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SENSE OF BELONGING AS A PREDICTOR OF INTENTIONS TO PERSIST AMONG AFRICAN AMERICAN AND WHITE FIRST-YEAR COLLEGE STUDENTS

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This study investigates the role of students' sense of belonging to their university in college student retention. Using individual growth curve modeling, we examined (a) whether sense of belonging predicts intentions to persist, and (b) the effects of an intervention designed to enhance students' sense of belonging. African American and white first-year students completed surveys three times throughout the academic year. Students were randomly assigned to a group that received an intervention to enhance students' sense of belonging or to one of two control groups. Sense of belonging was found to predict intentions to persist, controlling for background variables and other predictors of persistence. Overall, sense of belonging and intentions to persist declined over the academic year. However, the decline in sense of belonging was smaller for students in the intervention group. Implications for the development of college retention programs and for existing models of student persistence are discussed.

KEY WORDS: sense of belonging; persistence; intentions; intervention.

INTRODUCTION

Copious research over the last 30 years has identified numerous indicators of college student persistence. The most influential model of student persistence (Tinto, 1987, 1993) identifies integration into the

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social and intellectual fabric of the institution, as well as commitment to the institution and to the goal of obtaining a college degree, as the most important predictors of student persistence (Donovan, 1984; Mayo, Murguia, and Padilla, 1995; Moores and Klas, 1989; Munro, 1981; Pascarella, Duby, and Iverson, 1983; Pascarella and Terenzini, 1980; Pascarella, Terenzini, and Wolfle, 1986). Other research has focused on additional factors including institutional fit (Bean, 1985; Cabrera, Castaneda, Nora, and Hengstler, 1992; Cabrera, Nora, and Castaneda, 1993), support from friends and family (Bank, Slavings, and Biddle, 1990; Mallinckrodt, 1988; Nora, 1987), financial need (Cabrera, Stampen, and Hansen, 1990; Hu and St. John, 2001; Mallette and Cabrera, 1991; Nora, 1990; Nora, Cabrera, Hagedorn, and Pascarella, 1996), racial climate (Cabrera, Nora, Terenzini, Pascarella, and Hagedorn, 1999; Eimers and Pike, 1997; Hurtado, 1992; Nora and Cabrera, 1996), student involvement on campus (Berger and Milem, 1999; Milem and Berger, 1997), and institutional-level variables such as whether institutions award 2-year or 4-year degrees (Strauss and Volkwein, 2004).

The primary goal of this research is to call for a more systematic study of one variable that has received sparse attention in existing studies of student persistence: students' sense of belonging to their college or university, defined as the psychological sense that one is a valued member of the college community. This research has two specific objectives. The first is to examine the role of sense of belonging in predicting college students' intentions to persist, taking into account other variables that predict persistence. The second is to test the effects of an intervention designed to increase students' sense of belonging.

Sense of Belonging in Models of Student Persistence

Failing to achieve an adequate sense of belonging can have important negative consequences (Baumeister and Leary, 1995; Durkheim, 1951). Hence, it is appropriate that models of college student persistence have often included elements of belonging. The most widely known and studied model of student persistence is that of Tinto (1987, 1993). Building upon the work of Spady (1971), Tinto theorized that students' integration into their social and academic college environment predicts whether they are likely to remain enrolled in college. In his longitudinal model, students' pre-college characteristics (e.g., socioeconomic status, high school achievement, etc.) shape their initial level of commitment to finishing college (goal commitment) and to completing a degree at the college in which they are enrolled (institutional commitment). Initial commitment levels influence students' social

and academic experiences, which in turn affect social and academic integration. Social and academic integration, along with initial goal and institutional commitment levels, determine subsequent levels of goal and institutional commitment, which ultimately determine students' likelihood of departing from the institution before completing their degree. Tinto's model also recognized that obligations outside of the college setting, such as work or family responsibilities, could also affect levels of commitment.

The feature of Tinto's model that this paper highlights is related to the mechanism by which it explained student departure - integration into the college setting. His model predicted that to the extent that students do not become integrated members of the college community they are more likely to withdraw. Implicit in his theory was that a sense of belonging, as determined by social and academic integration, is a central feature of student persistence.

Alternative models of student persistence share Tinto's emphasis on integration, and thus sense of belonging, in one form or another. For instance, Astin (1984) emphasized student involvement as essential to persistence. In Astin's work, student involvement referred to actual student behaviors rather than to perceptions of social or academic integration. Berger and Milem (1999; Milem and Berger, 1997) have found that both student involvement behaviors and perceptions of integration play a role in persistence decisions. Specifically, they found that first-year students who reported more involvement behaviors reported higher academic and social integration, as well as more institutional commitment. Social integration, in turn, was associated with institutional commitment, intentions to enroll for a second year (Milem and Berger, 1997), and actual re-enrollment (Berger and Milem, 1999). The emphasis on student involvement and perceived integration, both of which are likely to be correlated with sense of belonging, is consistent with the idea that developing a sense of belonging is important to college persistence.

Also, Bean's (1985) student persistence model identified academic, social-psychological, and environmental factors likely to affect the socialization of students, including variables closely related to sense of belonging. Specifically, the indicators of successful socialization included in Bean's model were institutional fit, college academic performance, and institutional commitment, all of which were hypothesized to affect persistence. Institutional fit was described, in part, as the extent to which students felt they "fit in" at the university, and was thus similar to sense of belonging.

Sense of Belonging in Student Persistence Research

As the previous discussion demonstrates, the concept of sense of belonging has been included in several models of student persistence in one form or another. However, sense of belonging is most often implied as the result of social and academic integration, rather than specified and measured as an independent construct. In research examining various models of student persistence, sense of belonging is rarely, if ever, directly assessed so that its independent effects on persistence can be measured.

In studies that do include at least one item that measures sense of belonging, this item is often grouped with other items to form a measure of a broader construct such as institutional fit (Bean, 1985; Cabrera et al., 1992) or institutional commitment (Cabrera et al., 1993; Nora and Cabrera, 1996; Strauss and Volkwein, 2004). Nora and Cabrera (1993) conducted a confirmatory factor analysis to investigate the appropriateness of combining sense of belonging with other measures to assess institutional commitment. Although the authors ultimately argued for a 2-factor structure of institutional commitment in which sense of belonging was combined with several other items, the factor structure in which sense of belonging was retained as a unique factor yielded a better fit to the data as measured by five out of six fit indices. Thus, there is empirical justification for studying sense of belonging as a unique variable in student persistence research.

There is also conceptual justification for examining sense of belonging in studies of student persistence. Most persistence studies include measures of social and/or academic integration, but the psychological sense that one is an accepted member of one's community, or sense of belonging, is distinct from one's level of involvement with the community (Hurtado and Carter, 1997). Both students' involvement and their subjective sense of belonging were important in early work on student persistence, in which students' subjective sense of belonging was believed to mediate the relationships between student involvement and outcomes such as student commitment and persistence (Spady, 1971). Hurtado and Carter (1997) point out that subsequent work has almost completely neglected the role of subjective sense of belonging. They take a step towards rectifying this oversight by studying the antecedents of sense of belonging among a sample of Latino students. They also call for future work to study the consequences of sense of belonging for outcomes such as student persistence.

There is evidence supporting the idea that sense of belonging should be considered in such research. For example, Zea, Reisen, Beil, and

Caplan (1997) assessed the collective self-esteem (Luhtanen and Crocker, 1992) students derived from their membership in the university community (i.e., how much students derived a positive identity from their university). Zea et al. found that students who reported more collective self-esteem were less likely to report having thoughts about leaving the university. Although this study did not measure sense of belonging, per se, its results are consistent with the idea that having a strong sense of belonging is important for student persistence. Even more convincing support comes from Gaertner and Dovidio's (2000) reanalysis of data from a study on racial climate at a large university (Snider and Dovidio, 1996) which found that students' feelings of belonging to the university community mediated the positive relationship between satisfaction and intentions to finish their degree.

We agree with Hurtado and Carter (1997) that sense of belonging has been under-studied in student persistence research. Thus, in this study we assess the correlates of sense of belonging in a sample of white and African American freshmen. We also report the outcomes of an intervention designed specifically to increase students' sense of belonging to their university.

METHODOLOGY

Student Sample

The study was conducted at a large, public, mid-Atlantic, predominately white (77% white, 8% African American, and 12% other race/ethnicity, 3% unknown race/ethnicity) university. A sample of full-time, first-year, non-transfer students were invited to participate in a three-wave survey during their first year of college. All first-year African American students ($N = 254$) and a random sample of 291 of their white peers were invited to participate.

The first survey was mailed during the second week of the fall semester. For Survey 1, 220 (76%) white and 145 (57%) African American students responded. All students who returned Survey 1 and who had not subsequently withdrawn from the university were invited to complete Surveys 2 and 3. The response rate for Survey 2, which was mailed during the first week of the spring semester, was 94% for both whites and African Americans. Response rates for the third survey, which was mailed during week 11 of 17 of the spring semester, were also high (96% for whites, 89% for African Americans). Median response times for Surveys 1, 2, and 3 were 14, 7 and 11 days, respectively.

Those who returned at least one survey, and hence were included in the analyses, were between 16 and 21 years of age (Mean = 18, SD = 0.49). The majority of the sample lived on campus (83%), with the remainder living in off-campus housing (1%) or with family (16%). Approximately 60% (219/365) of the total sample was female. The white and African American samples were 55% and 68% female, respectively. Women were slightly over-represented in our sample compared with the university population, in which 51% of white students and 59% of African American students are female. Students were paid for completing each survey and provided written informed consent before participating in the study.

Procedure

A longitudinal experimental design was used. Participants completed a survey containing measures of financial difficulties, social and academic integration, peer and parental support, sense of belonging, institutional commitment, and intentions to persist at the beginning of their first semester and at the beginning and end of their second semester. Upon returning the first survey, respondents were randomly assigned to an enhanced sense of belonging group or one of two control groups with the constraint that white and African American students were distributed equally across each group.

A multi-faceted approach was designed to increase sense of belonging in students in the enhanced sense of belonging group. These students received several written communications from university administrators (e.g., the Provost and/or Vice-Provost for Student Affairs) emphasizing that they were valued members of the university community and that their responses to the surveys (in aggregate form) would be used to help improve campus life for all students. These students also received small gifts for daily use (e.g., ID holders, magnets, decals, etc.) that displayed the university's name, logo, and colors. The purpose of these gifts was to surround students with items that emphasized their connection to their university.

Students in both control groups were asked to complete the same surveys but did not receive the communications and logo-bearing gifts designed to affect students' sense of belonging. Specifically, all communication with these students came from a professor in the Psychology department rather than from university administrators. Furthermore, students' membership in the campus community was not mentioned in these communications. We thought it was possible that receiving gifts during one's freshman year might be sufficient to affect students' sense

of belonging, regardless of whether the gifts displayed university insignia. Therefore, students in the gift control group received paraphernalia from the psychology professor identical to that received by students in the enhanced sense of belonging group except that the gifts for this group did not contain university insignia, name, or colors. In the no-gift control group, students did not receive any gifts or additional communications, thus providing data from respondents who did not have any experiences related to their participation in the study other than completion of the surveys.

Variables Studied

Our goal was to examine the unique role of sense of belonging in student persistence, while taking into account other factors that have been shown to predict student persistence. Because the key determinants of student persistence in Tinto's model are (1) pre-college characteristics, (2) social and academic integration, and (3) student commitment, we included measures of these variables in this study. We also included two additional variables, peer and parental support, that have been shown to be reliable predictors of student persistence (Bean, 1980; Cabrera et al., 1992, 1993, 1999; Eimers and Pike, 1997; Nora et al., 1996). Table 1 describes the variables measured in this study, each of which is discussed below, as well as provides information on their reliability, means, and standard deviations.

Student Background Variables

We included four student background variables: race, gender, financial difficulties, and SAT scores (see Table 1). Students' perceived financial difficulty was assessed because students' attitudes regarding the financing of their college education have been shown to relate to their persistence behavior (Cabrera et al., 1992; Mallette and Cabrera, 1991). Students' SAT scores were included as a measure of academic background.

Social and Academic Integration

We used Pascarella and Terenzini's (1980) measures of social and academic integration. These included two subscales (peer-group interactions; interactions with faculty) designed to assess social integration and two subscales (perceived faculty concern for student development and teaching; academic and intellectual development) designed to assess

TABLE 1. Description of Study Variables

Variable	Description	Alpha			Mean (SD)		
		Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Student background characteristics							
Race	White = 1 African American = −1						
Gender	Male = 1 Female = −1						
Financial difficulty (FINDIFF)	Average response to the following two items: Considering the financial aid you've received and the money you and your family have, how much difficulty have you had so far in paying for your school expenses? (no difficulty, some difficulty, or a great deal of difficulty) Do you have any concern about your future ability to finance your college education? (no, some concern, or major concern). Higher values indicate greater financial difficulty.	0.78	0.83	0.83	1.88 (0.61)	1.93 (0.64)	1.97 (0.66)
SAT comprehensive (SAT)	Sum of SAT verbal and quantitative scores. Obtained from university records.				1187 (141)		

TABLE 1. *(Continued)*

Variable	Description	Alpha			Mean (SD)		
		Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Integration variables							
Interactions with peers (PEERINT)	Average score on the interactions with peers subscale in Pascarella and Terenzini (1980)	0.78	0.79	0.82	3.54 (0.74)	3.73 (0.72)	3.75 (0.75)
Interactions with faculty (INTFAC)	Average score on the interactions with faculty subscale in Pascarella and Terenzini (1980)	0.79	0.83	0.85	3.11 (0.69)	3.25 (0.76)	3.28 (0.78)
Academic integration (ACADINT)	Average score on the faculty concern and academic development subscales in Pascarella and Terenzini (1980)	0.76	0.80	0.82	3.72 (0.52)	3.70 (0.58)	3.67 (0.57)
Support variables							
Peer support (PEERSUP)	My close friends encourage me to continue attending <name of institution>. (From Cabrera et al., 1992)				3.98 (1.02)	4.01 (1.04)	4.01 (1.05)
Parental support (PARSUP)	Average score on two items: My family approves of my attending <name of institution>. My family encourages me to continue attending <name of institution>. (From Cabrera et al., 1992)	0.78	0.73	0.69	4.66 (0.64)	4.51 (0.73)	4.51 (0.69)

TABLE 1. *(Continued)*

Variable	Description	Alpha			Mean (SD)		
		Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Sense of belonging (BELONG)	Average score on sense of belonging subscale in Bollen and Hoyle (1990). Items included: I feel a sense of belonging to <name of institution>. I am happy to be at <name of institution>. I see myself as part of the <name of institution> community.	0.89	0.93	0.93	4.00 (0.87)	3.99 (0.91)	3.93 (0.92)
Institutional commitment (COMMIT)	Average score on two items from institutional and goal commitments subscale from Pascarella and Terenzini (1980): It is not important for me to graduate from this university. I am confident I made the right decision to attend <name of institution>.	0.51	0.58	0.50	4.34 (0.90)	4.14 (0.96)	3.95 (1.04)
Intentions to persist (INTENT)	I intend to complete my degree at <name of institution>.				4.49 (0.93)	4.31 (1.04)	4.24 (1.14)

Note: All integration variables, support variables, sense of belonging, institutional commitment, and intentions to persist were measured using 5-point Likert response scales on which 1 = strongly disagree and 5 = strongly agree. Negatively worded items were reverse-scored prior to being combined with other items. Higher values indicate more favorable responses for all measures.

academic integration. We conducted a confirmatory factor analysis in which different subscale combinations were examined.[1] A factor structure in which the peer-group interactions and interactions with faculty subscales remained separate, and the faculty concern and academic and intellectual development subscales were combined, yielded the best fit to the data. We thus included average scores for the peer-group interactions and interactions with faculty subscales as separate predictors in the analyses. Faculty concern and academic and intellectual development subscale items were averaged into a single score representing academic integration (see Table 1).

Peer and Parental Support

We utilized items measuring peer and parental support from Cabrera et al. (1992). More details regarding these items are provided in Table 1.

Sense of Belonging

Bollen and Hoyle (1990) proposed that perceived cohesion, or "the extent to which group members feel 'stuck to,' or part of, particular social groups" (p. 482), consists of individuals' sense of belonging to a group as well as their sense of morale regarding group membership. Their conceptualization of sense of belonging as feeling part of a social group is very similar to Spady's (1971) conceptualization of students' subjective sense of integration into the college community. We thus used Bollen and Hoyle's sense of belonging subscale in this study (see Table 1).

Institutional Commitment

Institutional commitment was measured using the average response to two items from Pascarella and Terenzini's (1980) institutional and goal commitments subscale (see Table 1).[2, 3]

Intentions to Persist

Intentions to persist were assessed with a single item (see Table 1). Although intentions to persist and actual persistence are not equivalent, the use of intentions to persist as an outcome in persistence research is substantiated by studies that show a strong association between intentions to persist and actual persistence (e.g., Bean, 1980; Cabrera et al., 1992, 1993; Pascarella et al., 1983).

Analytic Procedures

Multilevel Model for Change

Data were analyzed using the multilevel model for change (MMC) technique (Singer and Willett, 2003), also known as individual growth modeling. A special case of hierarchical linear modeling, this technique involves analyzing data at multiple levels. Rather than grouping the data according to a between subject characteristic, MMC involves grouping data from the same individuals across time. In MMC analyses, all variables are measured at all time points, thus allowing one to examine: (a) whether variables change over time, and (b) what factors are associated with the change variables undergo over time. This procedure involves estimating the starting value (i.e., initial status) and change over time (i.e., rate of change) for the variables of interest.

Data Preparation

Multilevel model for change requires the creation of a person–period dataset in which each line contains data from one person at one time point. For example, a student who returned all three surveys would have three separate lines of data in the person–period dataset, each identified by that student's identification number and the time at which the student returned that particular survey to the researchers. The initial person period data set contained 1042 lines of data. Sixteen lines of data were deleted due to missing values.

Variables with a slight negative skew were transformed prior to analyses. An inverse transformation on the reverse-scored values best normalized the distributions of the following variables: peer support, parental support, institutional commitment, and intentions to persist. Peer-group interactions and sense of belonging were best normalized using a log (base 10) transformation on the reverse-scored values. The transformed values of peer group interactions and sense of belonging were multiplied by −1 to re-establish the original direction of the scale (i.e., higher values indicate more positive responses). Interactions with faculty, academic integration, financial difficulty, and SAT scores did not require data transformations. All continuous variables were mean-deviated prior to the analyses. Parameter estimates for a given predictor reflect the value of that predictor when all other predictors are at their mean value (i.e., zero). All reported parameter estimates are unstandardized and reflect the transformations performed on the data.

The metric of time used in this study is the number of weeks (i.e., days/7) that elapsed between the start of the academic year (time = 0) and the return of each completed survey. The reported parameter estimates for rate of change represent the magnitude of change in a variable over a period of 1 week.

Analytic Strategy

The analyses proceeded in several stages. First, we determined whether there was sufficient variation in several variables to justify exploring predictors associated with that variation. This was achieved by estimating the unconditional means model for peer group interactions, interactions with faculty, academic integration, peer support, parental support, sense of belonging, institutional commitment, and intentions to persist. The unconditional means model also provides a baseline model for comparison with subsequent models. For this and all other models, the −2LL deviance statistic was used to assess goodness-of-fit.

Next, we determined whether a model that includes time as a predictor provides a better fit to the data than a model that does not include time. This was achieved by estimating the unconditional growth model, which is the unconditional means model plus the effect of time, for the same set of variables. Chi-square tests comparing goodness-of-fit statistics for the unconditional means and unconditional growth models indicate whether consideration of time improves fit. The information produced by the unconditional growth model also indicates whether there is sufficient variation in rate of change across participants to explore predictors associated with that variance.

After that we estimated models in which student background characteristics (i.e., race, gender, financial difficulty, and SAT scores) were included as predictors of the Time 1 value (initial status) and the change between Times 1, 2 and 3 (rate of change) of the variables found to impact persistence in previous research (i.e., integration variables: peer-group interactions, interactions with faculty, academic integration; support variables: peer support and parental support). Separate models for each integration and support variable were estimated and the resulting deviance statistics were compared to the deviance statistics for the unconditional growth model for each variable. This indicated whether models containing student background variables fit the data better than models that contained only time.

We then estimated a model in which all student background, integration, and support variables were included as predictors of the initial status and rate of change of sense of belonging. This model also tested the

effect of the intervention on the rate of change of sense of belonging. Because the intervention did not begin until after the first survey was completed, the effect of the intervention on initial status was not included in the model. Effects of the intervention were tested by three pairs of orthogonal contrast codes (Judd and McClelland, 1989, see Table 2). Each pair of contrast codes was included in a separate estimation of the model. Because orthogonal contrast codes were used, the fit of the model and parameter estimates of the other variables in the model were identical regardless of which pair of contrast codes was included in the model.

Because institutional commitment is so often emphasized as having a crucial role in influencing persistence, the above analysis was repeated using institutional commitment as the outcome variable and including sense of belonging as an additional predictor for both initial status and rate of change. The analysis was also repeated with intentions to persist as the outcome, with sense of belonging and institutional commitment as additional predictors of initial status and rate of change.

Finally, to determine whether results varied by race, interactions between race and all predictors were added to each model. Whether this resulted in better-fitting models than those in which no race interactions were included was assessed.

TABLE 2. Contrast-coded (CC) Effects of the Intervention

	Experimental group			
	Enhanced sense of belonging (ESB)	Gift control (GC)	No-gift control (NGC)	Comparison
CC1A	2	−1	−1	ESB versus GC and NGC combined
CC1B	0	1	−1	GC versus NGC
CC2A	1	−1	0	ESB versus GC
CC2B	1	1	−2	ESB and GC combined versus NGC
CC3A	1	0	−1	ESB versus NGC
CC3B	−1	2	−1	ESB and NGC combined versus GC[a]

[a]CC3B is not of theoretical interest but is the necessary complement to CC3A.

RESULTS

Unconditional Means Models (UMM)

Estimates of the UMMs are reported in Table 3. The parameter estimates for the intercept in initial status indicate whether the grand mean of a given outcome varies significantly from zero. None of them did, which was expected because all of the outcome variables were mean-deviated prior to analyses (i.e., the mean = 0).

The most informative elements of Table 3 are the variance components. The within-person variance component of the UMM indicates whether there is significant variability within individual students' responses. The initial status variance component indicates whether there is significant between-person variability in students' average responses. The within-person and initial status variance components are statistically significant for all outcome variables. Predictors were added to subsequent models with the goal of explaining some of this variance.

Unconditional Growth Models (UGM)

Estimates of the UGMs are reported in Table 4. The UGM is identical to the UMM except that it contains a measure of time as a predictor. Comparing the goodness-of-fit statistics for the UGM to those of the UMM indicates whether including time in the model resulted in a significantly better fit with the data. The deviance statistics for the UGMs and UMMs were compared using chi-square analyses. The degrees of freedom for these tests are the difference in the number of parameters estimated in each of the two models, including fixed effects and variance components. Including time as a predictor resulted in a better-fitting model for all variables except peer support (see Table 4). This indicates that examining all variables except peer support longitudinally yields more information than examining them cross-sectionally.

The UGM includes two fixed effects: the initial status intercept and the rate of change intercept. The initial status intercept of the UGM represents the average starting value of the outcome (i.e., average Time 1 response), and the parameter estimates for the initial status intercepts indicate whether the average Time 1 value of each outcome differed significantly from zero. Because all variables were mean-deviated, an initial status intercept that is not different from zero indicates that the mean value of the variable at Time 1 is not different from the mean value of the variable collapsed across all time points. The initial status intercept parameter estimates indicate that the starting values of peer-group

TABLE 3. Unconditional Means Models

		PEERINT	INTFAC	ACADINT	PEERSUP	PARSUP	BELONG	COMMIT	INTENT
Fixed effects									
Initial status	Intercept	−0.0004	0.0041	−0.0031	−0.0016	−0.0017	−0.0005	−0.0019	−0.0006
Variance components									
	Within-person	0.0075*	0.2912*	0.1307*	0.0568*	0.0305*	0.0145*	0.0424*	0.0455*
	Initial status	0.0121*	0.2627*	0.1793*	0.0387*	0.0335*	0.0208*	0.0375*	0.0429*
Goodness-of-fit									
Deviance (−2LL)		−1493.61	2103.10	1395.78	355.27	−160.67	−848.31	121.90	209.30

Note: *$p < 0.001$; Parameter estimates are unstandardized. PEERINT = peer-group interactions, INTFAC = interactions with faculty, ACADINT = academic integration, PEERSUP = peer support, PARSUP = parental support, BELONG = sense of belonging, COMMIT = institutional commitment, INTENT = intentions to complete degree at current university.

interactions and interactions with faculty were significantly lower than the mean of those outcomes across all time points. The starting values for academic integration, peer support, and sense of belonging did not differ significantly from the overall mean of those outcomes. Parental support, institutional commitment, and intentions to persist all had starting values that were significantly higher than the overall mean of those outcomes.

The rate of change intercept in the UGM represents the average rate of change across all participants for the outcome variable, not controlling for the effects of any variables. A significant rate of change intercept indicates that, on average, the value of that outcome changes over time. As one might expect, peer-group interactions and interactions with faculty increased over time. In contrast, parental support, institutional commitment, and intentions to persist decreased over the duration of the study. There was also a marginally significant decrease over time for academic integration and no average change over time for peer support or sense of belonging.

Although the fixed effects in the UGM are interesting, the variance components are more informative for subsequent model testing. The presence of time in the model alters the meaning of the variance components. The within-person variance component now represents the variability of individuals' responses around their unique linear change trajectories rather than their unique mean responses. The initial status variance component now represents between-person variability in initial status of the outcome (i.e., Time 1 response value), rather than between-person variability in average response. The addition of time to the model results in two additional variance components: covariance and rate of change. The covariance component represents the extent to which initial status co-varies with rate of change. The rate of change variance component represents between-person variability in rate of change, or the extent to which people deviate from the average rate of change for a given outcome variable.

The most informative variance components are those for within-person, initial status, and rate of change. The within-person variance components in Table 4 indicate that there is significant variation of individuals' scores around individuals' unique change trajectories for all outcome variables. This raises the possibility of identifying predictors to account for some of this variation. A similar pattern of results occurred for variance in initial status. That is, there was significant between-person variability in starting values for all outcomes. There was significant between-person variability in rate of change for peer-group interactions, interactions with faculty, sense of belonging, and intentions to persist.

TABLE 4. Unconditional Growth Models

		PEERINT	INTFAC	ACADINT	PEERSUP	PARSUP	BELONG	COMMIT	INTENT
Fixed effects									
Initial status	Intercept	−0.0283***	−0.1273***	0.0332	−0.0084	0.0484***	0.0094	0.0772***	0.0502**
Rate of change	Intercept	0.0016***	0.0074***	−0.0021†	0.0004	−0.0029***	−0.0005	−0.0045***	−0.0029***
Variance components									
	Within-person	0.0054***	0.2380***	0.1176***	0.0514***	0.0258***	0.0114***	0.0343***	0.0309***
	Initial status	0.0131***	0.2127***	0.1520***	0.0440***	0.0307***	0.0244***	0.0425***	0.0525***
	Covariance	−0.0001†	−0.0002	0.0003	−0.0004	−0.00002	−0.0002*	−0.0003	−0.0007***
	Rate of change	0.00001***	0.0002**	0.0001†	0.00003†	0.00002†	0.00002***	0.00002†	0.0001***
Goodness-of-fit									
Deviance (−2LL)		−1558.44	2052.77	1379.43	351.08	−204.17	−867.34	55.49	146.33
Chi-square deviance comparisons between unconditional means and growth models									
	Chi-square	64.83***	50.33***	16.34***	4.19	43.50***	19.03***	66.41***	62.97***

Note: †$p < 0.1$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Parameter estimates are unstandardized. df = 3 for all Chi-square comparisons; PEERINT = peer-group interactions, INTFAC = interactions with faculty, ACADINT = academic integration, PEERSUP = peer support, PARSUP = parental support, BELONG = sense of belonging, COMMIT = institutional commitment, INTENT = intentions to complete degree at current university.

There was only marginally significant variability in rate of change for academic integration, peer support, parental support, and institutional commitment. Low variability in rate of change foreshadows a difficulty in identifying predictors that are associated with rate of change, given that there is little variance to be explained to begin with.

Integration and Support Variables

Table 5 displays models in which the student background variables of race, gender, SAT, and financial difficulty were used as predictors of the initial status and rate of change for peer-group interactions, interactions with faculty, academic integration, peer support, and parental support. Deviance statistics of each model containing the student background predictors and the corresponding UGMs were compared. As reported in the last row of Table 5, including the student background predictors resulted in a better-fitting model for peer-group interactions, interactions with faculty, academic integration, peer support, and parental support.

Examining the fixed effects for each model provides a better understanding of how each student background characteristic relates to the initial status and rate of change of each outcome variable.[4] For peer-group interactions, no background characteristics were significantly related to the initial starting value. That is, students reported the same number of peer-group interactions at the beginning of the academic year, regardless of race, gender, SAT score, or financial difficulty. The increase in peer-group interactions over time (i.e., the rate of change intercept) remains significant after controlling for the student background characteristics. The only additional significant predictor of rate of change is SAT scores. Students with higher SAT scores experienced a more rapid increase in their peer-group interactions than students with lower SAT scores.

For interactions with faculty, the only significant effect of student background variables was a negative effect of SAT score on initial status. Students with higher SAT scores reported fewer interactions with faculty members at the beginning of the academic year than those with lower SAT scores. Students reported an increase in interactions with faculty members over the course of the academic year, and this increase did not depend on students' race, gender, SAT score, or financial difficulty.

For academic integration, both gender and SAT scores were associated with initial status. Males reported less academic integration than females at the beginning of the academic year. Students with higher

TABLE 5. Models Estimating Integration and Support Variables, Sense of Belonging, Institutional Commitment, and Intentions to Persist

		PEERINT	INTFAC	ACADINT	PEERSUP	PARSUP	BELONG	COMMIT	INTENT
Fixed effects									
Initial status	Intercept	−0.0334***	−0.1283***	0.0141	−0.0238	0.0336*	0.0195*	0.0596***	0.0261†
	RACE	0.0107	−0.0024	0.0070	0.0408*	0.0559***	0.0104	0.0167	−0.0166
	GENDER	−0.0098	0.0130	−0.0725*	−0.0255	−0.0070	0.0122	−0.0155	0.0214
	SAT	−0.0021	−0.9852**	0.4885*	−0.1027	−0.0927	−0.0242	0.1227	0.0899
	FINDIFF	−0.0134	−0.0273	−0.0432	−0.0231	−0.0183	0.0049	0.0101	−0.0235
	PEERINT						0.4853***	0.2349*	0.1232
	INTFAC						0.0335**	−0.0089	0.0042
	ACADINT						0.0143	0.0487†	−0.0254
	PEERSUP						0.0874***	0.0965*	0.0436
	PARSUP						0.1781***	0.3101***	0.0653
	BELONG							0.2915***	0.2961***
	COMMIT								0.3602***
Rate of change	Intercept	0.0016***	0.0081***	−0.0019	0.0003	−0.0027***	−0.0011**	−0.0037***	−0.0011†
	RACE	−0.0001	−0.0011	0.0003	0.0004	−0.0005	0.00003	0.0003	0.0010
	GENDER	−0.0004	0.0010	−0.0001	−0.0006	−0.0003	−0.0004	0.0009	−0.00001
	SAT	0.0062**	0.0100	0.0124	0.0011	0.0054	−0.0009	−0.0006	0.0010
	FINDIFF	−0.0004	−0.0030	−0.0029	0.0002	−0.0006	−0.0003	0.00002	0.0004
	CC1A						0.0005**	0.0001	0.0004
	CC1B						0.0003	−0.00003	−0.0006
	CC2A						0.0005†	0.0002	0.0008†
	CC2B						0.0004*	0.0001	−0.0001
	CC3A						0.0009**	0.0002	0.0003
	CC3B						0.0001	0.0001	0.0005†

Table 5. *(Continued)*

		PEERINT	INTFAC	ACADINT	PEERSUP	PARSUP	BELONG	COMMIT	INTENT
	PEERINT						−0.0035	0.0022	−0.0053
	INTFAC						−0.0002	0.0003	−0.0001
	ACADINT						0.0022**	0.0004	0.0015
	PEERSUP						−0.0008	0.0001	−0.0017
	PARSUP						−0.0038*	−0.0019	0.0076*
	BELONG							−0.0024	0.0064
	COMMIT								−0.0041
Variance components									
	Within-person	0.0054***	0.2370***	0.1167***	0.0514***	0.0257***	0.0111***	0.0321***	0.0271***
	Initial status	0.0128***	0.1989***	0.1428***	0.0419***	0.0283***	0.0098***	0.0188***	0.0293***
	Covariance	−0.0001*	−0.0002	0.0001	−0.0004	−0.00002	−0.0001	−0.0003	−0.0008***
	Rate of change	0.00001***	0.00023**	0.00006	0.00003	0.00002~	0.00001	0.00001	0.00005***
Goodness-of-fit									
Deviance (−2LL)		−1591.75	2032.61	1339.32	332.63	−230.03	−1261.31	−279.48	−237.32
Chi-square deviance comparisons with unconditional growth models									
	df	8	8	8	8	8	20	22	24
	Chi-square	33.31***	20.15**	40.11***	18.46*	25.87**	393.98***	334.97***	383.65***

Note: $^{\dagger}p < 0.1$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$; Parameter estimates are unstandardized. PEERINT = peer-group interactions, INTFAC = interactions with faculty, ACADINT = academic integration, PEERSUP = peer support, PARSUP = parental support, BELONG = sense of belonging, COMMIT = institutional commitment, INTENT = intentions to complete degree at current university, FINDIFF = financial difficulty. See Table 2 for description of contrast-coded effects. For BELONG, COMMIT, and INTENT, only one pair of contrast codes was included in the model at a time.

SAT scores also initially reported more academic integration than those with lower SAT scores. There was no change in academic integration over time, nor were any student background variables associated with changes in academic integration.

For peer support, the only significant effect for either initial status or rate of change was the effect of race on initial status. White students reported more peer support than African American students at the beginning of the academic year.

For parental support, there was a significant effect of race on initial status. White students reported more parental support at the beginning of the academic year than African American students. There was also a significant decline in parental support over time, but this was not associated with students' race, gender, SAT score, or financial difficulty.

Sense of Belonging

The model in which student background, integration, support variables, and contrast-coded effects of the intervention were used to predict sense of belonging is displayed in Table 5. Including this set of predictors resulted in a better-fitting model compared to the UGM.

Starting values of sense of belonging were not related to students' race, gender, SAT scores, or financial difficulty. However, greater sense of belonging at the start of the academic year was associated with peer-group interactions, interactions with faculty, peer support, and parental support, but not academic integration.[5]

On average, students reported a small but statistically significant decline in sense of belonging over the course of the academic year, as shown in Table 1. This decline was not associated with any student background characteristics. It was, however, associated with academic integration and parental support. Students who reported more academic integration experienced an increase in sense of belonging over time, whereas those with less academic integration experienced a decrease in sense of belonging. Having more parental support, however, was associated with a faster decline in sense of belonging over time.

The effect of the intervention designed to increase students' sense of belonging was tested by three pairs of contrast codes (see Tables 2 and 5). The mean values of sense of belonging for each group of participants at each time point are shown in Table 6. Results for the first pair of contrast codes indicated that students in the enhanced sense of belonging group experienced a less rapid decline in sense of belonging over time compared to both of the control groups combined (CC1A), and that sense of belonging declined equally over time for students in

TABLE 6. Means (and Standard Deviations) of Sense of Belonging and Intentions to Persist for the Intervention and Control Groups at Times 1, 2, and 3

Outcome	Participant group	Time 1	Time 2	Time 3
Sense of belonging	Enhanced sense of belonging	4.05 (0.89)	4.13 (0.87)	4.04 (0.92)
	Gift control	4.02 (0.85)	3.96 (0.84)	4.02 (0.89)
	No gift control	3.94 (0.89)	3.87 (1.01)	3.75 (0.92)
Intentions to persist	Enhanced sense of belonging	4.54 (0.96)	4.39 (1.04)	4.31 (1.14)
	Gift control	4.47 (0.96)	4.31 (0.99)	4.23 (1.13)
	No gift control	4.47 (0.87)	4.25 (1.09)	4.18 (1.14)

each of the control groups (CC1B). Results for the second set of contrast codes indicated that there was a marginally significant trend for students in the enhanced sense of belonging group to experience a less-rapid decline in sense of belonging over time than those who were in the gift control group (CC2A), and that students who received gifts of any kind (containing university insignia or not) reported a less rapid decline in their sense of belonging over time than those who did not receive gifts (CC2B). Results for the final set of contrast codes indicated that students in the enhanced sense of belonging group experienced a less rapid decline in sense of belonging compared to students in the no-gift control group (CC3A).[6]

Institutional Commitment

A model containing student background, integration, and support variables, sense of belonging, and the effects of the intervention as predictors of institutional commitment is reported in Table 5. This model fit the data better than the UGM.

The fixed effects indicated that no student background characteristics were associated with the initial status of institutional commitment. However, the initial status of institutional commitment was positively associated with peer-group interactions, peer support, parental support, and sense of belonging. The association between initial status of institutional commitment and academic integration was marginally significant, and there was no association between institutional commitment and interactions with faculty.

Institutional commitment declined over time. Interestingly, the decline was not associated with any of the predictors (see Table 5). Students tend to report less commitment to the university over their first year of college, regardless of background, integration experiences during college,

or support from peers or parents. The intervention also did not prevent this general decline in commitment.

Intentions to Persist

Finally, a model including all student background, integration, and support values, the effects of the intervention, sense of belonging, and institutional commitment as predictors of initial status and rate of change of intentions to persist was estimated (see Table 5). The model including these predictors fit the data better than the UGM.

Examining the fixed effects reveals that the intentions to persist students report at the beginning of the academic year are not related to student background characteristics, integration experiences, or support from friends or parents. However, both sense of belonging and institutional commitment are positively associated with initial status of intentions to persist. That is, students who report a greater sense of belonging or more institutional commitment at any time point also report stronger intentions to persist at the beginning of the academic year.

There is a marginally significant trend for students to report weaker intentions to persist over time. It is striking that very few predictors are associated with this decline in intentions. Parental support is the only predictor that is significantly related to change in intentions over time, such that students who report having more parental support experience an increase, rather than decrease, in intentions to persist. In general, the intervention did not unambiguously affect changes in intentions to persist. However, there was a marginally significant trend for students in the enhanced sense of belonging group to experience a less-rapid decline in intentions compared to those in the gift control group.

Interactions with Race

To explore whether the results in Table 5 were consistent across African American and white students, interactions between each predictor and race were added to each model, and each model was re-estimated. Deviance statistics for the new models and the models excluding the race interactions were compared. Including the race interactions improved the fit only for the models predicting academic integration and peer support (see Table 7). Improvement of the peer-group interactions model was marginally significant, as well.

Based on the generally weak improvement in overall fit with the data provided by including the race interactions, it is not surprising that there were few statistically significant fixed effects of the interactions

TABLE 7. Chi-square Tests of −2LL Deviance Statistics Comparing Models in Table 5 with Models Containing All Race* Predictor Interactions for Both Initial Status and Rate of Change Predictors

	PEERINT	INTFAC	ACADINT	PEERSUP	PARSUP	BELONG	COMMIT	INTENT
Goodness-of-fit of models containing race interactions								
Deviance (−2LL)	−1604.22	2026.32	1326.14	318.71	−233.91	−1280.68	−294.38	−266.38
Chi-square deviance comparisons with unconditional growth models								
df	6	6	6	6	6	20	20	22
Chi-square	12.48†	6.29	13.18*	13.92*	3.89	19.37	14.90	29.07

Note: †$p < 0.1$, *$p < 0.05$, PEERINT = peer-group interactions, INTFAC = interactions with faculty, ACADINT = academic integration, PEERSUP = peer support, PARSUP = parental support, BELONG = sense of belonging, COMMIT = institutional commitment, INTENT = intentions to complete degree at current university.

with race.[7] For peer-group interactions, interactions with faculty, parental support, institutional commitment, and intentions to persist, there were no significant race interactions. For academic integration, the interaction between gender and race was significantly related to initial status (parameter estimate = −0.091, $p < 0.01$). This interaction suggested that white males reported less academic integration at the beginning of the academic year than did white females, but this pattern was reversed and less pronounced for African American males and females. For peer support, there were significant interactions between gender and race for both initial status (parameter estimate = −0.0602, $p < 0.001$) and rate of change (parameter estimate = 0.0018, $p < 0.05$). White males reported less peer support at the start of the academic year than did white females, but this pattern was reversed for African American students. Peer support increased over time for white males but decreased over time for white females. This pattern was reversed and more pronounced for African American students.

The remaining three race interactions occurred in the sense of belonging model. There was an interaction between race and parental support for both initial status (parameter estimate = −0.114, $p < 0.01$) and rate of change (parameter estimate = 0.0043, $p < 0.01$) of sense of belonging. Having more parental support was associated with greater sense of belonging at the beginning of the academic year for students of both races. This pattern was more pronounced, however, for African American students. Having more parental support was associated with a more rapid decline in sense of belonging for members of both races, but this effect was more pronounced for white students. Finally, there was an interaction between race and peer support on the rate of change of sense of belonging (parameter estimate = −0.0028, $p < 0.05$). For white students, having more peer support was associated with a faster decline in sense of belonging over time. In contrast, for African American students having more peer support was associated with an increase in sense of belonging over time.

Despite these few interactions with race, the results were remarkably similar for members of both groups. It is of particular interest that the effect of the intervention on sense of belonging, institutional commitment, or intentions to persist did not differ for white and African American students.

DISCUSSION

The main goal of this research was to highlight the importance of sense of belonging in understanding student persistence, because, as

Hurtado and Carter (1997) have argued, it is a potentially important but seriously understudied variable. To do this, we examined the predictors of sense of belonging, including the effects of an intervention designed to enhance students' sense of belonging. We also examined whether sense of belonging predicted institutional commitment and intentions to persist while controlling for student background variables (race, gender, financial difficulty, and SAT) and other variables that commonly predict persistence (peer interactions, faculty interactions, academic integration, peer support, and parental support).

We found that several of these variables were associated with sense of belonging at the beginning of the academic year. Students who reported more peer-group interactions, interactions with faculty, peer support, and parental support also initially reported having a greater sense of belonging. Neither academic integration nor student background variables were associated with starting values of sense of belonging. It is interesting to note that the variables that were associated with sense of belonging at the beginning of the year were all quite social in nature. That is, variables that pertained to interactions students had in the university setting (with peers or with faculty) or social support students had for entering the university setting (from peers or from parents) were associated with a greater sense of belonging, whereas students' background characteristics and academic integration were not. This suggests that the early social experiences students have when they first enter college and the social support they receive during that time are likely to be better determinants of initial levels of sense of belonging than are demographic characteristics or academic experiences.

We also found that sense of belonging significantly declined over the course of the academic year. Although academic integration was not associated with sense of belonging at the start of the year (Time 1), it was associated with sense of belonging's rate of change. Having above-average academic integration was associated with an increase in sense of belonging over time, whereas having below-average academic integration was associated with a decrease in sense of belonging over time. How well a student adjusts to the academic environment of college is thus closely tied to their developing sense of belonging with the college. This could be a fruitful area to target in programs to preserve students' sense of belonging over the course of their first year of college. Once students begin college, taking measures to ensure that they become well-integrated academically may help guard against a decline in sense of belonging.

Parental support was also a significant predictor of sense of belonging's rate of change, such that having more parental support was

associated with a more rapid decline in sense of belonging over time. Upon first glance, this effect seems counterintuitive. However, it is possible that parents who detect their children's waning sense of belonging to the university offer increased support in hopes of encouraging their children to finish their degree. Alternatively, students who are more closely connected to their parents could also be more tied to their home lives in general instead of to college, thus decreasing their sense of belonging with the university. Some evidence shows that students who go home more often during college are more likely to drop out (Massey, Fischer, Lundry, and Charles, 2003).

The intervention was successful in that it affected changes in students' sense of belonging over time. Students who received mailings and gifts that emphasized their status as a valued member of the university community experienced a less rapid decline in their sense of belonging compared to students who received no gifts and to students in both control groups combined. Students who received gifts of any kind (i.e., the enhanced sense of belonging and gift control groups combined) experienced a less rapid decline in sense of belonging than students who received no gifts, but there was no difference in decline of sense of belonging for students in the gift control and no-gift control groups. In addition, those in the enhanced sense of belonging group experienced a marginally significant less rapid decline in sense of belonging over time than those in the gift control group. A similar marginally significant effect was found for intentions to persist. Thus, providing students with mailings and gifts that highlight their connection with the university may provide more protection against declining intentions to persist than providing comparable mailings that do not highlight the university connection.

Although the intervention affected sense of belonging as it was designed to do, the statistically significant effects of the intervention tended to be small in size (see Table 6). The effects of this intervention remain important, however, because they demonstrate that students' sense of belonging over their first year of college can be affected by relatively simple and low cost means. More comprehensive and elaborate programs targeting sense of belonging might well have a larger impact than the intervention used in this study, which was designed merely to test the hypothesis that sense of belonging can be changed rather than as a full-fledged programmatic effort to foster students' sense of belonging.

In addition to being affected by the intervention, sense of belonging was found to be a significant predictor of both institutional commitment and intentions to persist, even after controlling for student background,

integration, and support variables. Sense of belonging was positively associated with institutional commitment and intentions to persist at the start of the academic year but was unrelated to changes over time in either variable. Thus, even though sense of belonging is related to institutional commitment and intentions to persist at the beginning of the year, it appears that sense of belonging does not contribute to the development of commitment or intentions over the course of the first year of college. This is somewhat surprising, given that it is reasonable to expect students with a declining sense of belonging to become less committed to their university and/or to display weaker intentions to finish their degree at their university. However, based on their early social experiences as they adjust to a new and sometimes daunting environment, first year students may quite quickly develop a sense of whether they belong at their school, which then affects their early sense of institutional commitment and intentions to persist. In contrast, as the school year progresses more practical factors, such as the extent to which students view a college degree as a necessary means to desired ends (e.g., entry into the career of their choice), may come to predominate in determining their sense of commitment and their intentions to persist, accounting for the lack of impact of sense of belonging on change in these variables.

However, before placing too much emphasis on the lack of association between sense of belonging and the developmental trajectories of institutional commitment and intentions to persist, it is important to recognize that none of the variables studied were related to changes in institutional commitment. Furthermore, parental support was the only statistically significant predictor of changes in intentions to persist, aside from the marginally significant effect of the intervention. For institutional commitment, the UGM revealed that there was only marginally significant variability in rate of change over time, suggesting that the decline in commitment is similar across students and making it unlikely that any variables will be associated with rate of change in commitment. It is possible that if the study had followed students for a longer period of time that more variation in students' institutional commitment would have emerged. The lack of variability observed during students' first year could be because students enter college with very high levels of commitment, as our data suggest, and therefore all tend to experience decreases in that commitment over their first year as they react to college's heavy academic demands. This tendency could overwhelm any potential effects that individual differences in student experiences might have on commitment. Importantly this study's results also suggest that relationships between commitment and peer-group interactions, peer

support, parental support, and sense of belonging exist at the beginning of the academic year rather than develop gradually over time.

For intentions to persist, the UGM indicated that there was statistically significant variability in rate of change, making it more feasible for variables associated with rate of change to be identified. However, this study found parental support to be the only significant predictor of changes in intentions. Although there was a significant decline in intentions to persist over time, the absolute change over the course of the study was quite small given that most students still evidenced very strong intentions to persist at the end of the academic year. Had the study followed students for a longer period of time, perhaps a more substantial decline in intentions would have emerged, making it more feasible to identify significant predictors of such change.

The positive relationship between institutional commitment and intentions to persist was present at the start of the academic year, as was the relationship between sense of belonging and intentions to persist. This suggests that relationships among these variables may be present when students enter college or develop very rapidly at the beginning of the school year, but that later changes in intentions to persist are not necessarily the outcome of changes in commitment or sense of belonging.

Although the main purpose of this research was to study sense of belonging, a number of additional findings deserve note. Related to the preceding discussion, this study found that several variables that are often included in developmental models of student persistence displayed only marginally significant variability in their rate of change during freshman year. Specifically, these variables were academic integration, peer support, parental support, and institutional commitment. This suggests that changes in these variables over time tend to be uniform, regardless of student backgrounds or college experiences. Researchers should therefore be cautious when placing these variables within conceptual models that predict that these variables develop differently for different students.

It is also worth noting that several of the variables that exhibited a significant change over time changed in the negative, rather than positive, direction. Although peer-group interactions and interactions with faculty increased over time, parental support, sense of belonging, institutional commitment, and intentions to persist all declined over time. For parental support, perhaps students interact with their parents less as they spend more time at college, so that the support their parents offer is less salient. It is also plausible that parents offer less support as their children become more independent throughout the first year of college. Either way, the decline in parental support is not surprising.

The general decline in sense of belonging, commitment, and intentions to persist is most likely due to the excitement and high expectations students bring with them to college. As students become more familiar with the challenging reality of being a college student, their initial excitement may fade, resulting in a decline in sense of belonging, commitment, and intentions to persist.

Another noteworthy finding of this research is that the effects of student background variables (race, gender, SAT scores, and financial difficulty) were sparse in this sample. This might well occur in a university that draws a relatively homogeneous group of students who then react and adjust to college in a similar manner. However, the students at the university studied come from quite a range of academic and social backgrounds. Thus, it is possible that student background variables had relatively little impact on the variables included in this study because the university at which the study was conducted does an effective job of socializing a diverse student body into a common university community. It certainly makes substantial efforts to do this. Whatever its cause, the limited role of student background characteristics in the current data set is not consistent with the role of student background that has been previously theorized. Specifically, Tinto (1993) hypothesized that student background variables affect starting values of commitment and intentions to persist, which then affect integration experiences, etc. In this research, the (few) significant effects of student background variables were for the initial status of integration and support variables, rather than for sense of belonging, commitment, or intentions. Thus, the current findings do not support Tinto's hypothesis that student background variables exert their influence on persistence decisions through their effect on initial commitment and intentions.

Finally, and related to the preceding discussion, it is important to note that this study's findings were remarkably similar for African American and white students. Of the many race interactions tested, only a small number were significant. This is consistent with past research that has found models of student persistence to be quite similar for African American and white students at predominantly-white universities (e.g., Eimers and Pike, 1997; Mallinckrodt, 1988; Nettles, Thoeny, and Gosman, 1986). However, two differences between the effects of parental and peer support on sense of belonging for African American and white students in this sample should be noted. Specifically, the positive relationship between parental support and sense of belonging at the beginning of the year was especially strong for African American students. Furthermore, although for white students peer support was associated with a faster decline in sense of belonging, for African American

students having more peer support was associated with an increase in sense of belonging over time. These results suggest that peer and parental support may be especially important factors for African American students in terms of the sense of belonging they develop in a predominantly white university.

Limitations

One limitation of this study is its sample size, which is smaller than samples used in other studies of student persistence (e.g., Biddle, Bank, and Slavings, 1987; Cabrera et al., 1993). The sample size was limited by two factors. First, we attempted to recruit approximately the same number of white and African American freshmen, which meant that the sample size was constrained by the number of African American freshmen at the university at the study's beginning. Furthermore, because the study contained the intervention component and students were paid for completing the surveys, the sample size was constrained by the availability of financial resources and staff. A concerted effort was made to enroll eligible students into the study in order to maximize the sample size. The type of statistical analysis utilized in this research does not require large samples, so the relatively small sample does not jeopardize the validity of the analyses. However, as with any research that is based on a sample of students at a single university, results should be generalized to other institutions with caution.

Another limitation is that this study focuses only on the first year of college. The relationships among the variables reported here could change as students continue through college. However, the greatest amount of attrition occurs prior to the second year of college, thereby making the freshman year an important time in which to study factors predicting persistence (Barefoot, 2004). Furthermore, previous research has shown that models of student persistence during the freshman year are similar to those for students in their later years of college (e.g., Bean, 1985).

Conclusions

This research highlights the importance of including sense of belonging in empirical studies of student persistence. Sense of belonging was found to be significantly associated with institutional commitment at the start of the academic year. Furthermore, even with student background, integration, and support variables in the model, sense of belonging and institutional commitment were the only two significant predictors of

intentions to persist at the start of the academic year. These findings suggest that sense of belonging is an important but often overlooked variable in studies of student persistence.

This study also reports the effects of an intervention designed specifically to enhance students' sense of belonging with the university. It serves as evidence that the development of sense of belonging can be modified using a relatively simple and inexpensive intervention. Given that sense of belonging was associated with the starting value, but not rate of change, of institutional commitment and intentions to persist, those who wish to develop future interventions using the current intervention as a model should consider starting the intervention prior to the start of the academic year.

Previous studies of persistence have conflated sense of belonging with other constructs such as institutional fit or commitment (Bean, 1985; Cabrera et al., 1992, 1993; Nora and Cabrera, 1996; Strauss and Volkwein, 2004). Several aspects of the current findings suggest that sense of belonging should be added as a stand-alone variable in persistence research. For instance, the developmental trajectories of sense of belonging and institutional commitment were associated with different sets of predictors. The general decline in sense of belonging was attenuated by academic integration and magnified by parental support, whereas the decline in institutional commitment was the same for all students. Perhaps most important is the finding that the intervention, which was designed specifically to impact students' sense of belonging, indeed protected against the decline in sense of belonging but had no effect on changes in institutional commitment. In addition, sense of belonging predicted the initial status of intentions to persist, even after controlling for institutional commitment. It thus appears that the unique role of sense of belonging in explaining student persistence should continue to be explored.

Finally, this study is among the first to utilize multilevel modeling for change analyses to study student persistence. As such, it provides a demonstration of another statistical tool that can be used to understand student persistence decisions. Importantly, its findings question existing models of student persistence that hypothesize that intentions to persist are the outcome of a developmental process that takes place throughout the first year of college. The results of this study suggest that many of the relationships between variables included in models of student persistence exist at or very near the beginning of students' college careers and that few of the commonly studied variables actually predict change over time in things like institutional commitment and intentions to persist. It is possible that student persistence decisions are the outcome of a

developmental process, but that this process takes place much earlier than typically believed, such as between the time when students get accepted into college and the first couple weeks of actually attending classes there. If this is the case, research should be conducted during this critical pre-college period and models of student persistence should take into account student expectations of college rather than (or in addition to) their actual experiences in college.

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ENDNOTES

1. Details of the confirmatory factor analysis are available from the first author upon request.
2. A third item from the Institutional and Goal Commitments subscale was excluded from the analyses because it was conceptually redundant with the measure of intentions to persist and could therefore artificially inflate the relationship between institutional commitment and intentions to persist. This item asks students how likely it is that they will enroll at the university the following semester.
3. The goal commitment items from that subscale were not included because others have found a lack of variance in goal commitment among some samples of college freshmen, making it difficult to use this variable as a meaningful predictor in analyses (Berger and Milem, 1999; Milem and Berger, 1997). The alpha for Pascarella and Terenzini's goal commitment items was also quite low in at least one published report (0.36, Mallette and Cabrera, 1991). Finally, when separate measures of institutional and goal commitment are included

in research, goal commitment tends to be less important as a predictor of student persistence (e.g., Bean, 1980; Cabrera et al., 1999; Eimers and Pike, 1997; Mallette and Cabrera, 1991).

4. Because the initial status intercepts merely indicate whether the average starting value was different than the average over all time points, they will not be discussed further.
5. In MMC analyses, significant associations between time-varying predictors (i.e., predictors that can have different values at different time points) and the initial status of an outcome represent associations between the predictors measured *at any time point* and the initial status (i.e., Time 1 value) of the outcome. For example, the significant association between the predictor variable peer-group interactions and the initial status of the outcome variable sense of belonging means that students who reported having more peer-group interactions at the beginning, middle, and/or end of their first year of college also reported a greater sense of belonging at the beginning of the academic year.
6. The final contrast code (CC3B) is not of theoretical interest. Nonetheless, its results are reported in Table 5 for completeness. This contrast was not significant for any outcome variable, indicating that the enhanced sense of belonging and no-gift control groups, combined, did not differ from the gift control group.
7. The full results of the models containing race interactions are available from the first author upon request. Because there were so few, only significant race interactions are presented here.

REFERENCES

Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel* 25(3): 297–308.

Bank, B. J., Slavings, R. L., and Biddle, B. J. (1990). Effects of peer, faculty and parental influences on students' persistence. *Sociology of Education* 63(3): 208–225.

Barefoot, B. O. (2004). Higher education's revolving door: Confronting the problem of student drop out in US colleges and universities. *Open Learning* 19(1): 9–18.

Baumeister, R. F., and Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin* 117(3): 497–529.

Bean, J. P. (1980). Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education* 12(2): 155–187.

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal* 22(1): 35–64.

Berger, J. B., and Milem, J. F. (1999). The role of student involvement and perceptions of integration in a causal model of student persistence. *Research in Higher Education* 40(6): 641–664.

Biddle, B. J., Bank, B. J., and Slavings, R. L. (1987). Norms, preferences, identities and retention decisions. *Social Psychology Quarterly* 50(4): 322–337.

Bollen, K. A., and Hoyle, R. H. (1990). Perceived cohesion: A conceptual and empirical examination. *Social Forces* 69(2): 479–504.

Cabrera, A. F., Castaneda, M. B., Nora, A., and Hengstler, D. (1992). The convergence between two theories of college persistence. *The Journal of Higher Education* 63(2): 143–164.

Cabrera, A. F., Nora, A., and Castaneda, M. B. (1993). College persistence: Structural equations modeling test of an integrated model of student retention. *The Journal of Higher Education* 64(2): 123–139.

Cabrera, A. F., Nora, A., Terenzini, P. T., Pascarella, E., and Hagedorn, L. S. (1999). Campus racial climate and the adjustment of students to college: A comparison between white students and African-American students. *The Journal of Higher Education* 70(2): 134–160.

Cabrera, A. F., Stampen, J. O., and Hansen, W. L. (1990). Exploring the effects of ability to pay on persistence in college. *Review of Higher Education* 13(3): 303–336.

Donovan, R (1984). Path analysis of a theoretical model of persistence in higher education among low-income Black youth. *Research in Higher Education* 21(3): 243–259.

Durkheim, E. (1951). *Suicide: A Study in Sociology* (J. A. Spaulding & G. Simpson, Trans.). Free Press, New York.

Eimers, M. T., and Pike, G. R. (1997). Minority and non-minority adjustment to college: Differences or similarities? *Research in Higher Education* 38(1): 77–97.

Gaertner, S. L., and Dovidio, J. F. (2000). *Reducing Intergroup Bias: The Common Ingroup Identity Model*, Psychology Press, Philadelphia, PA.

Hu, S., and St. John, E. P. (2001). Student persistence in a public higher education system: Understanding racial and ethnic differences. *The Journal of Higher Education* 72(3): 265–286.

Hurtado, S. (1992). The campus racial climate: Contexts of conflict. *The Journal of Higher Education* 63(5): 539–569.

Hurtado, S., and Carter, D. F. (1997). Effects of college transition and perceptions of the campus racial climate on Latino college students' sense of belonging. *Sociology of Education* 70(4): 324–345.

Judd, C. M., and McClelland, G. H. (1989). *Data Analysis: A Model Comparison Approach*, Harcourt Brace Jovanovich, New York.

Luhtanen, R., and Crocker, J. (1992). A collective self-esteem scale: Self-evaluation of one's social identity. *Personality and Social Psychology Bulletin* 18(3): 302–318.

Mallette, B. I., and Cabrera, A. F. (1991). Determinants of withdrawal behavior: An exploratory study. *Research in Higher Education* 32(2): 179–194.

Mallinckrodt, B (1988). Student retention, social support, and dropout intention: Comparison of Black and White students. *Journal of College Student Development* 19(1): 60–64.

Massey, D. S., Fischer, C., Lundry, G., and Charles, C. Z. (2003). *The Source of the River: The Social Origins of Freshmen at America's Selective Colleges and Universities*, Princeton University Press, Princeton, NJ.

Mayo, J. R., Murguia, E., and Padilla, R. V. (1995). Social integration and academic performance among minority university students. *Journal of College Student Development* 36(6): 542–552.

Milem, J. F., and Berger, J. B. (1997). A modified model of college student persistence: Exploring the relationship between Astin's theory of involvement and Tinto's theory of student departure. *Journal of College Student Development* 38(4): 387–400.

Moores, K., and Klas, L. D. (1989). Comparing personal, social, and institutional variables for university dropouts and those who persist. *College Student Journal* 23(1): 16–22.
Munro, B. H. (1981). Dropouts from higher education: Path analysis of a national sample. *American Educational Research Journal* 18(2): 133–141.
Nettles, M. T., Thoeny, A. R., and Gosman, E. J. (1986). Comparative and predictive analyses of black and white students' college achievement and experiences. *Journal of Higher Education* 57(3): 289–318.
Nora, A. (1987). Determinants of retention among Chicano college students: A structural model. *Research in Higher Education* 26(1): 31–59.
Nora, A. (1990). Campus-based aid programs as determinants of retention among Hispanic community college students. *Journal of Higher Education* 61(3): 312–331.
Nora, A., and Cabrera, A. F. (1993). The construct validity of institutional commitment: A confirmatory factor analysis. *Research in Higher Education* 34(2): 243–262.
Nora, A., and Cabrera, A. F. (1996). The role of perceptions of prejudice and discrimination on the adjustment of minority students to college. *The Journal of Higher Education* 67(2): 119–148.
Nora, A., Cabrera, A., Hagedorn, L. S., and Pascarella, E. (1996). Differential impacts of academic and social experiences on college-related behavioral outcomes across different ethnic and gender groups at four-year institutions. *Research in Higher Education* 37(4): 427–451.
Pascarella, E. T., Duby, P. B., and Iverson, B. K. (1983). A text and reconceptualization of a theoretical model of college withdrawal in a commuter institution setting. *Sociology of Education* 56(2): 88–100.
Pascarella, E. T., and Terenzini, P. T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education* 51(1): 60–75.
Pascarella, E. T., Terenzini, P. T., and Wolfle, L. M. (1986). Orientation to college and freshman year persistence/withdrawal decisions. *Journal of Higher Education* 57(2): 155–175.
Singer, J. B., and Willett, J. B. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*, Oxford University Press, New York.
Snider, K., and Dovidio, J. F. (1996). *A Survey of the Racial Climate at Indiana State University*, Institutional Research and Testing, Indiana State University, Terre Haute, IN.
Spady, W. G. (1971). Dropouts from higher education: Toward an empirical model. *Interchange* 2: 38–62.
Strauss, L. C., and Volkwein, J. F. (2004). Predictors of student commitment at two-year and four-year institutions. *The Journal of Higher Education* 75(2): 203–227.
Tinto, V. (1987). *Leaving College: Rethinking the Causes and Cures of Student Attrition*, University of Chicago Press, Chicago.
Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition* (2nd edn.). University of Chicago Press, Chicago.
Zea, M. C., Reisen, C. A., Beil, C., and Caplan, R. D. (1997). Predicting intention to remain in college among ethnic minority and nonminority students. *The Journal of Social Psychology* 137(2): 149–160.

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