

Associations between Perceptions about Siblings' Development and Emerging Adults'

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Abstract

Siblings shape each other's attitudes and behaviors during childhood and adolescence; however, it is less clear if siblings continue to influence each other in emerging adulthood. This study investigated the extent to which emerging adults modeled their siblings in domains of adulthood attainment. Participants included 1,750 emerging adults from the United States between the ages of 18 and 29. Data were collected via Amazon Mechanical Turk. Findings revealed that perceptions of siblings' adulthood attainment were positively related to emerging adults' development in those same domains. Moreover, the extent to which emerging adults modeled their siblings enhanced these associations; neither birth order nor gender composition moderated these findings. In short, processes of sibling influence continue to be relevant in emerging adulthood.

Keywords: Siblings, Sibling influence, Social learning, Emerging adulthood

Open Research Statement: The data used in this paper may be made available through contacting the Alex Jensen at alexjensen@byu.edu.

Associations between Perceptions about Siblings' Development and Emerging Adults'
Adulthood Attainment

Emerging adulthood is a volatile time when individuals attempt to establish their identity in a variety of domains (Arnett, 2000). Indeed, the development of emotional autonomy and decisions made about career and education are some of the most important decisions that individuals make during this life stage. Scholars readily acknowledge the role that parents (e.g., Soenens & Vansteenkiste, 2005; Wood, Read, Mitchell, & Brand, 2004) and peers (e.g., Connolly, Furman, & Konarski, 2000; Lefkowitz, Boone, & Shearer, 2004) play in shaping emerging adults' development in these domains; however, the role of siblings has largely been unexplored. Perhaps the influence of siblings has been minimized given research documenting that contact between siblings decreases during emerging adulthood (Stocker, Lanthier, & Furman, 1997; White, 2001). Yet, more recent work suggests that family relationships, including sibling relationships, remain central in emerging adults' lives. For example, several studies show that sibling relationships become more harmonious (i.e., more intimate and less conflictual) during early adulthood (e.g., Jensen, Whiteman, & Fingerman, 2018; Scharf, Shulman, & Avigad-Spitz, 2005; Whiteman, McHale, & Crouter, 2011). Given these ties, the goal of the present study was to investigate whether and how perceptions about siblings' developmental attainment shape emerging adults' emotional autonomy, as well as educational and work orientations.

Markers of Adulthood

Emerging adulthood is a time when individuals continue to develop their identities and make decisions that will ultimately shape their life trajectories (Arnett, 2000). Although this journey to adulthood is highly individualized, numerous studies have examined the criteria

necessary to be considered an adult. Although terminology varies to describe what facets are essential to becoming an adult, many theorists and researchers explore similar themes. For example, Baggio, Iglesias, Studer, and Gmel (2014) highlighted that financial independence and independent living arrangements were important markers of adulthood. Likewise, Arnett (2001) discussed the importance of development in these domains, while adding taking responsibility for one's actions and establishing an equitable relationship with parents as critical achievements associated with "individualistic criteria" of adulthood (p. 135). Broadly, these domains reflect emerging adults' development of emotional autonomy (Nelson et al., 2007; Schwartz, Cote, & Arnett, 2005). As a marker of adulthood, emotional autonomy is important because it demonstrates the ability for individuals to take responsibility for themselves and make independent decisions that are critical to success as adults (Arnett, 1997, 2001; Nelson et al., 2007).

Beyond emotional autonomy, theory and research highlight other critical markers of adulthood attainment. Arnett (2001), for example, noted the importance of the capability to care for a family, either through providing financially, emotionally or otherwise. Similarly, Nelson and colleagues (2007) stressed that providing for a family refers not to the immediate, but rather the eventual ability to care for a family. Therefore, to successfully develop in this domain, emerging adults need to solidify their orientations towards education and work (Baggio et al., 2014; Schwartz et al., 2005), both of which play an important role in predicting future occupational attainment (Ng, Eby, Sorensen, & Feldmen, 2005).

Other markers of adulthood attainment include norm compliance, having stable romantic relationships and more (Arnett, 2001; Schwartz et al., 2005). Importantly, Shulman and Connolly (2013) found that plans for education and career were tied to finding long-term romantic

partners. As such, education and work orientations are an important precursor to this marker of adulthood. Arnett (2001) further suggested that although it is often unclear when an individual leaves emerging adulthood and enters adulthood, individuals across the lifespan selected emotional autonomy, education, and work as among the most important indicators of adulthood. Thus, these domains form a trifecta of attributes that are critical for emerging adults to cultivate in order to successfully transition into adulthood.

Sibling Influence in Emerging Adulthood

Naturally, parents play an important role in shaping their offspring's development across the lifespan, including during the transition from adolescence into emerging adulthood. In fact, a great deal of research has focused on emerging adults' process of separation from parents (e.g., Kins, Beyers, Soenens & Vansteenkiste, 2009; Kloep & Hendry, 2010; Seiffe-Krenke, 2006). Likewise, scholars have examined the role of peers during emerging adulthood exploring their roles as confidants regarding romantic relationships and sexual practices (e.g., Connolly et al., 2000; Lefkowitz et al., 2004), as important sources of social support and advice (e.g., Fraley & Davis, 1997), as well as sources of social comparison (Moreno et al., 2011). As important as both parents and friends are for emerging adults' development, there is another important close relationship that has been rarely examined, namely sibling relationships.

Throughout childhood and adolescence, siblings are ubiquitous. More than 80% of youth grow up in homes with siblings (McHale, Updegraff, & Whiteman, 2012) and recent time use data indicates that between the ages of six and 12 siblings spend up to half of their discretionary hours with each other (Dunifon, Fomby, & Musick, 2017). Clearly, close proximity and daily contact yields many opportunities and avenues for siblings to influence each other. As youth transition into adulthood, however, it is less clear if siblings still play an important role in each

other's lives. Indeed, during emerging adulthood siblings typically move away from each other, and therefore experience a decrease in contact (Scharf, et al., 2005; Steinbach & Hank, 2018). Despite more limited contact, sibling relationships often improve during emerging adulthood including increased intimacy (Jensen et al., 2018; Whiteman et al., 2011) and decreased conflict and rivalry (Scharf et al., 2005). These changes in sibling relationships may provide a context in which siblings serve as salient models of adulthood.

Modeling, which is rooted in Bandura's observational learning theory (Bandura, Ross, & Ross, 1963), is one important process through which siblings influence each other (Whiteman, Beccerra, & Killoren, 2009). In short, modeling hypotheses hold that individuals look towards others for examples of appropriate behavior that they may then choose to replicate for themselves (ultimately contingent on the rewards or punishments the referent received). Within the family, siblings (especially older, same-gender siblings) represent salient potential targets for modeling, given that they share qualities associated with effective models, including similarity and nurturance (Mischel, 1966).

Shared heritages and histories provide emerging adults with a foundation for understanding and comparison. As mentioned, recent research documents that sibling relationships become more intimate and less conflictual during emerging adulthood (Jensen et al., 2018; Scharf et al., 2005), providing a context of warmth and support. Older siblings also likely share a third quality of effective socialization agents—status (Mischel, 1966). Given the age-grading of sibling relationships as well as typical developmental progressions, older siblings will likely embark on many critical developmental transitions (e.g., education and career plans) before their younger siblings. As such, they have more expertise, and thus may be more salient models for emerging adulthood.

Beyond birth order, previous research has examined other structural moderators of sibling influence. Given that more similar individuals are more salient role models (Mischel, 1966), it has been proposed that sibling modeling, and in turn, sibling similarities, should be greatest among same-gender siblings. Research support for this hypothesis is mixed, however, with some studies finding greater similarities between siblings' risk behaviors (e.g., McHale, Bissell, & Kim, 2009; Whiteman & Christiansen, 2008) and others failing to find patterns of moderation (e.g., Samek, Goodman, Riley, McGue, & Iacono, 2017; Samek, & Reuter, 2011). Despite these mixed findings, given the theoretical foundation, in this study, we explored whether sibling similarities in emerging adulthood were greatest among same-gender dyads.

Research documents that social learning processes operate to make siblings similar during childhood and adolescence. For example, sibling modeling hypotheses have been proposed and found to explain sibling similarities in areas such as romantic and sexual risk behaviors (e.g., McHale et al., 2009; Wheeler et al., 2016; Whiteman, Zeiders, Killoren, Rodriguez, & Updegraff, 2014), alcohol and other substance use (e.g., Slomkowski, Rende, Novak, Lloyd-Richardson, & Niaura, 2005; Whiteman, Jensen, & Maggs, 2014), as well as aggression and delinquency (e.g., Patterson, 1984; Slomkowski, Rende, Conger, Simons & Conger, 2001). Although less work has focused on sibling influence during emerging adulthood, two recent papers have explored sibling influence on emerging adults' risky behaviors. Samek and colleagues found that older siblings' alcohol use consistently predicted younger siblings' alcohol use from adolescence and into adulthood. Whiteman, Jensen, and McHale (2017) found that younger siblings' deviant behaviors and excessive alcohol use were strong predictors of their older siblings' subsequent behaviors in those domains from adolescence and into emerging adulthood.

Beyond risky behaviors, research has examined how siblings influence each other in positive ways during childhood and adolescence. For example, Lee, Padilla, and McHale (2016) found that older siblings' work ethic predicted younger siblings' work ethic—even when parents' work ethic did not. Other work demonstrates that older siblings socialize each other to have greater empathy (Tucker, Updegraff, McHale, & Crouter, 1999). Of particular relevance to the present study, in a qualitative study, Schultheiss, Palma, Predragovich, and Glasscock (2002) discovered that siblings influence the extent to which individuals explore different careers, both through providing support and acting as a model.

Taken together, these studies highlight that siblings are important socializers of both risky and prosocial behaviors during adolescence and potentially into emerging adulthood. With the exception of Whiteman et al.'s (2017) findings, this work also indicates that top-down socialization (or older to younger sibling) may continue to influence emerging adults. The transition towards more egalitarian relationships during emerging adulthood (Buhrmester & Furman, 1990), however, makes it likely that bidirectional influences may be more likely during this period of life. The present study examines this possibility and expands the body of work on sibling influence by investigating whether emerging adult brothers' and sisters' shape each other's development in other key areas of adulthood beyond substance use.

Present Study

Emerging adulthood is a period when individuals must make important decisions about what kind of adult they will ultimately become. Although largely ignored by the scholarly literature during this period, siblings are important socialization agents and may shape each other's attitudes and plans for adulthood. Anchored in theory and extant research on sibling influence, we hypothesized that there would be positive relationships between participants'

perceptions of their siblings' markers of adulthood attainment (i.e., emotional autonomy and orientations towards education and work) and their own during development in these same domains during emerging adulthood. We further hypothesized that these relationships would be moderated by the degree to which emerging adults looked towards their siblings as models. Specifically, we expected that associations between siblings' markers of adulthood during emerging adulthood would be stronger when participants reported greater sibling modeling. Finally, given the age-grading of sibling relationships and the notion that modeling processes should be most salient for same-gender siblings, we hypothesized that modeling processes would be enhanced (and thus sibling similarities greater) when models were older as opposed to younger siblings and when siblings shared the same gender.

Method

Participants

Participants were 1,750 American emerging adults between 18 and 29 ($M = 25.44$, $SD = 2.56$) years of age with at least one living sibling. Although not nationally representative, the ratio of participants from each state compared to the entire sample strongly resembled the ratio of each state's population compared to the national population (see Table 1 for demographic information). Participants were primarily White (74.7%) and evenly split by gender; likewise, sibling dyads were fairly balanced in terms of gender composition (older brother-younger brother = 26.63%; older sister-younger sister = 24.51%; older brother-younger sister = 23.37%; older sister-younger brother = 25.49%). Forty percent of participants had only one sibling ($M = 2.20$, $SD = 1.49$), although some had as many as 15 siblings (*Range* 1 – 15); the average age difference between the emerging adults and their closest-aged sibling was 4.06 ($SD = 3.38$) years. Although individuals were given the opportunity to provide data on more than one sibling

(when applicable, with the maximum accepted at nine; M of siblings reported on = 1.84, SD = .99), data for this study focused on participants' relationships with their closest-aged sibling (50.3% reported on an older sibling; 49.7% reported on a younger sibling).

Procedure

Data were collected through web-based surveys via Amazon Mechanical Turk (MTurk), an increasingly popular and reliable form of data collection within social science fields (e.g., Burhmester, Kwang, & Gosling, 2011; Schleider & Weisz, 2015; Sheehan & Pittman, 2016). Participants were eligible for the study if they had successfully completed 500 previous MTurk tasks with a 95% approval rating. After consenting to participate, participants were asked questions about themselves and their siblings ($N = 2,443$). All questions were presented in a randomized order. Additionally, a planned missingness design was utilized to reduce the overall number of survey questions without compromising the quality of data (Graham, Hofer, & MacKinnon, 1996). Throughout the survey, participants were asked between two and nine attention checking questions (e.g., "I have been to every country on earth," "If you are paying attention then select somewhat disagree," and "If you are paying attention, then select always."). The survey included one additional attention-checking question per each sibling reported on. Participants who incorrectly answered any attention checking questions were omitted ($N = 693$) bringing the final sample size to $N = 1,750$. Surveys lasted about 20 minutes. All participants were paid an honorarium of \$2.25; those who reported on more than one sibling received an additional dollar for each sibling they reported on. The Institutional Review Board at Brigham Young University approved all procedures.

Measures

Emotional autonomy. Emerging adults' emotional autonomy was measured using three items from Steinberg and Silverberg's (1986) autonomy scale. Using a four-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) participants reported their agreement with the following items: "I go to my parent(s) for help before trying to solve a problem myself;" "When I've done something wrong, I depend on my parent(s) to straighten things out for me;" and, "If I was having a problem with one of my friends or at school/work, I would discuss it with one of my parents before deciding what to do." Items were reverse coded and total scores were averaged across the three items with higher values indicating more emotional autonomy ($M = 3.01$; $SD = .66$; Cronbach's $\alpha = .57$). The same items were used to measure participants' perceptions of their closest-aged sibling's emotional autonomy. For each item, the sibling's name was substituted in place of references to the self ($M = 2.67$; $SD = .73$; Cronbach's $\alpha = .60$).

Education orientation. Emerging adults' education orientations were measured using five items from a revised version of the Home/Employment Orientation Scale (Hock, Gnezda, & McBride, 1984). Participants rated their agreement with items on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items included: "My life wouldn't be complete without an education" and "Education or coursework brings me a lot of personal satisfaction." Scores were averaged across the five items with higher scores indicating more salient education orientations ($M = 3.56$; $SD = .89$; Cronbach's $\alpha = .64$). The same items were used to measure participants' perceptions of their closest-aged sibling's education orientation; however, the sibling's name was substituted in place of references to the self ($M = 3.26$; $SD = .89$; Cronbach's $\alpha = .71$).

Work orientation. Work orientations were measured using five items from a revised version of the Home/Employment Orientation Scale (Hock et al., 1984). Emerging adults rated

their agreement with items on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items included: "My life wouldn't be complete without a career" and "A career or job brings me a lot of personal satisfaction." Items were averaged together to create a scale with higher scores denoting more salient work orientations ($M = 3.46$; $SD = .88$; Cronbach's $\alpha = .60$). The same items were used to measure participants' perceptions of their closest-aged sibling's work orientation, with the sibling's name substituted in place of references to the self ($M = 3.35$; $SD = .93$; Cronbach's $\alpha = .67$).

Sibling modeling. Sibling modeling was measured with the Sibling Influence Scale (Whiteman, Bernard, & McHale, 2010; Whiteman, McHale, & Crouter, 2007). Specifically, emerging adults rated their agreement with eight items measured on Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items included: "My sister/brother sets an example for how to behave" and "From watching my sister/brother, I have learned how to do things." Scores were averaged across the eight items with higher scores representing greater modeling ($M = 2.78$, $SD = .76$, Cronbach's $\alpha = .72$)

Demographic and control variables. Participants reported on a number of demographic variables that were used as controls in this study, including: age, gender (0 = female, 1 = male), ethnicity (0 = white, 1 = other), income, years of education, parents' years of education, work status (0 = not employed, 1 = employed part or full time), number of siblings (sibship size), sibling gender composition (0 = same gender, 1 = mixed gender), sibling age-spacing (absolute difference in years), birth order (0 = older than sibling, 1 = younger than sibling), and coresidence with sibling (0 = does not live with sibling, 1 = lives with sibling). Analyses also controlled for sibling relationship qualities, including sibling intimacy, sibling conflict, and frequency of social comparisons to their sibling.

Sibling intimacy was measured using four items from Blyth and Foster-Clark's (1987) intimacy questionnaire. Emerging adults rated their experiences with their brother/sister on a scale ranging from 1 (*never*) to 5 (*very often*). Example items included: "How often do you and your sibling go to each other for advice and support?" and "How often do you understand what each other are really like?" Ratings were averaged together with higher scores indicating greater relationship intimacy ($M = 3.55$; $SD = .90$; Cronbach's $\alpha = .79$).

Sibling conflict was measured using three items from Furman and Buhrmester's (2009) scale on conflict in sibling relationships. On a scale ranging from 1 (*never*) to 5 (*very often*), participants rated the frequency with which they engaged in conflictual interactions. Items included: "How often do you and your sibling get upset or mad at each other?" "Get annoyed with each other?" and "Argue with each other?" The three items were averaged together to create a scale with higher scores indicating more frequent conflict ($M = 2.52$; $SD = .80$; Cronbach's $\alpha = .55$).

The frequency of *social comparisons to siblings* was measured using five items from Gibbons and Buunk's (1999) social comparison orientation scale. On a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), participants rated the degree to which they compared themselves to their sibling. Example items included: "I always pay a lot of attention to how I do things compared with how my sibling does things" and "I often compare myself with my sibling with respect to what I have accomplished in life." Total scores were averaged across the items, with higher numbers indicating more frequent social comparison with their sibling ($M = 2.45$; $SD = .90$; Cronbach's $\alpha = .74$).

Results

Analytic Strategy

We first examined patterns of missing data. As mentioned, the study employed a planned missingness design in which measures with three or more items randomly had one-third of the items (rounded down) omitted from the survey to reduce participant burden and create random patterns of missing data. Little's MCAR test supported the hypothesis that the data were missing at random ($\chi^2 = 1078.56, df = 1093, p = .62$). Using the approach outlined by Howard, Rhemtulla, and Little (2015), we used demographic variables without any missing data to create 24 orthogonal principle components to use as auxiliary variables in the multiple imputation. The principle components were used to impute 10 different data sets that were used for analysis. Imputation was conducted in SAS 9.4 using PROC MI, and analyses were combined across the imputed data sets using PROC MI ANALYZE. Because PROC MIANALYZE does not provide combined estimates of R^2 , those values were averaged across imputations.

After multiple imputation, we conducted analyses separately for each dependent variable (i.e., emotional autonomy, education orientation, and work orientation). All models were tested using hierarchical ordinary least squares (OLS) regression. The models were tested using identical techniques, except that each dependent variable was paired with the congruent measure for siblings. Prior to analysis, all continuous variables were centered at their mean. In the first model, we entered demographic and control variables, as well as main effects for perceptions of siblings' adulthood markers (i.e., sibling's autonomy, sibling's education orientation, and sibling's work orientation) that were congruent with the dependent variable, sibling modeling, birth order, and gender composition of the sibling dyad. In the second model, we entered all possible two-way interactions between our variables of interest: perceived sibling's value X sibling modeling, perceived sibling's value X birth order, perceived sibling's value X gender composition, sibling modeling X birth order, sibling modeling X gender composition, and birth

order X gender composition. The third model included three three-way interactions: perceived sibling's value X sibling modeling X birth order, perceived sibling's value X sibling modeling X gender composition, and sibling modeling X birth order X gender composition. The fourth and final model included a four-way interaction between perceived sibling's value X sibling modeling X birth order X gender composition.

Across all three dependent variables, results revealed that neither birth order nor gender composition (or their combination) moderated the associations between emerging adults' perceptions of a sibling's adulthood attainment, sibling modeling, and their own development. Therefore, birth order and gender composition were omitted as moderators in the models presented (but included as controls) and the final models include two-way interactions between perceptions of a sibling's development and sibling modeling. Significant interactions were probed following the procedures outlined by Aiken and West (1991). Bivariate correlations and descriptive statistics for the dependent variables, independent variables, and moderators are presented in Table 2.

Emotional Autonomy

As can be seen in Table 3, results from Model 1 revealed that age was positively related to emotional autonomy ($b = .02$, $SE = .01$, 95% CI [.00, .03], $\beta = .07$, $p = .01$), whereas social comparison was negatively related to emotional autonomy ($b = -.10$, $SE = .02$, 95% CI [-.14, -.07], $\beta = -.14$, $p = .000$). Model 1 further revealed a positive relationship between perceptions of siblings' emotional autonomy ($b = .14$, $SE = .04$, 95% CI [.07, .21], $\beta = .15$, $p = .000$) and a negative relationship with sibling modeling ($b = -.16$, $SE = .04$, 95% CI [-.24, -.09], $\beta = -.19$, $p = .000$) and emerging adults' emotional autonomy, respectively. There was also a negative relationship between birth order and emerging adults' emotional autonomy ($b = -.10$, $SE = .03$,

95% CI [-.17, -.03], $\beta = -.08$, $p = .003$), such that younger siblings reported less emotional autonomy than older siblings. In Model 2, a two-way interaction between perceptions of siblings' emotional autonomy and modeling emerged ($b = .11$, $SE = .03$, 95% CI [.06, .17], $\beta = .10$, $p = .000$) emerged. As can be seen in Figure 1, testing of the simple slopes revealed that there was a significant positive association between perceptions of a sibling's emotional autonomy and their own in conditions of high ($b = .26$, $SE = .05$, 95% CI [.15, .36], $\beta = .26$, $p = .000$), but not low modeling ($b = .06$, $SE = .04$, 95% CI [-.01, .14], $\beta = .06$, $p = .098$).

Education Orientation

As can be seen in Table 4, Model 1 revealed that emerging adults' education orientations were negatively related to gender, such that males were less likely to have salient education orientations ($b = -.12$, $SE = .04$, 95% CI [-.20, 0.04], $\beta = -.07$, $p = .00$). Additionally, emerging adults' education orientations were negatively related to age ($b = -.05$, $SE = .01$, 95% CI [-.06, -.03], $\beta = -.13$, $p < .000$) and parents' education ($b = -.04$, $SE = .02$, 95% CI [-.08, .00], $\beta = -.05$, $p = .04$), but positively related to their own years of education ($b = .26$, $SE = .03$, 95% CI [.21, .31], $\beta = .25$, $p < .000$) and sibling conflict ($b = .09$, $SE = .03$, 95% CI [.03, .14], $\beta = .08$, $p = .00$). Model 1 further revealed a positive relationship between perceptions of a sibling's education orientation and emerging adults' own education orientations ($b = .33$, $SE = .03$, 95% CI [.28, .38], $\beta = .33$, $p = .000$). This main effect, however, was qualified in Model 2 by a perception of a sibling's education orientation X sibling modeling interaction ($b = .08$, $SE = .03$, 95% CI [.02, .14], $\beta = .06$, $p = .013$). Testing of the simple slopes (see Figure 2) revealed positive associations between perceptions of a sibling's education orientation and that of participants in conditions of high modeling ($b = .41$, $SE = .05$, 95% CI [.32, .50], $\beta = .41$, $p = .000$) and low

modeling ($b = .29$, $SE = .04$, 95% CI [.21, .37], $\beta = .29$, $p < .001$), however, the association was stronger for those who reported greater modeling.

Work Orientation

As can be seen in Table 5, Model 1 revealed that emerging adults' work orientations were significantly related to ethnicity, such that ethnic minority emerging adults reported greater orientations toward work ($b = .18$, $SE = .05$, 95% CI [.08, .28], $\beta = .09$, $p = .00$). Additionally, work orientations were positively linked to participants' years of education ($b = .14$, $SE = .03$, 95% CI [.08, .19], $\beta = .14$, $p = .000$) and work status (employed individuals reported greater orientations toward work; $b = .34$, $SE = .05$, 95% CI [.23, .45], $\beta = .17$, $p = .000$), but negatively related to age ($b = -.03$, $SE = .01$, 95% CI [-.05, -.01], $\beta = -.09$, $p = .00$). Model 1 further revealed positive relationships between perceptions of a sibling's work orientation and that of participants ($b = .12$, $SE = .02$, 95% CI [.07, .17], $\beta = .13$, $p = .000$). Following the same pattern as education orientation, this main effect was qualified in Model 2 by a perceptions of a sibling's work orientation X sibling modeling interaction ($b = .12$, $SE = .03$, 95% CI [.06, .18], $\beta = .10$, $p = .000$). Testing of the simple slopes (see Figure 3) revealed that perceptions of a sibling's work orientation was more strongly related to emerging adults' own work orientations in conditions of high modeling ($b = .25$, $SE = .05$, 95% CI [.16, .34], $\beta = .28$, $p = .000$) as compared to low modeling ($b = .07$, $SE = .04$, 95% CI [.00, .15], $\beta = .08$, $p = .047$).

Discussion

During the transition to adulthood, past work has suggested that it is critical for emerging adults to develop emotional autonomy as well as solidify their plans for education and work (Arnett, 2001; Nelson et al., 2007). Although generally ignored in the literature on emerging adulthood, siblings represent an important potential source of socialization, especially given that

research documents that individuals look to their siblings as role models in important developmental domains throughout adolescence (McHale et al., 2009; Slomkowski et al., 2001; Whiteman et al., 2014). As such, we hypothesized that perceptions about a close-in-age sibling's development in key domains of emerging adulthood—emotional autonomy, education orientation, and work orientation—would be positively related to emerging adults' development in these same domains. We further expected that these relationships would be enhanced when siblings modeled one another. Finally, given the age-grading of the sibling relationship as well as the focus on top-down transmission processes (i.e., older to younger) and the notion that modeling processes are stronger for those who are more similar (e.g., same gender) we posited that modeling effects would be especially pronounced for younger siblings and same-gender siblings.

Our hypotheses regarding sibling similarities were generally supported: participants' perceptions of their siblings' emotional autonomy, education orientation, and work orientation were positively associated with their own ratings in each domain of emerging adulthood, respectively. Additionally, our hypothesis that these relationships would be stronger for those who modeled their siblings was supported. That is, emerging adults who considered their sibling as a person worth modeling tended to be more like them—even in early adulthood. These findings are consistent with the sibling socialization literature which has consistently shown that sibling modeling is associated with greater similarity between siblings risky behaviors during adolescence (e.g., Slomkowski et al., 2001; Whiteman et al., 2014; Whiteman et al., 2007) and even early adulthood (Wheeler et al., 2016). Furthermore, these findings provide evidence that despite more limited contact in emerging adulthood, siblings likely still matter to each other and may play a role in the attainment of adulthood.

Our hypotheses regarding birth order, gender composition, and modeling were not supported in any domain. Perhaps birth order is less relevant for this developmental period given that emerging adulthood is increasingly recognized as an extended moratorium in which emerging adults explore educational and vocational options (Cote, 2006). Therefore, the timing and expectations for completion of specific developmental tasks have become increasingly fluid (Cote, 2006). This flexibility likely enables older and younger siblings to experience developmental milestones together, reducing the hierarchy associated with birth order. Indeed, previous work has shown that the degree to which siblings' transitions are "in sync" with another shapes the nature and power dynamics in the sibling relationship (Conger & Little, 2010; Shortt & Gottman, 1997). As such, perhaps bidirectional influence between siblings is more likely in during early adulthood as compared to adolescence (Whiteman et al., 2017).

With respect to gender composition, it is possible that opposite-gender siblings increasingly become sources of support and insight in emerging adulthood. In fact, previous research has demonstrated that there are no significant differences in sibling warmth as a function of gender or gender composition during emerging adulthood (Stocker et al., 1997). Therefore, the intimacy differences that are found at earlier ages (Kim, McHale, Oscood, & Crouter, 2006) may no longer apply, and opposite-gender siblings may serve as salient sources of influence, much like same-gender siblings.

Limitations and Conclusions

It is important to consider the findings of this study in the context of potential methodological shortcomings. For example, given the cross-sectional nature of the data we were unable to test the direction of effects. Although we examined whether reporting about an older or younger sibling moderated links between participants' perceptions about their sibling and their

own developmental attainment, the increasingly egalitarian sibling relationships in emerging adulthood suggests bidirectional influences may be more prevalent during this developmental period (Whiteman et al., 2017). Because our study also employed only a single reporter, the associations between participant's adult development and perceptions of a sibling's were potentially inflated because of common method variance (Campbell & Fiske, 1959). Although this is certainly a limitation, it is important to note that it is valuable to understand how individuals perceived their siblings' development. Indeed, previous research has shown that how an individual perceives reality is just as important as a more objective "reality" (Yadlosky, Aubin, Mosack, & Devine, 2017). Additionally, the magnitude of associations between young adults' perceptions of their siblings' development and their own (β 's ranged from .13 – .35) were generally consistent with work on sibling influence in emerging adulthood on deviant and sexual risk behaviors that utilized reports from multiple siblings (Samek et al., 2018; Whiteman et al., 2014). Future work, nonetheless, would benefit from including multiple reporters and sources of socialization, including siblings, parents, peers, and romantic partners, in order to isolate to degree to which siblings and others uniquely shape emerging adults' development and attainment.

Our findings are also limited by the data collection method. Although, MTurk has been used in the past to collect high quality data on psychological processes and family relationships (e.g., Buhrmester et al., 2011; Schleider & Weisz, 2015) and 99% of emerging adults are internet users (Pew Research Center, 2017), our sample was not representative of the entire population of emerging adults. Additionally, a number of the measures, especially the emotional autonomy scale, demonstrated less than desirable internal consistencies. Although it is possible that these low reliabilities were the result of using relatively few items to assess the various constructs, it is

also possible that they reflected normative developmental change. For example, it is possible that items about consulting with parents are less relevant for emerging adults than adolescents. As such, future studies likely would benefit from using other measures specifically designed to assess emerging adults' development (e.g., Markers of Adulthood Importance Scale; Arnett, 2001; Inventory of the Dimensions of Emerging Adulthood; Baggio et al., 2014).

Despite these limitations, this study contributes to the literature regarding how siblings influence each other across the transition into adulthood. Specifically, in three critical domains in emerging adulthood, perceptions of brothers' and sisters' developmental progression and attainment were positively associated with emerging adults' attainment in those same domains. Importantly, these associations were stronger when emerging adults used their siblings as models for behavior. For emerging adults, successfully transitioning into adulthood is a critical milestone. Indeed, decisions and development during this life stage have important implications for an individual's life trajectory (Arnett, 2000). Because siblings continue to shape each other's development during this transitional period, it is critical for future research to include and examine processes of sibling influence as well as understand how siblings can support each other during emerging adulthood.

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Table 1

Demographic characteristics of participants and their closest aged sibling.

	Participants (N = 1750) <i>M (SD) or Proportion</i>	Sibling (N = 1750) <i>M (SD) or Proportion</i>
Age	25.44 (2.56)	25.04 (5.85)
Income ^a	4.40 (2.35)	3.74 (2.45)
Education level ^b	5.46 (.84)	4.96 (1.22)
Sibship Size	2.20 (1.49)	-
Coresidence with sibling	.15	
Women	.50	.52
Birth Order		
Firstborn	.37	.26
Secondborn	.37	.49
Thirdborn	.16	.16
Other	.10	.09
Employment status		
Full time	.55	.54
Part time	.26	.21
Student	.31	.33
Unemployed	.14	.20
Other	.09	.05
Ethnicity		
African American	.08	-
European American	.75	-
Asian	.08	-
Hispanic	.06	-
Other	.03	-

^aIncome in 2017: 1 = less than \$10,000, 2 = \$10,000 - \$25,000, 3 = \$25,001-\$40,000, 4 = \$40,001-\$50,000, 5 = \$50,001-\$60,000, 6 = \$60,001-\$75,000, 7 = \$75,001-\$100,000, 8 = \$100,001-\$125,000, 9 = \$125,001-\$150,000, 10 = \$150,001-\$200,000, 11 = \$200,001-\$250,000, 12 = \$250,001 or more; ^bEducation Level: 1 = none, 2 = elementary school, 3 = some high school, 4 = high school, 5 = some college/vocation or trade school (beyond high school), 6 = college graduate, 7 = master's degree, 8 = other advanced degree

Table 2

Bivariate correlations and descriptive statistics of study variables (N = 1750)

Variables	1	2	3	4	5	6	7	8
1. Emotional Autonomy	-	-.10**	-.09**	.16**	-.09**	-.04	-.07**	-.25**
2. Education Orientation		-	.29**	-.06**	.36**	.09**	-.04	.10**
3. Work Orientation			-	-.04	.18**	.15**	-.03	.12**
4. Siblings' Emotional Autonomy				-	-.01	.11**	.19**	-.03
5. Siblings' Education Orientation					-	.41**	-.02	.27**
6. Siblings' Work Orientation						-	.07*	.23**
7. Birth Order							-	.14**
8. Modeling								-
<i>M</i>	3.01	3.56	3.46	2.67	3.26	3.35	.50	2.78
<i>SD</i>	.66	.89	.84	.74	.89	.93	.50	.76

** $p < .01$, *** $p < .001$

Table 3

Summary of Ordinary Least Squares Regression for Variables Predicting Emotional Autonomy ($N = 1750$)

Variables	Model 1						Model 2						
	<i>b</i>	<i>SE</i>	95% CI		<i>p</i>	β	<i>b</i>	<i>SE</i>	95% CI		<i>p</i>	β	
Intercept	3.03	.05	2.94	3.12	.000		3.03	.05	2.94	3.12	.000		
Gender	.05	.03	-.01	.12	.126	.04	.05	.03	-.01	.12	.123	.04	
Age	.02	.01	.00	.03	.007	.07	.02	.01	.00	.03	.010	.07	
Ethnicity	-.02	.04	-.09	.05	.570	-.01	-.02	.04	-.09	.05	.521	-.02	
Income	-.01	.01	-.02	.01	.459	-.02	-.01	.01	-.02	.01	.465	-.02	
Education	.01	.02	-.03	.06	.509	.02	.01	.02	-.03	.06	.557	.02	
Parents' Education	-.03	.02	-.06	.00	.100	-.04	-.03	.02	-.06	.00	.099	-.04	
Work Status	.01	.04	-.07	.09	.839	.01	.02	.04	-.06	.09	.707	.01	
Sibship Size	.01	.01	-.01	.04	.253	.03	.01	.01	-.01	.04	.219	.03	
Coresidence	-.10	.05	-.20	.00	.040	-.06	-.09	.05	-.19	.01	.069	-.05	
Age Difference	-.01	.00	-.02	.00	.130	-.04	-.01	.00	-.02	.00	.107	-.04	
Gender Composition	.02	.03	-.04	.08	.504	.02	.02	.03	-.04	.09	.488	.02	
Sibling Intimacy	-.00	.02	-.05	.04	.824	-.01	-.01	.02	-.05	.03	.657	-.01	
Sibling Conflict	-.03	.02	-.08	.02	.204	-.04	-.03	.02	-.08	.01	.144	-.04	
Sibling Comparison	-.10	.02	-.14	-.07	.000	-.14	-.10	.02	-.14	-.07	.000	-.14	
Modeling (Mod)	-.16	.03	-.21	-.10	.000	-.18	-.16	.04	-.23	-.09	.000	-.19	
Siblings' Emo Aut (Sib)	.13	.02	.08	.17	.000	.14	.14	.03	.08	.21	.000	.16	
Birth Order (BO)	-.10	.03	-.17	-.03	.003	-.08	-.10	.03	-.17	-.04	.003	-.08	
Mod X BO							.01	.05	-.09	.11	.837	.01	
BO X Sib							-.01	.05	-.10	.08	.853	-.01	
Model X Sib							.11	.03	.06	.17	.000	.10	
R^2			.13							.14			

Note. All continuous variables were centered at their means. Gender (0 = female, 1 = male), ethnicity (0 = white, 1 = other), work status (0 = not employed, 1 = employed part or full time), sibling gender composition (0 = same gender, 1 = mixed gender), birth order (0 = older than sibling, 1 = younger than sibling) and coresidence with sibling (0 = does not live with sibling, 1 = lives with sibling); Sibling's Emo Aut = sibling's emotional autonomy; CI = confidence interval, LB = lower bound, UB = upper bound

Table 4

Summary of Ordinary Least Squares Regression for Variables Predicting Education Orientation (N = 1750)

Variables	Model 1					Model 2						
	<i>b</i>	<i>SE</i>	95% CI		<i>p</i>	β	<i>b</i>	<i>SE</i>	95% CI		<i>p</i>	β
			LB	UB					LB	UB		
Intercept	3.67	.06	3.56	3.79	.000		3.66	.06	3.54	3.78	.000	
Gender	-.12	.04	-.20	-.04	.003	-.07	-.12	.04	-.20	-.04	.003	-.07
Age	-.05	.01	-.06	-.03	.000	-.13	-.05	.01	-.06	-.03	.000	-.13
Ethnicity	.00	.05	-.09	.10	.920	.00	.00	.05	-.09	.10	.952	.00
Income	.01	.01	-.01	.03	.332	.02	.01	.01	-.01	.03	.312	.02
Education	.26	.03	.21	.31	.000	.25	.26	.03	.21	.31	.000	.25
Parents' Education	-.04	.02	-.08	.00	.039	-.05	-.04	.02	-.07	.00	.044	-.05
Work Status	-.03	.05	-.13	.06	.501	-.02	-.04	.05	-.13	.06	.468	-.02
Sibship Size	.01	.01	-.02	.04	.497	.02	.01	.01	-.02	.04	.503	.02
Coresidence	-.05	.06	-.16	.07	.407	-.02	-.05	.06	-.17	.06	.374	-.02
Age Difference	-.00	.01	-.02	.01	.482	-.02	.00	.01	-.02	.01	.479	-.02
Gender Composition	.01	.04	-.07	.09	.844	.00	.01	.04	-.07	.09	.863	.00
Sibling Intimacy	.00	.03	-.07	.06	.881	.00	.00	.03	-.06	.06	.994	.00
Sibling Conflict	.09	.03	.03	.14	.002	.08	.09	.03	.03	.14	.002	.08
Sibling Comparison	.01	.03	-.05	.06	.844	.01	.01	.03	-.05	.06	.821	.01
Modeling (Mod)	.00	.04	-.08	.08	.937	.00	-.01	.05	-.10	.08	.821	-.01
Siblings' Edu Orient (Sib)	.33	.03	.28	.38	.000	.33	.35	.04	.28	.42	.000	.35
Birth Order (BO)	-.05	.04	-.13	.04	.262	-.03	-.05	.04	-.13	.03	.247	-.03
Mod X BO							.02	.06	-.09	.13	.745	.01
BO X Sib							-.04	.05	-.14	.07	.490	-.02
Model X Sib							.08	.03	.02	.14	.013	.06
<i>R</i> ²			.20						.21			

Note. All continuous variables were centered at their means. Gender (0 = female, 1 = male), ethnicity (0 = white, 1 = other), work status (0 = not employed, 1 = employed part or full time), sibling gender composition (0 = same gender, 1 = mixed gender), birth order (0 = older than sibling, 1 = younger than sibling) and coresidence with sibling (0 = does not live with sibling, 1 = lives with sibling); Siblings' Edu Orient = sibling's education orientation; CI = confidence interval, LB = lower bound, UB = upper bound

Table 5

Summary of Ordinary Least Squares Regression for Variables Predicting Work Orientation (N = 1750)

Variables	Model 1						Model 2					
	<i>b</i>	<i>SE</i>	95% CI		<i>p</i>	β	<i>b</i>	<i>SE</i>	95% CI		<i>p</i>	β
			LB	UB					LB	UB		
Intercept	3.15	.06	3.03	3.27	.000		3.13	.06	3.01	3.25	.000	
Gender	.00	.04	-.08	.08	.980	.00	.00	.04	-.08	.08	.955	.00
Age	-.03	.01	-.05	-.01	.000	-.09	-.03	.01	-.05	-.01	.000	-.09
Ethnicity	.18	.05	.08	.28	.001	.09	.18	.05	.08	.28	.001	.09
Income	.00	.01	-.02	.02	.771	.01	.00	.01	-.01	.02	.710	.01
Education	.14	.03	.08	.19	.000	.14	.13	.03	.08	.18	.000	.13
Parents' Education	.00	.02	-.04	.04	.945	.00	.00	.02	-.04	.04	.858	.01
Work Status	.34	.05	.23	.45	.000	.17	.34	.06	.23	.45	.000	.17
Sibship Size	.01	.01	-.02	.04	.456	.02	.01	.01	-.02	.04	.422	.02
Coresidence	.05	.06	-.06	.17	.372	.02	.06	.06	-.06	.18	.357	.02
Age Difference	.01	.01	-.01	.02	.289	.03	.01	.01	.00	.02	.209	.03
Gender Composition	.01	.04	-.07	.10	.743	.01	.02	.04	-.07	.10	.704	.01
Sibling Intimacy	-.01	.03	-.07	.05	.786	-.01	.00	.03	-.06	.06	.931	.00
Sibling Conflict	.05	.03	-.01	.11	.079	.05	.05	.03	.00	.11	.069	.05
Sibling Comparison	.06	.03	.00	.12	.043	.03	.06	.03	.00	.12	.055	.03
Modeling (Mod)	.05	.04	-.03	.13	.194	.05	.04	.05	-.06	.14	.428	.04
Siblings' Work Orient (Sib)	.12	.02	.07	.17	.000	.13	.16	.04	.09	.23	.000	.18
Birth Order (BO)	-.06	.04	-.15	.02	.157	-.04	-.06	.04	-.15	.03	.178	-.03
Mod X BO							.02	.06	-.10	.14	.754	.01
BO X Sib							-.06	.05	-.16	.05	.265	-.04
Model X Sib							.12	.03	.06	.18	.000	.10
<i>R</i> ²			.10						.11			

Note. All continuous variables were centered at their means. Gender (0 = female, 1 = male), ethnicity (0 = white, 1 = other), work status (0 = not employed, 1 = employed part or full time), sibling gender composition (0 = same gender, 1 = mixed gender), birth order (0 = older than sibling, 1 = younger than sibling) and coresidence with sibling (0 = does not live with sibling, 1 = lives with sibling); Siblings' Work Orient = sibling's work orientation; CI = confidence interval, LB = lower bound, UB = upper bound

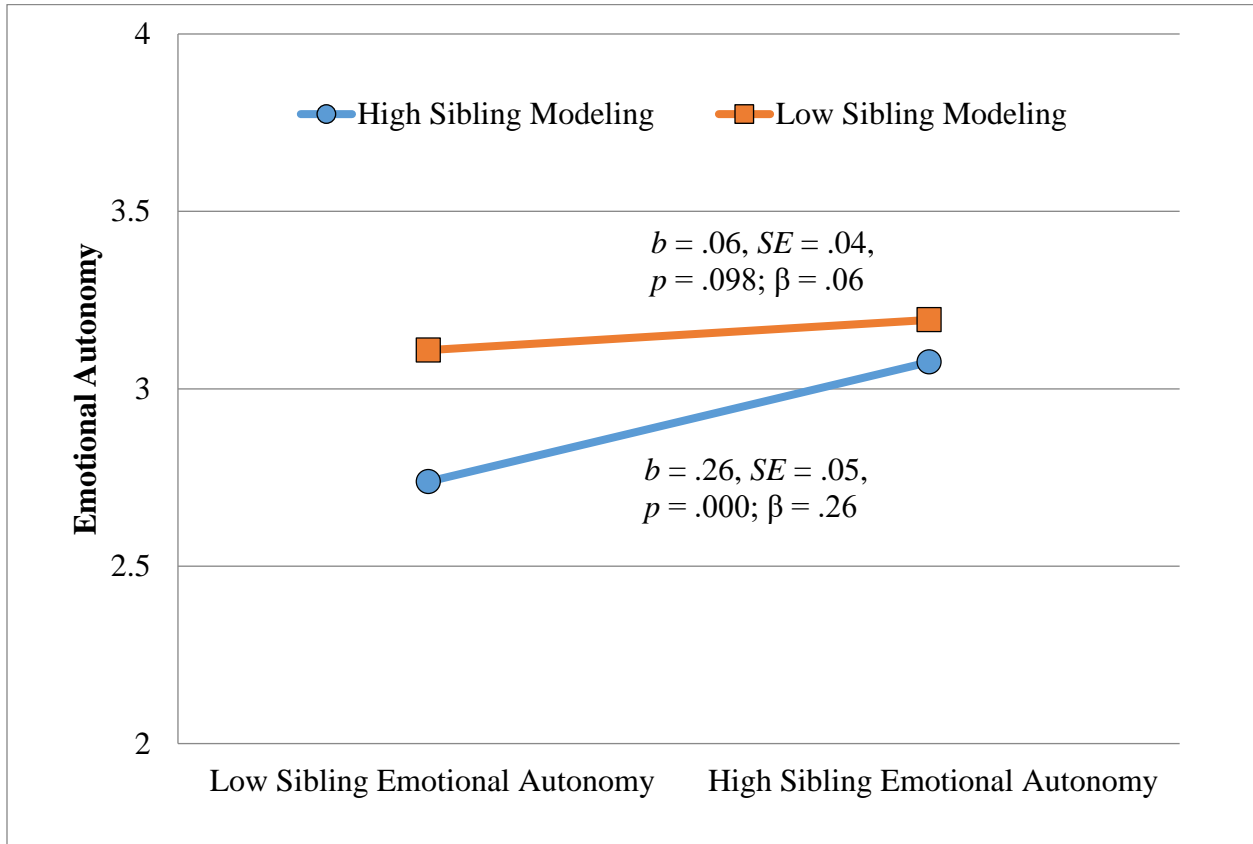


Figure 1. The association between emerging adult siblings' emotional autonomy as a function of sibling modeling.

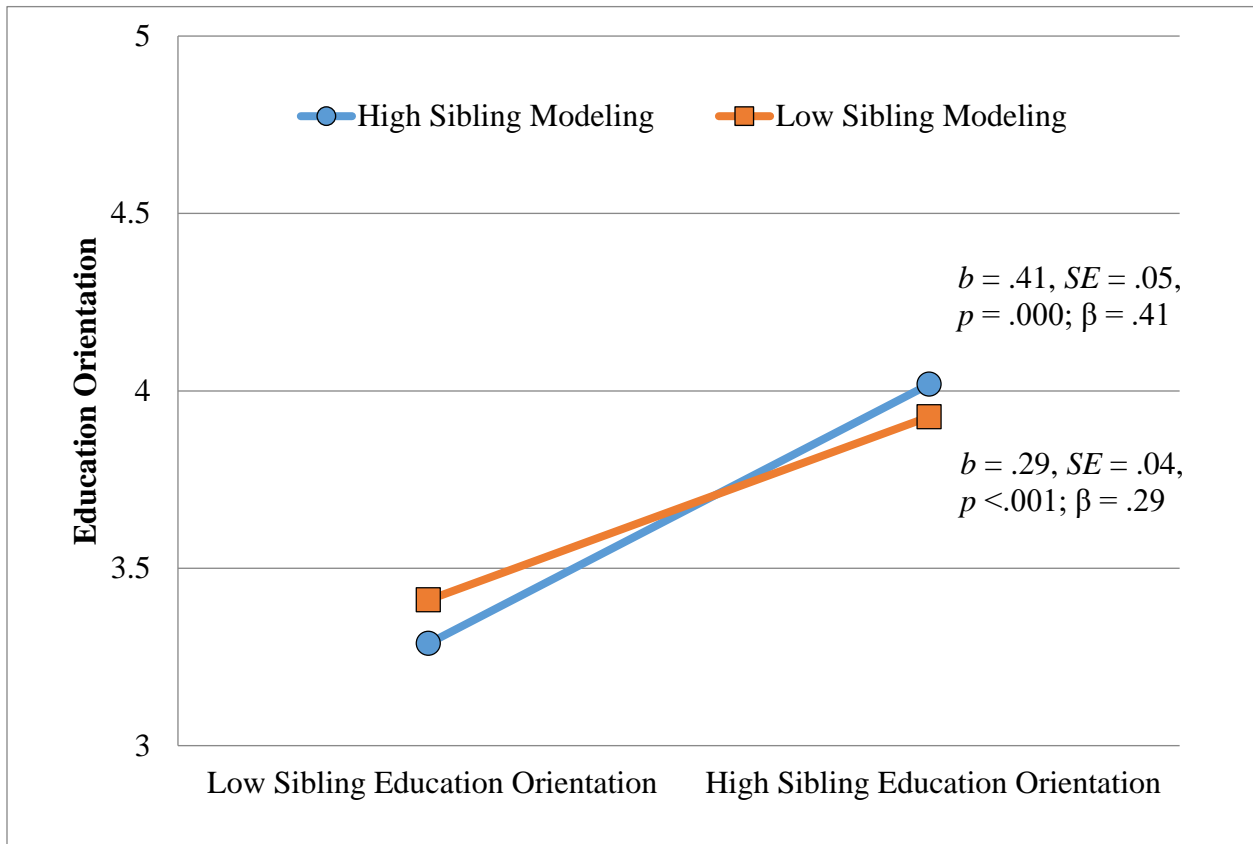


Figure 2. The association between siblings' education orientation and participants' education orientation as moderated by modeling.

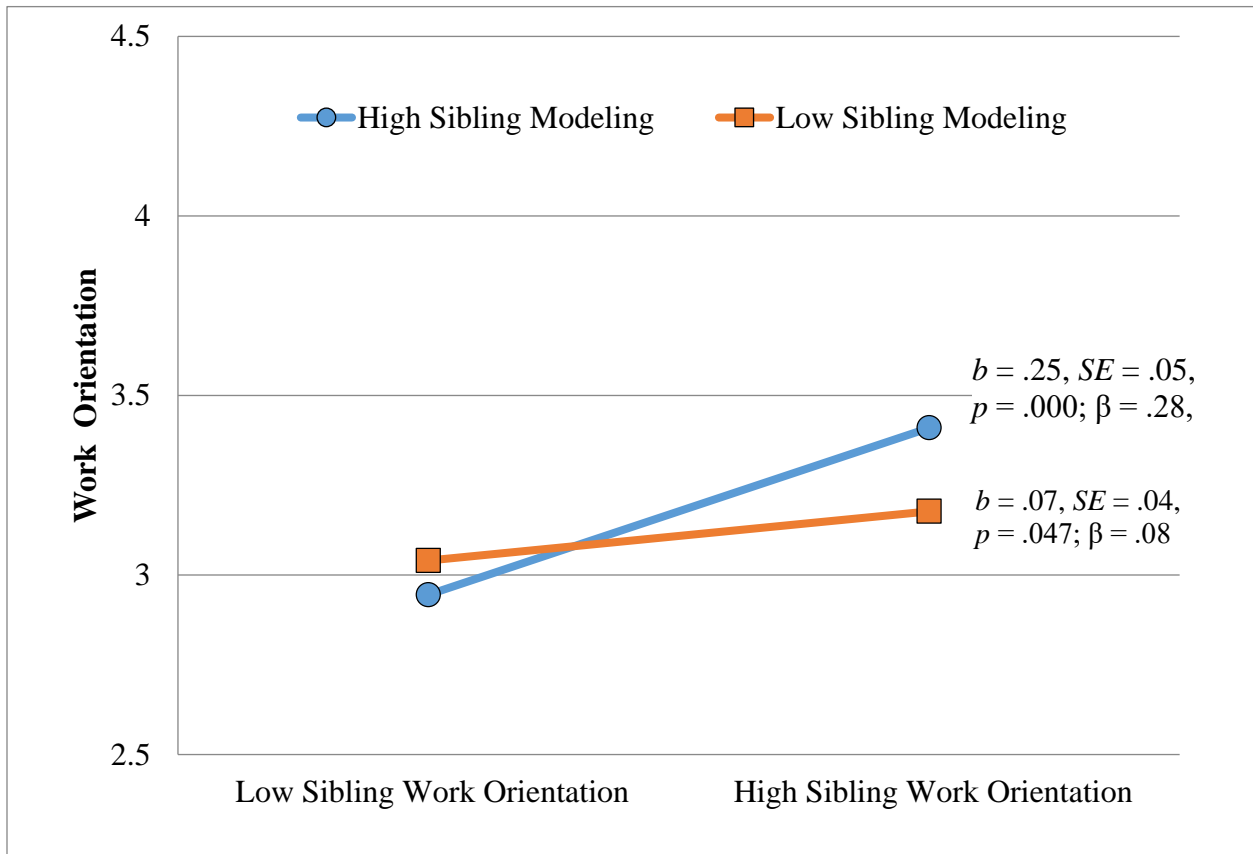


Figure 3. The association between siblings' work orientation and participants' work orientation as moderated by modeling.