifically a lower rate of full-time college attendance among Black Americans, contributed to this pattern. Note that because their examination begins at the end of high school, Gore & Aseltine's (2003) findings do not demonstrate a shift in racial disparities across adolescence and early adulthood; they only demonstrate racial differences in early adult growth.

Greater vulnerability—In addition to being more likely to face these challenging roles, because Black Americans are overrepresented among those of lower SES (Massey & Denton, 1993; Williams & Williams-Morris, 2000), they may also be more vulnerable to

these roles' negative mental health effects. For example, among working early adults, those of lower SES are more likely to hold lower-status jobs that are more restrictive (i.e., afford less autonomy) and pay a lower wage (Eggers & Dunkelberger, 1982; Kallenberg, Reskin, & Hudson, 2000), which is associated with increased anxiety (Karasek, 1979; Lerner, Levine, Malsrpeis, & D'Agostino, 1994) and poorer mental health (Bijl, & Ravelli, 2000; Lerner et al., 1994). Thus, by virtue of their lower SES, employed Black American early adults may be more likely to hold lower status jobs then employed White American early adults, rendering the relation between employment and depressive affect more positive for Black Americans. Similarly, by virtue of their lower SES, under/unemployed Black Americans may receive less financial and structural support from their families compared to under/unemployed White Americans, potentially rendering under/unemployment more challenging and stressful for Black Americans. To the extent that racial differences in vulnerability are a function of SES, then any racial differences in vulnerability found should disappear after controlling for SES.

Of course these early adult social roles are naturally linked (e.g., those who are unemployed are more likely to live at home, those who are parents are less likely to go to college, etc.) and therefore are not independent from one another (Bachman, Wadsworth, O'Malley, Johnston, and Schulenberg, 1997; Ross, Schoon, Martin, and Sacker, 2009). According to Cumulative Risk Theory (Rutter, 1979; Sameroff, Seifer, Baldwin, & Baldwin, 1993) it is important to examine risks or challenges in combination, especially when those risks or challenges are often dealt with in combination. Put another way, sometimes it is not which challenges one faces that is important but the number of challenges one faces. To the extent that Black Americans, due to lower SES, are more vulnerable to the negative effects of any single challenging early adult social role, then as the number of challenging early adult social roles increases so to should their vulnerability (relative to White Americans). If true then Black-White differences in depressive affect would be larger among those facing more challenging social roles and smaller among those facing fewer challenging social roles. Put succinctly, due to racial differences in SES race may moderate the relation between the accumulation of challenging social roles and early adult growth in depressive affect such that the relation is positive for both races but more positive for Black Americans.

Summary, key questions, and description of sample

This study examines whether there is a developmental shift in the nature of Black-White differences in depressive affect, and whether this shift takes place during early adulthood and is the consequence of a muted downward pivot in depressive affect among Black Americans relative to White Americans. Moreover, that muted (relative to White Americans) downward pivot in depressive affect among Black Americans is expected to be partially explained (i.e., mediated) by the fact that Black Americans are more likely to face challenging early adult social roles (Figure 1a). Additionally, by virtue of their lower SES, Black Americans are expected to be more vulnerable to the negative effects of challenging early adult social roles than are White Americans (Figure 1b). Because racial differences in vulnerability are expected to be rooted in racial differences in SES, any racial differences in vulnerability found are expected to disappear after controlling for SES. Finally, due to known gender differences in adolescent growth of depressive affect, whether gender moderates the above relations is also analyzed.

In order to examine these questions, data from the Maryland Adolescent Development in Context Study (MADICS), a longitudinal survey spanning the ages 13 to 22, is utilized. Because the MADICS sample - like the predominately middle-class suburb of Washington, DC from which it was sampled - is roughly two-thirds Black American and one-third White American, it is well-suited to examine the model in Figures 1a and 1b. That is, though there are SES disparities across race and substantial variation within each race (Goldstein, Davis-

Kean, Eccles, 2005), the fact that the two racial groups grew-up in the same community allows for a more focused examination of racial differences. With that said, it is not clear how the results from these data will generalize to more impoverished, urban samples or more affluent samples.

Methods

Sample

The data for this study come from the MADICS, a multi-wave community-based, longitudinal study of adolescents and their families (PIs: Jacquelynne S. Eccles and Arnold J. Sameroff). Participants were drawn from a southeastern Maryland county that borders the District of Columbia. Like the county, the sample is comprised of a majority of Black Americans (66%), is largely working- or middle-class, and is equally divided across gender (males = 51%). Participants were recruited via a note from the school to the adolescents' parents. In September, 1991, there were 7,841 7th grade students in the district enrolled in the 23 middle schools of focus. Of these, 5,452 parents/guardians authorized their child's participation in The Comer and Cook school evaluation study (CCSES). The MADICS sample is a purposive sub-sample (based on the parents' willingness to participate in a stratified sampling procedure designed to get proportional representations of families from each of the 23 middle schools being studied) of those families. Administrators of the CCSES were able to compare the characteristics of the MADICS Wave 1 sample with the characteristics of the larger CCSES sample. In general, the differences are quite small and usually non-significant despite the large sample size. Primarily, the MADICS sample is slightly wealthier and more likely to be White American than the CCSES sample.

During the 7th grade (Wave 1), 1,482 adolescents and their families participated. Out of these, 142 individuals were not included in the analyses because (1) they were either not of Black American or White American descent (n = 129), or (2) they had missing data for race (n = 13). Out of the remaining 1,340, analyses were limited to the 965 individuals who reported data for at least two of the time points that data for depressive affect were collected (Wave 2 – summer before Grade 9, Wave 3 – end of Grade 11, Wave 4 - 1-year post high school, and Wave 5 - 3-years post high school). For the sake of caution those individuals who reported data for depressive affect at one or fewer time points (n = 375) were dropped from the analyses.

The majority of adolescents who did not participate in follow-up assessments did not participate because they moved out of the district. Compared to the individuals who reported data for depressive affect at one or fewer time points (n = 375) those who reported data for depressive affect at two or more time points (n = 965) reported lower levels of depressive affect at Wave 2, $t(939) = 2.68$, $p < .01$, $R^2 = .007$. Finally, the race and gender distributions were equivalent among those who did (n = 965) and did not (n = 375) report depressive affect for two or more time points.

To handle missing data among those included in the study, Full Information Maximum Likelihood (FIML) was used (Arbuckle, 1996). Using the *auxiliary* command within Mplus (Muthen & Muthen, 1998–2008), auxiliary variables related to missingness were included in the analyses. The variables covered the following domains: school/academic achievement, relations with peers, relations with parents, family characteristics, neighborhood characteristics, spirituality/religion, puberty/physical health, sexual experiences and dating, and risky behavior.

Procedure

Both the focal child and his or her primary caregiver were interviewed in their home at Waves 1, 2, and 3 (Grade 7, summer before Grade 9, and end of Grade 11). These questionnaires included a broad range of items about family dynamics, family and peer relationships, resources, and stressors, as well as a broad array of indicators of adolescent development. For Waves 4 and 5 (1-year post high school and 3-years post high school), only the focal children (now adults) were surveyed using a mailed questionnaire. Data collected during these later waves also included measures of work, college, and romantic experiences.

Measures

Depressive affect—The scale for depressive affect is a 7-item scale, and is a truncated version of the Child Depressive Inventory (CDI) (Kovacs, 1992). Using Exploratory Factor analysis, the administrators of MADICS selected the items that were appropriate for both adolescents and early adults. The CDI items used are: *I am sad, I feel like nothing will ever work out for me, I am worthless all the time, I feel like I hate myself, I feel like crying everyday, things bother me all the time, I feel that I have plenty of friends* (reverse coded). Possible responses range from 1 (once in a while) – 3 (all the time). Data are only available for Waves 2, 3, 4, and 5 Cronbach alphas were high and stable across wave: .78, .81, .78 and .81 respectively. While research by Steele et al. (2006) indicates that the factor structure of the CDI varies across Black-Americans and White-American children, variance was limited to the Ineffectual and Social dimensions of the CDI. All items used in this study are part of the Mood and Self-esteem dimensions, which Steele et al. (2006) found to be invariant across race.

Family socio-economic status—Family SES was based on a standardized composite of three indicators of family SES: parental occupational category (Hollingshead, 1957), educational attainment of highest educated parent, and family income (adjusting for family size). All three indicators of family SES were assessed at Waves 1, 2, and 3. Each indicator was first averaged across the three waves (i.e., summed and divided by the number of waves at which data were available). Then the averaged indicators were standardized, summed, and divided by the number of status dimensions on which data were available. Note that because the SES measure is standardized, it has a mean of zero, rendering it mean-centered.

Early adult social roles—Early adult social roles were based on Wave 4 and 5 measures. Unless missing, respondents were categorized based on their responses at Wave 4. If data were missing at Wave 4, then respondents were categorized based on their responses at Wave 5 (if available). Early adult *living arrangements* were based on a single measure: "*During most of last Winter, where did you live?*" Possible responses were: (1) *Parents home or apartment*, (2) *Your own house*, (3) *College fraternity or sorority*, (4) *College dorm/residence hall*, (5) *Other relative's home*, (6) *An apartment, or* (7) *A rented room*. Those who answered "1" or "5" were coded as "living with parents/relatives", all others were coded as "living on their own".

Early adult *college/work status* was based on two measures. All respondents were asked "Are you in college full-time?" Here "college" included four-year university, community college, and post-high school vocational training. Those individuals who indicated that they were in college full-time were categorized as "full-time college". Those who indicated they were not in college full-time were also asked about their employment status. Those who were employed full-time were categorized as "full-time employment", those who were employed part-time or unemployed were categorized as "under/unemployed". These last two

groups were combined because preliminary analyses indicated that they did not differ in depressive affect, and this was true for both races.

Early adult *single-parenthood* was based on a two measures. First, respondents were asked if they had ever been pregnant (impregnated another in the case of males). For each pregnancy, respondents were asked whether the pregnancy resulted in a live birth. All those who indicated that they had given birth to (or impregnated someone who gave birth to) one or more children were categorized as a “Parent”. Among those categorized as “Parent”, those who indicated that they were not married were categorized as a “single-parent”. All others were categorized as a “non single-parent” (i.e., either a married parent or a non-parent).

Early adult *index of challenging social roles* was the sum of each individual's “challenging” social roles (i.e., those previously found to be associated with decreased well-being) and had a possible range of 0 to 3. Specifically, living with parents/relatives, under/unemployment, and being a single-parent were all defined as challenging social roles since each is the social role within their respective social role domain that is most associated with decreased well-being during early adulthood (Galambos et al., 2006; Schulenberg et al., 2005).

Results

All analyses were conducted with Mplus Version 5.2 (Muthen & Muthen, 1998–2008) and utilized a maximum likelihood estimator that is robust to non-normality and FIML to adjust for missingness. FIML-adjusted estimates of the depressive affect and family SES means, as well as rates of the early adult social roles are listed in Table 1. In Table 1 and all subsequent tables cases of significant differences across race are indicated by a superscripted number. Trajectory plots of the FIML-adjusted depressive affect means are presented in Figure 2. Each of the family SES indicators was lower for Black Americans. Also, relative to White Americans, Black Americans were less likely to be in college full-time and more likely to be both under/unemployed and hold a higher number of challenging social roles. The races no longer differed in under/unemployment and number of challenging social roles after controlling for family SES (not tabled). Additionally, preliminary analyses indicated that covariation among the early adult social roles was equivalent across race. Though gender main effects were found, gender failed to moderate racial differences in growth or correlates of growth. In order to save space and reduce complexity, results are not broken out by gender. Due to space constraints, fit indices are not presented for each model, though in every case model fit was excellent - e.g., CFI > .98 and RMSEA < .02 (McDonald & Ringo Ho, 2002). Finally, for primary analyses (Tables 2–3) the effect size (Cohen's *d*; Cohen, 1992) of the race difference is included for each estimate. Following Cohen's (1992) guidelines, effect sizes near or below .2 are noted as small (S), effect sizes near .5 are noted as medium (M), and effects sizes near or above .8 are noted as large (L).

Early adulthood as pivot point in depressive affect

Using piece-wise latent growth curve-modeling (Li, Duncan, Duncan, & Hops, 2001) growth of depressive affect was broken into two growth pieces: *Piece 1* is the piece that best corresponds with adolescence (linear growth between summer before Grade 9 and end of Grade 11), and *Piece 2* is the piece that best corresponds with early adulthood (linear growth between end of Grade 11 and 3-years after the end of high school) – see Figure 3. A more traditional modeling approach would be to model linear and quadratic growth factors, but for the present study the piece-wise approach is more desirable for three reasons. First, though a quadratic trend does indicate a bend or pivot in growth, it does not provide empirical evidence for when exactly the bend or pivot occurred. The present study predicts that a pivot in growth occurs at a specific point in time; only the piece-wise approach can

directly test that prediction by comparing the linear growth before that point in time to the linear growth after that point in time. Second, only be separating early adult growth from adolescent growth can the present study directly examine race differences in the relation between early adult social roles and early adult growth. Third, preliminary analyses indicated that only the piece-wise approach provided a satisfactory fit.

Using a multiple-group approach (Duncan, Duncan, Strycker, Li, & Alpert, 1999) and race as the grouping factor, growth in depressive affect was modeled separately for each race. Race differences were determined using chi-square difference tests (Kline, 1998). Using the model constraint command in Mplus (Muthen & Muthen, 1998–2008), two new model parameters were created: (1) A Black American "Growth Piece difference" factor [(Piece 2 growth factor for Black Americans) minus (Piece 1 growth factor for Black Americans)]; and (2) a White American "Growth Piece difference" factor [(Piece 2 growth factor for White Americans) minus (Piece 1 growth factor for White Americans)]. Note the estimates for these new model parameters as well as their standard errors were calculated within Mplus and are automatically incorporated into the piece-wise growth model. Nothing was calculated by hand.

The *Baseline Model* in Table 2 lists separately for each race the mean estimates for the intercept (hereafter referred to as Grade 9), Piece 1 growth, Piece 2 growth, and Growth Piece Difference (hereafter referred to as Growth Pivot). The Baseline Model provided an excellent fit as evidenced by model fit indices ($\chi^2(4) = 3.06$, p = .55, CFI = .998, RMSEA = .001) and the fact that the model-implied trajectories closely track the FIML-adjusted mean trajectories (Figure 2). Though not included in Table 2, standardized estimates of notable estimates are listed in the text in italics. Grade 9 depressive affect was low and equivalent across race, $\Delta\chi^2(1) = 1.05$, $p = 31$, $d = .019$(S), and on a scale of 1 to 3 it was 1.283 and 1.287 for Black Americans and White Americans respectively. Because the same pattern held in all subsequent analyses, results concerning Grade 9 depressive affect are not mentioned again. Piece 1 Growth differed across race, $\Delta\chi^2(1) = 4.05$, $p < .05$, $d = .486$(M). For Black Americans Piece 1 growth was stable (−.009, *−.142*), and for White Americans Piece 1 growth was positive (.046, *.229*). Piece 2 growth also differed across race, $\Delta\chi^2(1) = 5.40$, $p < .05$, $d = .365$(M), but the pattern was reversed. For White Americans Piece 2 growth was stable (.005, .037) and for Black Americans Piece 2 growth was positive (.046, *.461*). Finally, Growth Pivot also differed across race, $\Delta\chi^2(1) = 5.84$, $p < .05$, $d = .979$(L). Conceptually, this amounts to a two-way interaction (i.e., a Race by Growth Pivot interaction). For Black Americans the estimate was positive and significant (.055, *.873*) indicating that relative to Piece 1 growth, Piece 2 growth was *more* positive or pivoted upward. For White Americans the estimate was negative and significant (−.041, *−.256*) indicting that relative to Piece 1 growth, Piece 2 growth was more negative or pivoted downward (the reverse of the Black American pattern).

In order to adjust for family SES, the standardized family SES composite was included as a predictor of each growth factor (*SES Baseline Model*, Table 2). Except for Piece 1 growth, which no longer differed across race, $\Delta\chi^2(1) = 2.10$, $p = .15$, $d = .384$(M), controlling for family SES did not alter Black-White differences in growth (i.e., patterns were similar to those found above in the Baseline Model). The relation between family SES and growth in depressive affect varied across race. For White Americans higher SES was associated with a lower initial (Grade 9) level (−.072, *−.239*), but with a greater increase across Piece 1 (.065, *.238*). In contrast, among Black Americans family SES was unrelated to both Grade 9 (−.004, *−.016*) levels and Piece 1 growth (−.016, *−.102*). For both Black Americans (−.028, *−.241*) and White Americans (−.030, *−.165*), family SES was negatively related to Piece 2 growth.

All together results indicate that as expected there is discontinuity in the growth of depressive affect across adolescence and early adulthood, and the direction of that discontinuity varied across race such that growth pivoted downward for White Americans and upward for Black Americans. Though slightly reduced, the differential pivot remained after controlling for family SES. Importantly, the differential pivot was the dual function of race differences in Piece 2/early adult growth (i.e., White Americans reporting negative growth relative to Black Americans) and Piece 1/adolescent growth (i.e., White Americans reporting positive growth relative to Black Americans). Thus, a complete understanding of the differential pivot requires a closer examination of both racial differences in Piece 1/ adolescent growth and Piece 2/early adult growth. Nonetheless, because the present study's hypotheses and key aims all pertain to racial differences in early adult growth, the scope of all subsequent analyses is limited to the examination of racial differences in Piece 2/early adult growth and accounting for the sizable, though incomplete, role that they play in the differential pivot. The topic of race differences in Piece 1 (adolescent) growth is not addressed again until the discussion.

The differential pivot and Black-White differences in distribution of social roles

As earlier analyses indicated, Black Americans were more likely to be under/unemployed and less likely to be in college full-time. If the Black-White difference in early adult growth of depressive affect is rooted in racial differences in the distribution of social roles, then adjusting the distribution of social roles to be equal across race should reduce if not eliminate the Black-White difference in early adult growth of depressive affect. A weight was created that renders the distribution of early adult social roles among White Americans to be equal to the distribution among Black Americans. Note that because the weight adjusts the White American distribution to match the Black American distribution, application of the weight only adjusts White American estimates. Building on the Baseline model, this "Role" weight was applied (*Role Weight Model*, Table 3) Relative to the Baseline Model, Piece 2 growth among White Americans was slightly more positive, which is to be expected since the "Role" weight adjusts the White American distribution of social roles to match the Black American distribution. Though relative to the Baseline Model the racial difference in Piece 2 growth decreased slightly, the difference still proved significant, $\Delta X^2(1) = 4.61$, $p < .05$, $d = .291$(S), as did the Black-White difference in Growth Pivot, $\Delta X^2(1) = 5.95$, $p < .05$, $d = 1.071$(L). Thus, Black-White differences in the distribution of early adult social roles do not explain racial differences in Piece 2 growth or racial differences in the pivot in growth across Piece 1 and Piece 2. As was the case for the Baseline model, controlling for family SES reduced racial differences in the growth factors (*SES Role Weight Model*, Table 3). Even so, the race difference in Growth Pivot remained significant, $\Delta X^2(1) = 3.96$, $p < .05$, $d = .954$(L).

The differential pivot and Black-White differences in vulnerability to challenging social roles

Black-White differences in vulnerability were examined two ways. Whether the independent effect of each social role varied across race was examined first. Examined second was whether the cumulative effect of social roles varied across race.

Independent approach—Building on the Baseline Model, the following were added as predictors of Piece 2 growth: a living with parents/relatives dummy variable, an under/ unemployment dummy variable, a full-time employment dummy variable, and a single-parent dummy variable (*Independent Model*, Table 3). The reference category is those holding only social roles associated with less depressive affect (i.e. the optimal social roles) during early adulthood: living away from parents/relatives, going to college full-time, and not being a single-parent. Among the reference group, in contrast to the Baseline Model the

two races did not differ in Piece 2 growth, $\Delta X^2(1) = .96$, $p = .33$, $d = .063$(S). As a direct result the portion of the differential pivot attributable to the race difference in Piece 2 growth was eliminated, and the size of the race difference in Growth Pivot was reduced to non-significance, $\Delta X^2(1) = 2.47$, p = .12, d = .560(M). Because the effect was still medium in size it is possible that among those facing only optimal social roles that there is a differential pivot in growth across race but the present study lacks sufficient power to detect it. However of greater relevance to the present study is that among those facing only optimal social roles the size of that differential pivot is substantially reduced (relative to the whole sample) and to the extent that a differential pivot remains, it is primarily due to racial differences in Piece 1 growth.

Among the social role predictors, only the influence of under/unemployment varied across race, $\Delta X^2(1) = 4.02$, $p < .05$, $d = .301$(S). Under/employment was positively related to Piece 2 growth among Black Americans (.078, *.373*) and unrelated to Piece 2 growth among White Americans (.019, *.109*). However, after controlling for family SES, the relation between under/unemployment and Piece 2 growth was positive for both Black Americans (.092, *.482*) and White Americans (.074, *.290*), and did not vary across race, $\Delta X^2(1) = .15$, $p = .70$, $d = .084$(S) (*SES Independent Model*, Table 3).

Cumulative approach—Again, building on the Baseline Model, the index of challenging social roles was added as a predictor of Piece 2 growth (*Cumulative Model*, Table 3). Note that the reference group, those holding zero challenging social roles, is the same as the Independent Model except that the reference group in the Cumulative Model also includes those employed full-time. As a result, racial differences (or lack thereof) in the growth factors are similar across the two models and are not described again here. The influence of the challenging roles index varied across race, $\Delta X^2(1) = 6.06$, $p < .05$, $d = .339$(M). Among Black Americans each increase in challenging role was associated with an increase in Piece 2 growth (.054, *.457*). However, among White Americans it was unrelated to Piece 2 growth (.018, *.210*). After controlling for family SES, the influence of the challenging social roles index no longer varied across race, $\Delta X^2(1) = 1.73$, $p = .18$, $d = .216$(S) (*SES Cumulative Model*, Table 3). Each increase in challenging role was associated with an increase in Piece 2 growth for both Black Americans (.058, *.610*) and White Americans (.035, *.407*).

Summary—As expected, race moderates the relation between challenging social roles and Piece 2 growth in depressive affect such that the relation is stronger among Black Americans. Among those facing only optimal social roles, the races do not differ in Piece 2 growth. However, as the number of challenging social roles increases – under/unemployment in particular – the risk (relative to White Americans) that Black Americans face for elevated Piece 2 growth (and by connection an upward pivot in growth) also increases. Finally, also as expected, after controlling for family SES race no longer moderated the relation between challenging social roles and Piece 2 growth (i.e., vulnerability no longer varied across race).

Discussion

As expected, among a middle-class suburban sample, growth in depressive affect pivots around the onset of early adulthood, with the trajectory pivoting upward for Black Americans and downward for White Americans. Opposed to a racial difference in the distribution of social roles, Black Americans' greater vulnerability to the negative effects of challenging social roles – under/underemployment in particular – appears to underlie racial differences in early adult growth (and by connection contribute to racial differences in growth pivot). Also as expected, racial differences in family SES explained racial differences in vulnerability. Collectively, findings indicate that some but not all Black

Americans are at a greater risk (relative to White Americans) for an upward pivot. Among those facing only optimal social roles the races do not differ in early adult growth and growth does not pivot upward for either race. However, among those facing challenging social roles, Black Americans are at a greater risk (relative to White Americans) for an upward pivot and that differential risk appears to increase as the number of challenging roles increases. Faced with the added burdens associated with lower SES, early adult Black Americans holding multiple challenging social roles appear to be at considerable risk for a sharp upward pivot in depressive affect growth, the effects of which could be long-lasting.

Shift in Black-White differences in depressive affect across adolescence and early adulthood

To date research focused on adults consistently indicates that Black Americans report higher levels of depressive affect while research on adolescents is more mixed. Opposed to reflecting an inconsistency, the different patterns of findings may reflect a developmental shift in Black-White depressive affect disparities. One aim of the present study was to examine whether such a shift in growth occurs and whether it specifically occurs during early adulthood. In order to demonstrate that a shift in growth occurred during early adulthood it is necessary to establish the following: (1) Early adult growth in depressive affect is higher among Black Americans than White Americans, and (2) The racial difference in early adult growth is different than it was during adolescence. After all, if racial differences in growth are the same across adolescence and early adulthood then no shift has occurred. Seminal research by Gore & Aseltine (2003) already established the first condition. The present study is the first to establish both conditions. Thus, in addition to replicating Gore & Aseltine's (2003) findings, which indicated that Black Americans report greater increases in depressive affect following the end of high-school, this study also establishes that the differential growth pattern is not an extension or continuation of adolescent patterns but instead appears to initiate around the onset of early adulthood. Due to the design of the MADIC's study, it is difficult to pinpoint precisely when the shift in Black-White differences in depressive affect occurs. What is clear is that at some point between the end of the 11^{th} grade and completion of the 1^{st} year after high-school the depressive affect trajectory pivots upward for Black Americans and downward for White Americans.

Though the study's findings demonstrate a differential pivot in the growth of depressive affect around the onset of early adulthood, it is not clear if this differential pivot explains, in full or in part, the inconsistency between adult and adolescent research concerning racial differences in depressive affect. Both races reported equivalent depressive affect at the latest time-point (3-years after high-school), though growth was trending in the opposite direction for both races. Whether or not this trend continues into the future is unclear, but if it does then likely Black Americans would report higher levels of depressive affect by middle-adulthood, which would be consistent with research on adults indicating higher depressive affect among Black Americans.

Early adult social roles and the differential pivot in growth

Another aim of the study was to examine whether the differential pivot was a function of racial differences in the rate and influence of early adult social roles. Though Black Americans were overrepresented among those under/unemployed and those not in college full-time, holding the distribution of social roles constant across race left the race differences in early adult growth and growth pivot largely unchanged. Far more important were racial differences in vulnerability. First, independent of living arrangements and parental status, the relation between under/unemployment and growth of depressive affect was more positive among Black Americans. Second, putting specific roles aside, the relation between

the accumulation of challenging social roles and growth in depressive affect was also more positive among Black Americans. Thus, the extent to which Black Americans were at a greater risk (relative to White Americans) for an upward pivot increased as the number of challenging roles increased. Black Americans facing only optimal early adult social roles were not at a greater risk, while those facing only challenging social roles were at the greatest risk.

As expected, after controlling for family SES the relation (both independent and cumulative) between challenging social roles and growth in depressive affect no longer varied across race, suggesting that racial differences in vulnerability are not intrinsic to race, but instead are a function of racial disparities in SES. Those of lower SES face disadvantage at the individual (higher baseline stress), family (reduced availability of emotional and financial support), and community (lower quality education, reduced access to health care, and higher crime rates) levels (Baum, Garofalo, & Yali, 1999; Williams, 1999; Williams & Collins, 1995). Faced with these extra burdens, those of lower SES may have a more difficult time negotiating the challenges of unemployment, single-parenthood, and living at home during early adulthood. Though controlling for family SES reduced racial differences in vulnerability to non-significance, it only reduced racial differences in vulnerability to the accumulation of challenging social roles by about one-third. Thus it is possible that independent of SES there are racial differences in vulnerability, but the present study lacks sufficient power to detect them. Even after adjusting for SES, racial disparities in health have also been linked to racism and discrimination (Williams, 1999). Therefore, though not examined here, in addition to SES it is possible that racism and discrimination also contribute to Black Americans' greater vulnerability to the negative mental health effects of challenging social roles.

Regarding the contribution of early adult social roles, it is difficult to compare the present study's findings to those of Gore & Aseltine (2003). First, Gore & Aseltine (2003) did not examine racial differences in vulnerability. Second, when testing for mediation, Gore & Aseltine (2003) did not include parental status in their examination nor did they examine the mediating influence of social roles separately from family SES. Nonetheless, findings from both studies indicate that racial differences in the distribution of social roles mediate only a small portion of racial differences in early adult growth. Gore & Aseltine (2003) found that racial differences in college attendance and employment only accounted for around 20% of the racial difference in early adult growth. Likewise, the present study found that recalibrating the distribution of social roles to be equal across race reduced the Black-White difference in Piece 2 growth by about 20% (i.e., from .041 to .032).

Race and mental health: What these findings do and do not suggest

To be clear, it is not the case that as a group Black Americans are at a greater risk for mental illness; after all, even when at their peak, average levels of depressive affect among Black Americans were low (~ 1.33 on a scale of 1 to 3), and research on adults clearly indicates that Black Americans are not at a greater risk for clinical depression and other mood disorders (Williams, & Earl, 2005). Though Black Americans overall do not appear to be at risk, a particular subset does – namely, Black Americans holding only challenging social roles. After all, among a group already at considerable risk (i.e., early adults facing multiple challenging social roles), Black Americans are at considerably greater risk for a sharp upward pivot in depressive affect. Additionally, due to the nature and number of challenges that they face, those challenges may be difficult to overcome, potentially rendering their upward inflection in growth more permanent, a true turning point. Not only do these early adults fall farther behind their better situated peers who are gaining valuable experience in the workplace or classroom, but due to the fact that Black Americans are more likely to come from low SES backgrounds, they are also more likely lack the financial and social

supports necessary to make up for lost ground, setting in motion a tough and challenging pathway that may prove difficult to alter. During high-school, counselors, teachers, and parents may be able to prevent this turn of events by encouraging at-risk adolescents to take advantage of vocational and technical training that is often available in today's high-schools. Avenues for intervention include designing programs (or better funding existing programs) that offer vocational training to early adults who need it.

Black-White differences in adolescent depressive affect growth

Though racial differences in early adult growth were the primary focus of this study, racial differences in adolescent growth, specifically the higher rate of increase among White Americans, also warrant discussion since they too contributed to the differential pivot in growth. What might explain this adolescent pattern, and what might explain its cessation around the onset of early adulthood? One possible explanation is that the influence of particular protective factors known to be important to the well-being of adolescent Black Americans, such as religiosity and religious engagement (Taylor, Chatters, & Levin, 2004), social support from the immediate and extended family (Hill, 1998; McAdoo, 2001) as well as socialization from parents focused on coping with discrimination (Bowman & Howard, 1985; Thornton, 1997), may wane during late adolescence. Higher levels of self-esteem among adolescent Black Americans have been linked to these factors (Crocker & Major, 1989; Hughes & Demo, 1989). Perhaps they foster lower depressive affect as well. As youth move out of the home and establish greater autonomy from their parents and family, it is possible that these forms of support and connections to these networks decrease.

Does differential pivot generalize to more economically and geographically diverse samples?

Both the present study and Gore & Aseltine (2003) found that early adult depressive affect increases at a faster rate among Black Americans than White Americans. In contrast, Adkins et al. (2009) found among a national sample that Black-White differences in depressive affect were stable across adolescence and early adulthood. Both the present study and Gore & Aseltine (2003) utilized largely middle-class urban/suburban samples, while Adkins et al. (2009) utilized a national sample that included respondents from urban, suburban, and rural areas ranging from affluent to poor. It could be that Black-White differences in family SES are reduced in rural settings and among the upper and lower ends of the SES continuum, which would reduce Black-White differences in vulnerability and in turn early adult growth of depressive affect among these segments of the population. A second possible explanation for the discrepancy in findings is that due to the cohort-sequential design of the data set Adkins et al. (2009) used, Add Health, the number of respondents assessed both near the end of high-school and shortly after the end of high-school comprised a small percentage of the overall sample. A shift, if any, among this group may have been watered down when combined with the rest of the sample.

Limitations

First, readers are cautioned to make inferences of causality. This study, like most research examining the relation between early adult social roles and mental health, followed the assumption that early adulthood transitions influence mental health. It is also possible, though likely to a lesser extent, that one's mental health could dictate one's transition patterns. Second, the study lacked sufficient power to detect race by growth pivot interactions that were medium in size or smaller, and to detect race differences in vulnerability that were small in size, increasingly the likelihood of Type II errors. Third, because MADICS combines college and work status into a single measure, it is not possible to examine the effect of one independent of the other. Fourth, the relation between SES and

health has been found to vary across race (Adkins et al., 2009; Kessler and Neighbors, 1986), a complication this study did not consider.

Summary and future directions

Early adulthood is marked by transition and opportunities for turning points, some early adults are bound to get knocked “off-track” as a result. The present study's findings indicate that among those facing challenging social roles Black Americans are more likely to get knocked off track, and that differential risk increases as the number of challenging social roles increases. Racial differences in SES appear to explain the racial differences in vulnerability. Future research should seek to replicate these findings using more geographically and economically diverse samples. Due to the sharpness of their upward pivot and their being more likely to come from low SES backgrounds, for Black Americans facing multiple challenging social roles, their upward pivot in growth may translate into more permanent and long-lasting deficits in mental health. Future research utilizing data that extends farther into adulthood should seek to identify who among those “knocked off-track” eventually adjusts and meets the challenges facing them and who does not.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Black-White differences in depressive affect and the role of early adult social roles and socio-economic status

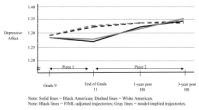

Figure 2.
FIML-adjusted-mean and model-implied trajectories of depressive affect by race and developmental period

Figure 3.
Depressive affect piece-wise growth curve model

Table 1

Depressive affect, family SES, and rates of early adult social roles, whole sample and by race

	Whole Sample (n = 956)	Black Americans (n = 609)	White Americans (n = 347)
Depressive affect			
Grade 9	1.281 (.359)	1.279 (.365)	1.287 (.349)
End Grade 11	1.285 (.354)	1.264 (.344)[1]	1.326 (.371)[1]
1-year post HS	1.335 (.375)	1.325 (.374)	1.342 (.378)
3-year post HS	1.342 (.390)	1.346 (.389)	1.337 (.391)
Family SES			
parental occupation	70.719 (19.010)	68.580 (20.030)[2]	74.321 (16.513)[2]
highest educated parent	14.788 (2.692)	14.363 (2.456)[3]	15.530 (2.915)[3]
family income	3.091 (1.373)	3.019 (1.421)[4]	3.216 (1.277)[4]
SES Composite (Standardized)	.000 (.806)	−.116 (.816)[5]	.180 (.789)[5]
Early adult social roles			
Early adult residential status			
Live with parents/relatives	50.13%	50.92%	48.73%
Live away from parents/relatives	49.87%	49.08%	51.27%
College/work status			
Full-time college	55.99%	52.75%[6]	61.68%[6]
Full-time employment	20.96%	20.13%	22.41%
Under/unemployed	23.04%	27.11%[7]	15.91%[7]
Parent status			
Single-Parent	11.64%	12.50%	10.14%
Non-single-parent	88.36%	87.50%	89.86%
Challenging roles Index	.893 (.890)	.976 (.957)[8]	.750 (.776)[8]

Note: Standard deviations in parentheses; Estimates sharing same superscripted number significantly differ from one another.

[1] $\Delta\chi^2(1) = 6.57$, $p < .01$

[2] $\Delta\chi^2(1) = 19.99$, $p < .001$

[3] $\Delta\chi^2(1) = 39.86$, $p < .001$

[4] $\Delta\chi^2(1) = 4.74$, $p < .05$

[5] $\Delta\chi^2(1) = 30.80$, $p < .001$

[6] $OR = 1.442$, $p < .05$

[7] $OR = .508$, $p < .01$

[8] $\Delta\chi^2(1) = 6.57$, $p < .01$

Table 2

Growth in depressive affect by race, with and without adjusting for race differences in the distribution of early adult social roles

	Baseline Model			SES Baseline Model			Role Weight Model			SES Role Weight Model		
	Blk-Am	**Wht-Am**	***d***	**Blk-Am**	**Wht-Am**	***d***	**Blk-Am**	**Wht-Am**	***d***	**Blk-Am**	**Wht-Am**	***d***
Grade 9 (α)	1.283^{***}	1.287^{***}	.019	1.283^{***}	1.300^{***}	.081	1.283^{***}	1.289^{***}	.029	1.283^{***}	1.307^{***}	.113
Piece 1 (β1)	$-.009^{1}$	$.046^{*1}$	.486	−.011	.034	.384	$-.009^{8}$	$.061^{*8}$	.606	.011	$.047^{*}$	.485
Piece 2 (β2)	$.046^{**2}$	$.005^{2}$	.365	$.042^{**4}$	$.010^{4}$	.292	$.046^{**9}$	$.011^{9}$	.291	$.042^{**}$	.015	.233
Growth Pivot	$.055^{*3}$	$-.041^{*3}$	.979	$.052^{*5}$	$-.023^{5}$	.848	$.055^{*10}$	$-.050^{*10}$	1.071	$.052^{**11}$	$-.032^{11}$	.954
Family SES→α	--	--	--	$-.004^{6}$	$-.072^{**6}$	.253	--	--	--	$-.004^{12}$	$-.097^{**12}$	.348
Family SES→β1	--	--	--	$-.016^{7}$	$.065^{*7}$	.543	--	--	--	$-.016^{13}$	$.075^{*13}$	.603
Family SES→β2	--	--	--	$-.028^{*}$	$-.030^{*}$	.014	--	--	--	$-.028^{*}$	$-.038^{*}$	.069

Note:Estimates sharing same superscripted number significantly differ from

$^{*}p < .05$,

$^{**}p < .01$,

$^{***}p < .001$,

[1] $\Delta\chi^2(1) = 4.05$, $p < .05$

[2] $\Delta\chi^2(1) = 5.40$, $p < .05$

[3] $\Delta\chi^2(1) = 5.84$, $p < .05$

[4] $\Delta\chi^2(1) = 3.87$, $p < .05$

[5] $\Delta\chi^2(1) = 4.42$, $p < .05$

[6] $\Delta\chi^2(1) = 4.63$, $p < .05$

[7] $\Delta\chi^2(1) = 4.87$, $p < .05$

[8] $\Delta\chi^2(1) = 4.44$, $p < .05$

[9] $\Delta\chi^2(1) = 4.61$, $p < .05$

[10] $\Delta\chi^2(1) = 5.95$, $p < .05$

Int J Behav Dev. Author manuscript; available in PMC 2012 January 24.

[11] $\Delta\chi^2(1) = 3.96$, $p < .05$

[12] $\Delta\chi^2(1) = 5.14$, $p < .05$

[13] $\Delta\chi^2(1) = 5.02$, $p < .05$

Table 3

The relation between early adult social roles and growth in depressive affect by race, independent and cumulative effects

	Independent Model			SES Independent Model			Cumulative Model			SES Cumulative Model		
	Blk-Am	**Wht-Am**	***d***	**Blk-Am**	**Wht-Am**	***d***	**Blk-Am**	**Wht-Am**	***d***	**Blk-Am**	**Wht-Am**	***d***
Grade 9 (α)	1.284***	1.287***	.014	1.284**	1.299**	.071	1.283***	1.287***	.019	1.283**	1.299**	.076
Piece 1 (β1)	−.010[1]	.048*[1]	.495	−.012	.035	.447	−.010[5]	.047*[5]	.482	−.011	.034	.415
Piece 2 (β2)	−.005	.000	.063	−.007	−.012	.045	−.006	−.009	.030	−.010	−.017	.064
Growth Pivot	.005	−.048*	.560	.005	−.046*	.610	.004	−.055*	.601	.001	−.051	.594
Live w/parents or rel.→β2	.031	.010	.105	.030	.010	.096	--	--	--	--	--	--
Live w/o parents or rel. (omitted)	(REF)	(REF)	(REF)	(REF)	(REF)	(REF)	--	--	--	--	--	--
Under/unemployed→ β2	.078**[2]	.019[2]	.301	.092**	.074*	.084	--	--	--	--	--	--
Full-time employ→ β2	.029	−.025	.103	.020	.007	.050	--	--	--	--	--	--
Full-time college (omitted)	(REF)	(REF)	(REF)	(REF)	(REF)	(REF)	--	--	--	--	--	--
Single-Parent →β2	.040*	.043*	.015	.038*	.036*	.023	--	--	--	--	--	--
Non-Single-Parent (omitted)	(REF)	(REF)	(REF)	(REF)	(REF)	(REF)	--	--	--	--	--	--
Challenging roles index	--	--	--	--	--	--	.054***[6]	.018[6]	.339	.058***	.035*	.216
Family SES→α	--	--	--	−.004[3]	−.071**[3]	.269	--	--	--	−.005[7]	−.073**[7]	.238
Family SES→β1	--	--	--	−.016[4]	.065*[4]	.605	--	--	--	−.015[8]	.065**[8]	.574
Family SES→β2	--	--	--	−.002	−.022	.146	--	--	--	−.006	−.020	.106

Note:Estimates sharing same superscripted number significantly differ from

* $p < .05$,

** $p < .01$,

*** $p < .001$;

[1] $\Delta\chi^2(1) = 3.98$, $p < .05$

[2] $\Delta\chi^2(1) = 4.02$, $p < .05$

[3] $\Delta\chi^2(1) = 4.50$, $p < .05$

[4] $\Delta\chi^2(1) = 3.98$, $p < .05$

[5] $\Delta\chi^2(1) = 4.03$, $p < .05$

[6] $\Delta\chi^2(1) = 6.06$, $p < .05$

[7] $\Delta\chi^2(1) = 4.37$, $p < .05$

[8] $\Delta\chi^2(1) = 3.94$, $p < .05$