Developmental Changes in Sexual Prejudice From Early to Late Adolescence: The Effects of Gender, Race, and Ideology on Different Patterns of Change

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This study documented significant changes in prejudice toward gay and lesbian individuals among adolescents from the ages of 12 to 18 years. Moreover, in line with developmental theories of prejudice, there was substantial variability in these patterns, partially predicted by the gender and ideological beliefs (reflected by social dominance orientation [SDO]) of individuals. Boys reported higher prejudice at age 12 than girls. SDO also accounted for initial differences in levels of prejudice. Further, although prejudice toward gay men did decrease among girls over time, it did not decrease among boys. Prejudice toward lesbians decreased at similar rates for boys and girls. These different trajectories are explained within the context of gender socialization processes during adolescence. In addition, fluctuations in adolescents’ own SDO corresponded with fluctuations in their level of prejudice, over and above those tied to age-related changes. This association was even stronger among those with overall higher SDO tendencies than others. However, SDO, when treated as a stable invariant factor, did not predict different patterns of progressive age-related change in prejudice. These results extend the research on sexual prejudice by examining it within a broader and more dynamic developmental framework, in greater alignment with developmental theories of prejudice.

Keywords: prejudice, homophobia, social dominance orientation, ideology, adolescence

Substantial research has identified many factors associated with prejudice. Yet there has been limited attention to the actual development of prejudiced attitudes or to variability in how these attitudes change. Although some studies have examined change in prejudice among adults (McClelland & Linnander, 2006; Van Laar, Sidanius, & Levin, 2008), the absence of longitudinal research is especially evident among children and adolescents. This limitation is significant because several developmental theories suggest these attitudes are likely to change earlier in development (Aboud, 1988; Bigler & Liben, 2006; Nesdale, 2001). A developmental framework and attention to earlier developmental periods could inform the research on prejudice largely conducted among adults and findings from cross-sectional studies. This knowledge could improve our understanding of prejudice and efforts to counter these attitudes prior to adulthood. In this study, we examined changes in prejudice toward gay and lesbian individuals from early to late adolescence. Moreover, we tested factors that predicted patterns of change in these attitudes.

Theoretical Models for Developmental Changes in Prejudice

Evidence of stereotyping, in-group favoritism, and prejudice among children and young adolescents has been well documented (Bigler & Liben, 2006). More broadly, however, researchers have been interested in comprehensive developmental patterns. Developmental theories propose that prejudiced attitudes change from childhood to adulthood. Social cognitive development theory stipulates that prejudice decreases as children develop a greater capacity for cognitive reasoning (Aboud, 1988). Summarily, they rely less heavily on basic group stereotypes to form their beliefs or judgments of individuals and instead are able to consider more nuanced individual differences.

While not ignoring the role of cognitive development, social identity development theory also places an emphasis on the social context and the role of other values and beliefs to explain the development of prejudice (Nesdale, 2001). Individuals adopt beliefs and views held by their social group (e.g., heterosexuals) to feel a greater sense of group membership and to differentiate from an outgroup (e.g., sexual minorities). In turn, these beliefs contribute to the formation of their prejudiced attitudes (Nesdale, 2001). As we later note, for example, this could involve the adoption of ideological beliefs held by dominant group members (e.g., social dominance beliefs) that lead to higher levels of sexual prejudice. Of importance, this theory suggests that patterns of change can vary across individuals based on these other factors (e.g., other beliefs and values or from intergroup contact). Similar to social identity development theory, developmental intergroup theory (Bigler & Liben, 2006) posits that certain individual characteristics (e.g., empathy or gender) may predict different trends in the
development of stereotypes and prejudice. Indeed, adolescents examine their beliefs and worldviews more critically, exhibit different ways of reasoning about social issues, and have more opportunities for intergroup interaction during this period (Heineze & Horn, 2009; Horn, 2003; Killen & Stangor, 2001; Molina & Wittig, 2006). Nevertheless, these types of co-occurring developments have not been examined in relation to how they predict patterns of change in prejudice.

Empirical research has focused on uniform or average developmental trends in prejudice implied through cross-sectional group comparisons. There is a need to move beyond this approach to analyze longitudinal data that could capture more accurately the nuanced differences in change as proposed by these developmental theories. Longitudinal data would provide the ability to test directly the extent to which there is variability in how sexual prejudice attitudes change over time and factors that may account for variability in these changes.

**Basic Cross-Sectional Age Differences in Prejudice**

Most often patterns of change in prejudice, whether for sexual prejudice or other forms of prejudice, have been inferred only through cohort comparisons (Aboud, 2003; Black-Gutman & Hickson, 1996; Hoover & Fishbein, 1999; Horn, 2006; Nesdale & Brown, 2004). For example, children at age 6, but not at age 12, reported more likeability for ingroup than outgroup members (Nesdale & Brown, 2004). Similarly, older adolescents report lower levels of subtle and blatant racial prejudice than early adolescents (White et al., 2009). These findings support the proposal of social cognitive development theory that prejudice decreases as children age.

Very few studies have focused on sexual prejudice among adolescents and none, to our knowledge, have been conducted among children. Further, although adolescents do express varying levels of sexual prejudice, limited attention has been given to whether or how these attitudes change (Baker & Fishbein, 1998; Hoover & Fishbein, 1999; Horn, 2006; Poteat, Espelage, & Koenig, 2009). Cohort comparisons from a White adolescent and young adult sample suggested an increase in sexual prejudice between Grades 7 and 9, followed by a decrease between Grade 11 and college (Hoover & Fishbein, 1999). However, these trends were largely nonsignificant and difficult to explain within a theoretical framework. Other findings from a racially diverse adolescent and young adult sample suggested an overall linear decreasing trend based on comparisons of students in Grades 10 and 12 and college (Horn, 2006). These findings suggest an overall decrease in sexual prejudice, at least during late adolescence to young adulthood.

The reliance on cross-sectional comparisons has prevented the ability to test whether cohort differences represent actual changes within individuals or instead reflect unique cohort effects. Moreover, these studies convey only a singular trend. Yet many adults report negative attitudes toward sexual minorities (Herek, 2000). Social identity development theory and developmental intergroup theory suggest there is greater variability in how adolescents’ attitudes change. Further, this could be accounted for based on other views or beliefs that they hold.

**Different Developmental Patterns of Change in Sexual Prejudice**

Studies have not tested the proposals of social identity development or developmental intergroup theories that individual characteristics and their broader belief systems should coincide with patterns of change in prejudice. Ideological beliefs; intergroup contact, gender; and, to a lesser extent, race are associated with sexual prejudice (Haslam & Levy, 2006; Herek, 2000; Herek & Capitiano, 1996; Whitley, 1999). Nevertheless, the extent to which these factors predict how prejudice changes over time is a more complex issue. On the basis of these theories, we focus on the social identities of gender and race, as well as ideology in the form of social dominance, as potential contributors to patterns of change in sexual prejudice.

Extant studies have focused on gender differences in overall levels of sexual prejudice. They have not, however, examined potential differences between boys and girls in how their attitudes change. We expect developmental trajectories will vary for boys and girls for several reasons. During adolescence, boys continue to be socialized to adopt masculine norms about expectations for men in society (Pleck, Sonenstein, & Ku, 1994). Although many forms of masculinity have been described (Imms, 2000; Kimmel, 1997; Pascoe, 2007), some of which are more inclusive than others (Anderson, 2009), the predominant and most representative forms of masculinity in society at present encourage or reflect sexual prejudice (Kimmel, 1997; Pascoe, 2007). These are significant associations between normative masculine beliefs and sexual prejudice among adolescent boys and adult men (Mahalik et al., 2003; Pleck et al., 1994; Sinn, 1997). As these norms are further developed and reinforced, boys’ attitudes toward sexual minorities may become increasingly negative or they may not report any decrease in prejudice. Boys often feel pressured to prove their heterosexuality (Phoenix, Frosh, & Pattman, 2003) and may fear being perceived as gay if they express increasingly positive attitudes toward sexual minorities. Although girls also are socialized to adopt gender norms related to femininity (Maccoby, 1998), these norms do not typically encourage sexual prejudice the same as for boys. Girls may thus report a more noticeable decrease in prejudice than boys.

To this point, we have discussed sexual prejudice singularly in its application to sexual minorities in general. Yet it is equally important to examine attitudes toward specific members of this community (e.g., gay, lesbian, bisexual, or transgender individuals). Attitudes toward specific groups could have unique developmental trajectories. These, too, could vary by gender. Some studies have documented adult gender differences on attitudes toward gay men but not toward lesbians (Whitley & Ægisdóttir, 2000) or have documented that men report more negative attitudes toward gay men than toward lesbians, whereas women do not (Herek, 1988; LaMar & Kite, 1998). The latter finding also was documented in an adolescent sample (Mata, Ghavami, & Wittig, 2010). We expect that different developmental processes for boys and girls may explain these findings. Masculine socialization models tend to connect these norms to homophobic attitudes specifically toward gay men (Kimmel, 1997; Pleck et al., 1994). The continual socialization of masculine norms among boys consequently may inhibit decreases in their prejudice toward gay men but not lesbians. Because gender norm socialization among girls does not empha-
size sexual prejudice toward gay men or lesbians, girls’ prejudice toward both groups may decrease in a similar manner. Over time, these differential developmental patterns for boys and girls could produce the observed patterns among adults. Namely, men ultimately would hold more distinct attitudes toward gay men and lesbians than would women, and gender differences would be more distinct for attitudes toward gay men than lesbians. To address this possibility, we distinguished between adolescents’ attitudes toward gay and lesbian individuals.

Although gender differences on sexual prejudice have been consistent, racial group differences have not (Herek, 2000; Herek & Capitano, 1995; Ryan, Huebner, Diaz, & Sanchez, 2009; Waldner, Sikka, & Baig, 1999). This may reflect variability in the representation of specific minority groups across studies, each of which may hold slightly different attitudes based on unique cultural factors. Typically small sample sizes of racial minorities in these studies also limit generalizability. Alternatively, this could reflect the case that such differences are negligibly weak. Thus, we tested for racial group differences in the developmental patterns of these attitudes for exploratory purposes. An approach that tests whether these attitudes change in similar or unique ways for White and racial minority adolescents could offer a better understanding of differences documented at single time points.

Ideology as a Predictor of Differences in Developmental Patterns of Prejudice

Of the many belief systems that have received attention in the literature on prejudice, social dominance orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994) has been among the most examined. Social dominance theory proposes that hierarchies exist in society, where some groups are in positions with more power and access to resources than others. SDO represents support for these hierarchies and for maintaining systems of inequality. Individuals in dominant positions report higher SDO than those in marginalized positions (Pratto et al., 1994; Sidanius & Pratto, 1999). Therefore, as proposed by social identity development theory, heterosexual adolescents may come to adopt SDO beliefs as they develop a sense of membership within this dominant group and to differentiate themselves from sexual minorities as an out-group. In turn, this may lead them to hold prejudiced attitudes toward sexual minorities. Indeed, there is considerable evidence that SDO is associated with many forms of prejudice, including sexual prejudice toward gay and lesbian individuals.

Building on the arguments of social identity development and developmental intergroup theories that other beliefs may interfere in the development of prejudice or contribute to variable patterns of change (Bigler & Liben, 2006; Nesdale, 2001), we expect SDO to predict how sexual prejudice changes in one of two ways. As one possibility, SDO could be considered a stable factor (e.g., trait-SDO) that moderates progressive age-related changes in prejudice. SDO is considered relatively stable among adults and has been treated as such in most studies (Sibley & Duckitt, 2008). In this case, those who endorse higher SDO than others may differ in how their prejudiced attitudes change as they age. Adolescents low on SDO may report decreased sexual prejudice as they grow older, a pattern congruent with overall trends in cross-sectional studies (e.g., Horn, 2006; Poteat et al., 2009). Counter to this, adolescents high on SDO may report increased prejudice because of their strong support for hierarchies over marginalized groups.

As another possibility, SDO itself could fluctuate as adolescents continue to form their beliefs. Adolescents may continually and concurrently evaluate and change their broader belief systems and prejudiced attitudes to some extent. Relative to adults, among whom most SDO research has been conducted, adolescents undergo much more substantial changes over briefer periods of time as they develop their sense of individual and group identity, develop more sophisticated and abstract reasoning abilities, experience more intergroup interactions, and form their own attitudes and perspectives (Bigler & Liben, 2006; Horn, 2006; Killen & Stangor, 2001; Nesdale, 2001). Therefore, particularly among adolescents, rather than assume stability in their SDO, it could be informative to model variability in these beliefs over time. We expect significant variability in both SDO and prejudice during early to late adolescence and that fluctuations in SDO will covary with those in sexual prejudice. Although both may change, we maintain the treatment of SDO as a predictor of prejudice, given that other experimental and short-term longitudinal studies provide evidence for this causal direction in that broader belief systems predict more specific attitudes (Guimond, Dambrun, Michinov, & Duarte, 2003; Pratto, Tatar, & Conway-Lanz, 1999; Sibley & Liu, 2010). This is also conceptually consistent with social dominance theory (Pratto et al., 1994). This pattern would provide stronger evidence for SDO as a predictor of individuals’ own sexual prejudice, independent of progressive age-related changes that may be reflective of other factors, such as cognitive development as proposed by social cognitive development theory (Aboud, 1988).

The Current Investigation

Although sexual prejudice remains pronounced in society, there has been minimal consideration of how these attitudes develop prior to adulthood. This constitutes a significant limitation in the developmental literature and points to the need for research to adopt a more dynamic framework. Further, attention to factors that may explain variability in how prejudiced attitudes change would bring the empirical examination of prejudice in greater alignment with theoretical proposals that such patterns are expected to vary based on other beliefs held by individuals (Bigler & Liben, 2006; Nesdale, 2001). To address these issues, we used an accelerated longitudinal design to test whether prejudiced attitudes changed from early to later adolescence. Additionally, we tested gender, race, and SDO as predictors of different patterns of change. Fi-
nally, we tested these patterns for attitudes toward gay and lesbian individuals.

We hypothesized that adolescents would report significant changes in sexual prejudice during this developmental period. We based this foundational hypothesis on extant cross-sectional findings (Hoover & Fishbein, 1999; Horn, 2006; Poteat et al., 2009) and on cognitive and social developmental theories of prejudice (Aboud, 1988; Bigler & Liben, 2006; Nesdale, 2001). Whereas extant studies have suggested a singular decrease in prejudice, however, we hypothesized that adolescents would vary significantly in how their attitudes changed. We hypothesized that gender, race, and SDO would predict different patterns of change over time. We based this hypothesis on social identity development and developmental intergroup theories that propose such variability because individuals differ in the broader worldviews and beliefs that they hold, which can affect their prejudiced attitudes (Bigler & Liben, 2006; Nesdale, 2001).

We tested SDO as a time-variant predictor of variability in adolescents’ own sexual prejudice across their assessments and as a stable moderator of patterns of age-related change across individuals. We hypothesized that the effect of SDO would be more evident when modeled as a time-variant predictor than as a stable predictor. Because of our attention to an earlier developmental period during which substantial changes in many attitudes and beliefs can occur (Nesdale, 2001), we expected that this would more accurately capture the dynamic, rather than static, nature of both SDO and sexual prejudice as held by adolescents.

Finally, we hypothesized that developmental trajectories would differ for attitudes toward gay men and lesbians. We expected gender differences would be more notable for developmental changes in attitudes toward gay men than lesbians because of underlying masculine gender socialization processes among boys that more specifically foster prejudice toward gay men (Kimmel, 1997; Pleck et al., 1994). As such, we expected changes in attitudes toward gay men would be more distinct for adolescent boys and girls but that their changes in attitudes toward lesbians would be similar.

### Method

#### Participants

Participants included 380 adolescents (192 girls, 188 boys) attending a small Central Illinois public high school. The school includes Grades 9–12 in addition to a “subfreshman” level (Grade 7/8), with grade level sizes of approximately 60 students. Of the sample, 218 identified as White, 91 as Asian American, 34 as biracial or multiracial, 11 as African American, 11 as Latino/a, three as Native American, and 12 reported other racial or ethnic group memberships. These proportions were comparable to the overall student population. At the school’s request, we were unable to collect data on students’ sexual orientation. During the study, participants’ ages ranged from 12 through 18.5 years old. Of the participants, 112 participated at all four waves, 104 at three waves, 126 at two waves, and 38 at one wave. Most of the missing data were expected because they resulted from the accelerated longitudinal design of the study. Older cohorts graduated during the project, whereas incoming younger cohorts participated after the start of the project. Because multilevel longitudinal modeling accounts for a varying number of waves of data for individuals and the spacing of waves (Singer & Willett, 2003), we were able to include participants with data from less than all four waves. Data from all individuals contribute to the estimation of fixed effects. However, individuals measured on fewer occasions contribute less or no information to the estimation of the variance of random effects, depending on the number of waves in which they participate. At all waves, participants represented over 90% of the school population. We report additional tests of the patterns of missing data in the results.

#### Procedure

We collected data as part of a 2-year study. It included four assessment periods that produced a 1-year overlap between adjacent age cohorts. Accelerated longitudinal designs involve the collection of data from more than one cohort. Multiple cohorts provide the ability to test for change across a more expansive period of time than could be achieved when involving only one cohort. This design is recommended as a way to decrease the likelihood of participant attrition over longer time periods and to minimize participant fatigue or reaction formation as a result of extensive repeated assessments (Willett, Singer, & Martin, 1998).

Parents of all registered students were sent consent forms, and a copy of the survey was available for parents to review at each wave. The study was described to parents and students as one on social attitudes and experiences, and it comprised a range of measures in addition to those included as the focus of this article (e.g., bullying, perceptions of peer relationships). Parents were asked to sign and return the form if they did not want their child to participate. Child assent was obtained at each wave. Only one child was consistently not allowed to participate. Consent procedures were approved by the Institutional Review Board and school. At each wave, students completed the survey during 40-min free periods. They were spaced apart to ensure the confidentiality of their responses, and they were informed that their individual responses would not be shared with teachers, parents, or other students. Proctors were present in every class to describe the study, to distribute and collect the surveys, to answer questions, and to ensure the confidentiality of responses at all waves. The time between Waves 1 and 2 was 8 months, the time between Waves 2 and 3 was 11 months, and the time between Waves 3 and 4 was 7 months.

#### Measures

**Demographic information.** Students completed a number of demographic items at each time point, including self-reported age, gender, and racial or ethnic group membership.

**Sexual prejudice.** The 20-item Attitudes Towards Lesbians and Gay Men scale (ATLG; Herek, 1988) assesses sexual prejudice with two subscales of 10-items each, one for attitudes toward gay men (ATG; e.g., “I think male homosexuals are disgusting”) and one for attitudes toward lesbians (ATL; e.g., “Female homosexuality is a sin”; 1 = strongly disagree, 5 = strongly agree). Higher scores reflect more negative attitudes. This scale has been used widely in research on sexual prejudice and has strong support for reliability and validity. Items from this scale also have been used in studies among adolescents (Mata et al., 2010), and students
in our study did not express any comprehension difficulty. Reliability estimates at each wave were $\alpha = .95$, .95, .95, and .96 (ATG; Waves 1–4) and $\alpha = .90$, .92, .91, and .92 (ATL; Waves 1–4).

SDO. The 16-item SDO (Pratto et al., 1994) assesses support for hierarchies between groups in society and for some groups to be in dominant positions over other groups (e.g., “If certain groups stayed in their place, we would have fewer problems”; 1 = very negative, 7 = very positive). Higher scores reflect greater endorsement of SDO beliefs. Similar to the ATLG scale, this scale has been used widely and has strong support for reliability and validity. Items from this scale also have been used among adolescents (Duriez et al., 2007; Mata et al., 2010). The reliability estimates of the scale at each wave were $R^2 = .9251$, .92, .91, and .92 (Waves 1–4).

Results

Descriptive Statistics and Preliminary Analyses

Means and standard deviations for ATG, ATL, and SDO that were computed by age are reported in Table 1. Also, we tested for patterns of missing data in our sample. The proportion of missing data for ATG and ATL was comparable for boys and girls ($\chi^2 = 0.01$, $p > .90$), as well as for White and racial or ethnic minority students ($\chi^2 = 0.30$, $p > .50$). Missing ATG and ATL data were also unrelated to SDO (ATG $r = 0.29$, $p > .50$; ATL $r = 0.43$, $p > .50$).

Modeling Procedures

We used multilevel models to investigate change with time-invariant and time-variant predictors. Models were fit using maximum-likelihood estimation. We chose age as our measure of time because it would account for the unequal spacing between time points and the fact that, conceptually, age better reflects the development of these attitudes than grade level. Age was scaled such that 0 corresponds to a 12-year-old student (i.e., we subtracted 12 from each student’s age), the youngest in the study. Thus, the intercept in our models represented attitudes at age 12.

As a preliminary step, we tested the appropriateness to treat the data from each age cohort as part of a single developmental trajectory. As is recommended when conducting accelerated longitudinal studies (Miyazaki & Raudenbush, 2000), our design produced overlapping data points across adjacent age cohorts. Thus, we could test whether cohort variability in scores around this overlap could be considered random variance or instead reflected systematic cohort differences. Random variability would suggest that the data from multiple cohorts contribute to a common overarching trajectory, whereas systematic cohort differences would suggest that trajectories are cohort-specific. We followed the procedures of Miyazaki and Raudenbush (2000) to test these possibilities. We first tested for a cohort effect in a model where age is a Level 1 predictor (i.e., the within-individual level) with a random intercept and random effect for age at Level 2. We tested two models, one that included cohort coefficients at Level 2 and one that did not. The model with cohort coefficients assumed an Age $\times$ Cohort interaction and the model without coefficients assumed that cohort trajectories varied at random around a common trajectory. Because the reduced model is a nested model of the full cohort model, we conducted a likelihood ratio (LR) test to determine if the reduced model produced a significantly poorer fit to the data than the cohort model. The cohort effects were nonsignificant for ATG (LR test statistic = 7.28, $df = 10$, $p = .70$) and ATL (LR = 11.75, $df = 10$, $p = .30$). Deviation between cohorts from a single trajectory could be considered random variance, and the data across cohorts could be treated as a reflection of a common trajectory. We did not include cohort effects in our model development; however, we retested for them in our final models.

During our model development and for our final model, we tested the fixed effects using empirical (robust or “sandwich”) standard errors. If the covariance structure is miss-specified, then model-based standard error estimates may be incorrect and our tests invalid (Verbeke & Molenberghs, 2000). Because tests of variances of the random effects are nonstandard tests, we computed likelihood ratio statistics and compared them to the appropriate mixture of chi-square distributions (Self & Liang, 1987; Stram & Lee, 1994, 1995; Verbeke & Molenberghs, 2000).

Predicting Changes in Attitudes Toward Gay Men

We fit a series of models to the data to determine whether and how prejudiced attitudes toward gay men (ATG) changed from early to late adolescence. Each model can be found in the Appendix. We report estimates of all fixed effects in Table 2 and the estimated variances and covariances of the random effects for the final model in Table 3. First, we fit the unconditional means model to the data and found significant variance between individuals’ ATG scores (LR = 703, $p < .01$). The intraclass correlation coefficient (ICC) equals .79, indicating a relatively large proportion of total variance in scores between individuals and a strong correlation between scores within individuals.

Model 1 tested our hypothesis that adolescents would report changes in ATG over time and that there would be significant variance across individuals in how their attitudes changed. As hypothesized, age was a significant predictor of change in ATG ($\beta_{10} = -0.08$, 95% confidence interval [CI] = [−0.11, −0.04]).
The negative coefficient indicated that, overall, ATG decreased as individuals aged. Further, as hypothesized, we found significant differences between individuals in ATG at age 12 ($LR = 321.15$, $p < .01$) and variability in how ATG changed over time ($LR = 11.90$, $p < .01$).

In Model 2, we added gender, race, and trait-SDO to predict (a) overall differences between individuals, and (b) variability in how their ATG changed over time. Trait-SDO was represented by a composite of individuals’ average SDO scores across all assessments. All variables predicted significant differences in the ATG intercept; however, only gender accounted for variability in how ATG changed over time. Girls reported lower initial ATG than did boys ($\beta_{01} = -0.25$, 95% CI = [–0.49, –0.02]), White participants reported lower initial ATG than did racial/ethnic minorities ($\beta_{02} = -0.31$, 95% CI = [–0.56, –0.07]), and those who endorsed overall higher SDO than others reported higher initial ATG ($\beta_{03} = 0.38$, 95% CI = [0.23, 0.53]). Finally, ATG decreased at a faster rate among girls than boys over time ($\beta_{11} = -0.08$, 95% CI = [–0.15, –0.01]). The intercept and slope variances remained significant ($LR = 201.18$, $p < .01$ and $LR = 19.17$, $p < .01$, respectively), and we retained these random effects in the subsequent model.

In Model 3, we added time-variant SDO, centered at individuals’ average SDO, to predict variability in ATG across assessments. Time-variant SDO predicted an increase in adolescents’ own ATG across assessments ($\beta_{20} = 0.19$, 95% CI = [0.12, 0.25]). When individuals reported higher SDO at one assessment than another, they also reported higher ATG at that assessment. There was also significant variability in this association across individuals ($LR = 97.08$, $p < .01$).

In Model 4, we added gender, race, and trait-SDO to predict the association between time-variant SDO and ATG at each assessment. Only trait-SDO accounted for variability in the association between individuals’ time-variant SDO and their ATG. Time-variant SDO was more strongly associated with individuals’ own ATG across assessments among those whose overall trait-SDO was higher ($\beta_{23} = 0.10$, 95% CI = [0.02, 0.18]). The amount of random variance in the time-variant SDO slope remained significant ($LR = 47.03$, $p < .01$).

Finally, we tested a parsimonious model in which we included the significant effects from our earlier sequence of analyses. The final model is...
This was the best model in terms of goodness-of-fit to the data and parsimony (i.e., it had the smallest Akaike information criterion and Bayesian information criterion statistics among the models). To further assess the goodness of model fit to the data, we used the HLMRSQ SAS macro (Recchia, 2010) to compute analogue \( R^2 \) statistics (Snijders & Bosker, 1999). The \( R^2 \) for Level 1 equals .34 and is the proportional reduction in prediction error variance of a student’s ATG score at a time point. The \( R^2 \) for Level 2 also equals .34 and is the proportional reduction in prediction error of the average ATG score for a student. We also examined residuals and influence diagnostics for this final model, and they did not indicate any problems. We also rechecked whether there was a cohort effect and found that it was not significant (LR = 44.90, df = 35, \( p = .12 \)).

Figure 1 illustrates the effects for gender, race and age in the final model. In Figure 1, the predicted ATG scores are plotted against age (scaled back to actual age) for each combination of gender and racial group identity. Girls have lower ATG scores than boys at any given age or race by –0.29 points (95% CI [–0.51, –0.06]). The Gender × Age interaction is evident where girls show a steeper decrease in ATG as they grow older than do boys. The slope for boys is not significant (–0.04; 95% CI = [–0.10, 0.01]); however, that for girls is significant (–0.40; 95% CI = [–0.61, –0.19]). In other words, girls, on average, show a significant decline; but boys’ ATG does not change as they grow older. The effect for race is also evident where we see that the predictions of ATG for Whites are –0.24 points lower (95% CI = [–0.39, –0.08]) than those for racial/ethnic minorities.

Figure 2a illustrates the interaction between time-variant SDO and trait-SDO. Predicted ATG is plotted versus student mean-centered time-variant SDO for different percentiles of trait-SDO (i.e., 25th, 50th and 75th). The effect of time-variant SDO is greater for students that have larger trait-SDO values (\( \hat{\beta}_{21} = 0.10, \) 95% CI [0.02, 0.17]). This interaction is indicated by the divergence of the lines in Figure 2a. This same relationship between ATG, time-variant SDO, and trait-SDO applies for girls, racial minorities, and other ages. The only difference is a change in the level of the predicted ATG scores.

**Predicting Changes in Attitudes Toward Lesbians**

We conducted the same sequence of tests of effects on ATL. The estimated fixed effects are reported in Table 4, and the estimated variances and covariances of the random effects of the final model are in Table 5. The unconditional means model indicated that there was significant variance between individuals’ ATL scores (LR = 539.86, \( p < .01 \)). The ICC equals .73 indicating that a large proportion of the total variance in ATL scores was between
individuals and a strong correlation existed between scores within students.

As hypothesized, the results of Model 1 indicated that there was an overall decrease in ATL over time ($\beta_{12} = -0.08, 95\% \text{ CI} = [-0.11, -0.05]$). Also, there were significant differences between individuals' ATL scores at age 12 ($LR = 276.51, p < .01$), but the variability in how their ATL scores changed over time was not significant ($LR = 2.13, p = .25$). Because the fixed and random effects are interdependent, for now, we left the random effect for age in the model.

In Model 2, we added gender, race, and trait-SDO to predict overall differences between individuals and variability in how their ATL changed over time. Only trait-SDO was significant as a predictor of the intercept. Adolescents who reported higher trait-SDO than others reported higher initial ATL ($\beta_{03} = 0.26, 95\% \text{ CI} = [0.13, 0.40]$). No factors predicted differences in age-related changes in ATL. The variance in the intercept remained significant ($LR = 211.32, p < .01$), and that for the slope was still not significant ($LR = 4.30, p = .08$).

In Model 3, we kept all the predictors from Model 2 and added time-variant SDO, centered at individuals' average SDO, to predict variability in ATL across assessments. Time-variant SDO scores were significant and positive predictors of variability in individuals' own ATL across assessments ($\beta_{20} = 0.12, 95\% \text{ CI} = [0.07, 0.18]$). When adolescents reported higher SDO at one assessment than another, they also reported higher ATL at that assessment. White participants reported lower initial ATL than did racial/ethnic minorities in this model ($\beta_{02} = -0.21, 95\% \text{ CI} = [-0.42, -0.00]$). The variability over students in terms of their intercepts and the effect of time-variant SDO were both significant ($LR = 291.72, p < .01$, and $LR = 103.62, p < .01$), but the variability of the effect of time was still not significant ($LR = 4.30, p = .08$).

Model 4 includes all the effects of the previous models, as well as gender, race, and trait-SDO, to predict the association between time-variant SDO and ATL. Only trait-SDO accounted for variability in the association between individuals' time-variant SDO and their ATL across assessments. Time-variant SDO was more strongly associated with individuals' own ATL scores across assessments among those whose overall trait-SDO was higher ($\beta_{23} = 0.08, 95\% \text{ CI} = [0.01, 0.16]$). The amount of random variance in the time-variant SDO slope remained significant ($LR = 97.40, p < .01$), and the random variance for age was still not significant ($LR = 2.10, p = .45$).

As a final parsimonious model, we included those effects from earlier models that were significant, as well as gender because of its marginal significance in prior models. The final model is

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POT_{ATL} = \pi_{0i} + \pi_{1i}(\text{Age})_i + \pi_{2i}(\text{Variant-SDO})_i + e_i
\]

\[
\pi_{0i} = \beta_{00} + \beta_{01}(\text{Race})_i + \beta_{02}(\text{Gender})_i + \beta_{03}(\text{Trait-SDO})_i + \epsilon_i
\]

\[
\pi_{1i} = \beta_{10}
\]

\[
\pi_{2i} = \beta_{20} + \beta_{21}(\text{Trait-SDO})_i + \epsilon_i
\]

This was the best model for ATL in terms of goodness-of-fit to the data and parsimony (see Table 4). The $R^2$ for Level 1 equals .24, and the $R^2$ for Level 2 also equals .24. We examined residuals and influence diagnostics for this final model, and they did not indicate any problems. For this final model, the cohort effect was not significant ($LR = 38.11, df = 30, p = .15$).

Figure 2b illustrates the interaction between time-variant SDO and trait-SDO. Predicted ATL is plotted versus student mean centered time-variant SDO for different percentiles of trait-SDO (i.e., 25th, 50th and 75th). The effect of time-variant SDO is greater for students that have larger trait-SDO values ($\beta_{21} = 0.09, 95\% \text{ CI} = [0.02, 0.16]$). This interaction is indicated by the divergence of the lines in Figure 2b. This same relationship between ATL, time-variant SDO, and trait-SDO applies for girls, racial/ethnic minorities and other ages. The only difference is a change in the level of the predicted ATL scores.

**Discussion**

Many individuals continue to hold prejudiced attitudes toward sexual minorities. Nevertheless, a pronounced limitation in research has been the inattention to how these attitudes actually develop. Our findings are among the first to identify developmental changes in sexual prejudice during adolescence. At a basic
Table 4

Estimated Fixed Effects, Standard Errors and 95% Confidence Intervals (CIs) for Models Predicting Change in Attitudes Toward Lesbians

<table>
<thead>
<tr>
<th>Effect</th>
<th>Model 1 β (SE)</th>
<th>Model 2 β (SE)</th>
<th>Model 3 β (SE)</th>
<th>Model 4 β (SE)</th>
<th>Final β (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.05 (0.06)</td>
<td>1.61 (0.20)</td>
<td>1.54 (0.19)</td>
<td>1.53 (0.19)</td>
<td>1.63 (0.13)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.08 (0.02)</td>
<td>-0.06 (0.06)</td>
<td>-0.03 (0.06)</td>
<td>-0.04 (0.05)</td>
<td>-0.07 (0.01)</td>
</tr>
<tr>
<td>V. SDO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.19 (0.10)</td>
<td>-0.21 (0.12)</td>
<td>-0.19 (0.10)</td>
<td>-0.19 (0.10)</td>
<td>-0.13 (0.10)</td>
</tr>
<tr>
<td>Race</td>
<td>0.02 (0.03)</td>
<td>0.06 (0.03)</td>
<td>0.01 (0.05)</td>
<td>0.01 (0.05)</td>
<td>0.27 (0.04)</td>
</tr>
<tr>
<td>T. SDO</td>
<td>0.26 (0.07)</td>
<td>0.30 (0.06)</td>
<td>0.31 (0.06)</td>
<td>0.32 (0.06)</td>
<td>0.37 (0.04)</td>
</tr>
<tr>
<td>Age × Gender</td>
<td>-0.03 (0.03)</td>
<td>-0.03 (0.03)</td>
<td>-0.03 (0.03)</td>
<td>-0.03 (0.03)</td>
<td>0.00 (0.01)</td>
</tr>
<tr>
<td>Age × T. SDO</td>
<td>0.00 (0.02)</td>
<td>0.00 (0.02)</td>
<td>-0.01 (0.02)</td>
<td>-0.01 (0.02)</td>
<td>0.08 (0.04)</td>
</tr>
<tr>
<td>V. SDO × Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. SDO × Race</td>
<td>0.04 (0.03)</td>
<td>0.02 (0.03)</td>
<td>0.01 (0.05)</td>
<td>0.01 (0.05)</td>
<td>0.09 (0.04)</td>
</tr>
<tr>
<td>V. SDO × T. SDO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5

Estimated Variances and Covariances of the Random Effects for the Final ATL Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intercept</th>
<th>Residual</th>
<th>V. SDO slope</th>
<th>Residual</th>
<th>Intercept</th>
<th>Residual</th>
<th>V. SDO slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIC</td>
<td>1,873.1</td>
<td>1,770.7</td>
<td>1,600.1</td>
<td>1,597.5</td>
<td>1,585.2</td>
<td>1,563.2</td>
<td></td>
</tr>
<tr>
<td>BIC</td>
<td>1,896.8</td>
<td>1,817.9</td>
<td>1,663.1</td>
<td>1,672.3</td>
<td>1,628.5</td>
<td>1,563.2</td>
<td></td>
</tr>
<tr>
<td>−2Ln (likelihood)</td>
<td>1,861.1</td>
<td>1,746.7</td>
<td>1,568.1</td>
<td>1,559.5</td>
<td>1,559.5</td>
<td>1,563.2</td>
<td></td>
</tr>
</tbody>
</table>

Note. Age = age centered around 12 years; V. SDO = adolescents’ time-varying social dominance orientation (SDO; i.e., their SDO at each assessment), centered at their mean SDO; Gender = female; Race = White; T. SDO = adolescents’ trait-SDO (i.e., their average SDO composite across assessments); AIC = Akaike information criterion; BIC = Bayesian information criterion. Values in bold represent estimated fixed effects, values in italics represent standard errors of the parameter estimates, and values under the 95% CI columns represent 95% confidence intervals of the parameter estimates.
category. Further, different forms of masculinity might coincide with different patterns of change in prejudice toward gay men. For instance, greater adherence to inclusive forms of masculinity (Anderson, 2009) might predict decreases in sexual prejudice among boys.

In contrast to attitudes toward gay men, boys and girls reported comparable decreases in prejudice toward lesbians. Also congruent with masculine socialization models that tend to connect masculine norms with prejudice toward gay men specifically, this finding suggests that gender norm socialization may more selectively influence boys’ attitudes toward gay men but not toward lesbians. Boys appear to form distinct attitudes toward gay men and lesbians during adolescence. This is of particular importance and suggests the need to examine sexual minority attitudes with greater specificity. Further, social identity development theory, with its emphasis on the role of these other belief systems and the social context, provides an explanation congruent with these divergent patterns, whereas cognitive development theories would have anticipated similar developmental patterns for prejudice toward gay men and lesbians and for both to decrease in line with age-related cognitive advances.

These distinct developmental processes also are relevant to and offer explanations for certain adult gender differences. Several studies document that adult men report more negative attitudes toward gay men than toward lesbians, whereas adult women do not (Herek, 1988; LaMar & Kite, 1998). As indicated by our longitudinal findings, this may partially be explained by the fact that boys’ prejudice toward gay men did not decrease over time, whereas their prejudice toward lesbians did, subsequently leading to a greater divergence in their attitudes toward these two groups by adulthood. In contrast, girls’ prejudice toward both groups decreased over time. Further, the comparable rate of decrease in prejudice toward lesbians among boys and girls during adolescence also offers an explanation for why adult gender differences are weaker on these attitudes than those toward gay men (Whitley & Ágísdóttir, 2000). In sum, our findings offer developmental evidence to explain adult gender differences in sexual prejudice.

Although we documented basic racial group differences on sexual prejudice, such that White participants reported lower levels than racial minorities, race did not predict different patterns of age-related change in these attitudes. These findings suggest that although there may be differences in overall levels of sexual prejudice, White and racial minority adolescents do not differ in the rate at which their levels of prejudice change. This may be partially because both White and racial minority heterosexual adolescents are in a dominant and privileged position with respect to their sexual orientation. Because of the small representation of certain racial minority groups in our sample, we were unable to test for differences according to specific group membership. Limited research has examined racial group differences on sexual prejudice (Herek, 2000), and thus, we consider these results as more exploratory compared with those for gender. Although our findings suggest that these attitudes change in similar ways for White and racial minority adolescents, continued research is needed to examine these patterns. Attention to cultural factors, in addition to more specific group differences, could provide a more informative explanation.

The Relevance of Belief Systems in Predicting Developmental Patterns of Prejudice

Social dominance theory has been applied extensively to explain individual differences in prejudice (Sibley & Duckitt, 2008). In line with findings among adults (Sibley & Duckitt, 2008; Sidanius & Pratto, 1999) and adolescents (Duriez et al., 2007; Mata et al., 2010; Poteat et al., 2007), SDO predicted differences in sexual prejudice at age 12. This highlights the relevance of SDO as a strong predictor of prejudice, even during early developmental periods.

Our findings for SDO offer empirical evidence of the theoretical supposition that belief systems should predict patterns of change in prejudice (Bigler & Liben, 2006; Nesdale, 2001). They also extend findings from two time point studies that provide basic evidence of the causal direction of SDO as a broader predictor of more specific prejudiced attitudes (Duriez et al., 2007; Sibley & Liu, 2010). As hypothesized, SDO was more effective as a time-variant than stable predictor of change in sexual prejudice. For the most part, adult studies have treated SDO as a stable factor. Adolescents, however, may have continued to consider and reconsider their SDO beliefs during this period, as they do with other worldviews and beliefs (Horn, 2003; Nesdale, 2001). Relative to adults, younger adolescents might hold these beliefs with less sophistication, clarity, or commitment. These ideals may be less solidified or fully formed than in adulthood, especially because they are abstract concepts. Adolescents may come to hold these beliefs with greater nuance and subtly as they progress into young adulthood. This would explain the variability we documented in adolescents’ SDO over time.

Given the place of SDO as one of the strongest predictors of multiple forms of prejudice, it is important to understand how it contributes to the development of prejudice during earlier developmental periods. Fluctuations in SDO were associated with those in adolescents’ own levels of sexual prejudice, over and above what was tied to their progressive age-related changes or gender. In effect, one reason why an individual reported higher prejudice at one time than another was because this person reported higher SDO at that time. It is critical to address adolescents’ SDO beliefs, because reductions in SDO may lead to decreases in sexual prejudice as well as other forms of prejudice. Our modeling of SDO and prejudice in this way captures more accurately the dynamic process by which ideological beliefs and prejudiced attitudes develop during this period. Adolescents likely construct their ideological beliefs and specific attitudes, such as prejudice, in tandem throughout this period. This issue has not been adequately discussed by theories such as social identity development or developmental intergroup theories. Although they do note the role of other beliefs in the development of prejudice, to some extent, there is an assumption that these other beliefs are relatively stable. Thus, there is a greater need for both theory and empirical research to consider more complex processes that lead to changes in prejudice. For instance, it is possible that other developmental factors (e.g., advances in cognitive reasoning) or critical social experiences (e.g., intergroup interaction or friends disclosing their sexual minority identity) might explain variability in adolescents’ SDO (and other belief systems for that matter), which subsequently may lead to changes in their prejudiced attitudes. These more expansive and complex processes should be examined in future studies.
As an important qualification, the relation between adolescents’ time-variant SDO and their own sexual prejudice was stronger among those whose overall SDO was higher than others. Characteristically high-SDO adolescents may have felt more confident relying on these beliefs to justify their sexual prejudice, thereby strengthening the extent to which periodic increases in their SDO corresponded with increases in prejudice. Although characteristically low-SDO adolescents also varied in their level of SDO at times, they may have held these beliefs more tentatively. This may explain why periodic increases in their SDO did not correspond as strongly with increases in prejudice. These findings for SDO suggest that, at least during adolescence, it is beneficial to consider SDO in this more dynamic, rather than static, manner.

Strengths, Limitations, and Future Research

Our findings identify adolescence as a critical period during which prejudiced attitudes undergo significant changes. By modeling actual change within the same individuals, our results extend limited past findings that relied on cross-sectional comparisons. Most important, our results move beyond the presentation of single uniform trends and, instead, identify factors that predict multiple developmental patterns. These findings contribute to a more comprehensive and dynamic understanding of prejudice. Our findings indicate the need for research to approach the study of prejudice from a broader developmental perspective and to model more appropriately how certain factors contribute to unique patterns of change.

There are several limitations to our study that must be considered and addressed in future research. We were not permitted to assess participants’ sexual orientation. Sexual minority youth data in our models may have affected the relative strength of our results to some extent. We suspect, however, that the overall pattern of findings would be comparable without the inclusion of their data. On the basis of other studies, we assume that heterosexual students comprised between 90% and 95% of our sample, and thus, the results are largely reflective of attitude changes among heterosexual adolescents. Nevertheless, studies should assess for sexual orientation whenever permitted and test the validity of our findings. In addition, the development of individuals’ own sexual orientation identity might be connected to changes in these attitudes. Also, we note that, in our raw data, a small number of adolescents did report increases in prejudice. These individuals may have been too few to allow for sufficient statistical power to identify them on account of the factors we examined, or there may be other factors that better distinguish these individuals than those we included. Attention to adolescents whose prejudice increases would be an important area for future research. Similar to this, we assessed explicit prejudiced attitudes that were, on average, low among our sample. Future research should explore more subtle or implicit expressions of sexual prejudice to compare with our findings. Implicit and explicit attitudes are not always strongly associated, and implicit attitudes and their development also may be predicted by a unique set of factors (Rudman, Phelan, & Heppen, 2007). Finally, although there are a number of strengths to using accelerated longitudinal designs (Willett et al., 1998), a greater number of assessments over a longer period of time would provide the opportunity to test for more complex patterns of change.

We note several areas for future research based on our findings. We examined attitudes toward two specific sexual minority groups (i.e., gay men and lesbians), and future research might test patterns of change in prejudice toward other minority groups. Prejudiced attitudes toward many groups tend to be associated to varying extents, and certain factors reflect domain-general predictors of multiple prejudices (e.g., empathy, perspective-taking, SDO; Bigler & Liben, 2006; Pratto et al., 1994). This suggests that developmental patterns for multiple forms of prejudice may be somewhat similar or that certain factors may predict similar trajectories across forms of prejudice. At the same time, other factors likely represent domain-specific predictors. For instance, masculine ideology beliefs may predict certain trajectories for sexual prejudice and sexism but not for other forms of prejudice. Continued research also is needed to identify social experiences (e.g., intergroup contact) that account for how sexual prejudice changes over time. The influence of intergroup contact has been documented extensively (Pettigrew & Tropp, 2006), yet with insufficient attention to early developmental periods or consideration of its prolonged effects. There is a need for research to examine how various social contexts (e.g., peers or family contexts) and interactions contribute to developmental changes in prejudice beyond adolescents’ own individual characteristics or beliefs. To conclude, our results underscore the need to address prejudice during earlier developmental periods prior to its reinforcement during adulthood. The continued application of developmental approaches would continue to inform our understanding of how prejudiced attitudes form and change across development.

References

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Van Laar, C., Sidanius, J., & Levin, S. (2008). Ethnic-related curricula and

Appendix

Sequence of Multilevel Developmental Models Tested

Below we present the sequence of models that we tested for ATG\(_i\) and ATL\(_i\). Model 1 is

Level 1: \(\pi_{it} = \pi_{0i} + \pi_{1i}(\text{Age})_t + e_{it}\)

Level 2: \(\pi_{0i} = \beta_{00} + r_{0i}\)

\(\pi_{1i} = \beta_{10} + r_{1i}\).

The intercept \(\pi_{0i}\) represents student \(i\)'s attitude when they are 12 years old, and \(\pi_{1i}\) represents student \(i\)'s change in ATG/L when they are older by 1 year. The residual \(e_{it}\) represents the variability in student \(i\)'s ATG/L not predicted by age.

Model 2 is

Level 1: \(\pi_{it} = \pi_{0i} + \pi_{1i}(\text{Age})_t + e_{it}\)

Level 2: \(\pi_{0i} = \beta_{00} + \beta_{01}(\text{Gender})_i + \beta_{02}(\text{Race})_i + \beta_{03}(\text{Trait-SDO})_i\)

\(\pi_{1i} = \beta_{10} + \beta_{11}(\text{Gender})_i + \beta_{12}(\text{Race})_i + \beta_{13}(\text{Trait-SDO})_i\)

\(+ r_{0i}\)

\(+ r_{1i}\).

The \(\beta_{01}, \beta_{02}, \) and \(\beta_{03}\) coefficients for gender, race, and trait-SDO represent the extent to which these factors predict overall differences between students in their ATG/L (the \(\pi_{0i}\) intercept). The \(\beta_{11}, \beta_{12},\) and \(\beta_{13}\) coefficients represent the extent to which these factors predict variability in how students’ ATG/L changed from early to late adolescence (the \(\pi_{1i}\) slope). The residuals \(r_{0i}\) and \(r_{1i}\) represent the variability in overall differences between students and variability in how their ATG/L changed over time not predicted by these factors, respectively.

Model 3 is

Level 1: \(\pi_{it} = \pi_{0i} + \pi_{1i}(\text{Age})_t + \pi_{2i}(\text{Variant SDO})_t + e_{it}\)

Level 2: \(\pi_{0i} = \beta_{00} + \beta_{01}(\text{Gender})_i + \beta_{02}(\text{Race})_i + \beta_{03}(\text{Trait-SDO})_i\)

\(\pi_{1i} = \beta_{10} + \beta_{11}(\text{Gender})_i + \beta_{12}(\text{Race})_i + \beta_{13}(\text{Trait-SDO})_i\)

\(\pi_{2i} = \beta_{20} + \beta_{21}(\text{Gender})_i + \beta_{22}(\text{Race})_i + \beta_{23}(\text{Trait-SDO})_i\)

\(+ r_{0i}\)

\(+ r_{1i}\)

\(+ r_{2i}\).

The \(\beta_{21}, \beta_{22},\) and \(\beta_{23}\) coefficients for gender, race, and trait-SDO represent the extent to which these factors predict variability in the association between state-SDO and students’ ATG/L at each assessment. The \(r_{2i}\) residual represents the variability in this relationship not predicted by these factors.