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College departure involves multiple mobility patterns that include lateral transfer (from a four-year to another four-year institution), reverse transfer (from a four-year to a two-year institution), and stop out (taking time out of higher education altogether). This study addresses how financial aid influences the likelihood of such mobility patterns for minority and low-income students. Utilizing data from the Education Longitudinal Survey of 2002, this study found that the effects of financial aid on multiple mobility patterns are similar across students of different income groups. By contrast, non-white students benefit significantly from financial aid, particularly from low-burden aid options (e.g., tuition waivers and grants) in lowering the probability of lateral transfer. No financial aid has a significant effect on changing the likelihood that students reverse transfer or stop out.

American higher education is under scrutiny for effectiveness in achieving its key goals. One such goal is ensuring student degree completion, an important indicator of student success. Federal and state governments seek to incorporate degree-completion rates in their measures of institutional accountability and to use them for financial aid and resource allocation decisions (Tinto, 2006-2007). Parents and students are also cautious about rising college costs and search for ways to gain the maximum benefit from a college education, which requires students to complete their degrees in a timely manner. The U.S. News and World Report (USNWR)—commonly considered a measuring stick of institutional quality and an influential source of prestige in higher education (Ehrenberg, 2003)—views degree-completion rates as factors in university rankings.

Not all students who start postsecondary education, however, complete their desired degrees within a reasonable timeframe, particularly at the institution where they are first enrolled. For instance, only about a third of full-time students attending four-year institutions completed their degrees within a four-year time frame at the same institution (National Center for Education Statistics, 2009). Against this background, a handful of recent researchers have identified college mobility or multi-institutional attendance pattern as a key problem that leads to low degree completion rates, particularly among those who began in four-year institutions (Goldrick-Rab, 2006; Goldrick-Rab & Pfeffer, 2007). Of the students who leave before the start of their second year, about half return to their first

institution after "checking out" other institutions, and the rest transfer to another institution or leave higher education entirely (Horn & Caroll, 1998). Within an eight year window, students who remain at their original institution tend to have the highest graduation rates, followed by those who transfer from a four-year to another four-year institution, followed by those who transfer from a four-year to a two-year institution (Goldrick-Rab & Pfeffer, 2009). Also, students who take time off from school are less likely to graduate than those who are continuously enrolled (Cabrera, Burkum, & LaNasa, 2003).

While the term "transfer" in higher education literature traditionally indicates student mobility from a two-year to a four-year institution (Borden, 2004; McCormick, 2003), this study focuses on the mobility of students who began their postsecondary education in four-year institutions. With this focus, this study extends previous research on student mobility in two ways. The primary contribution is a multifaceted concept of mobility. In existing research, students departing from their initial four-year institutions are typically viewed as "dropouts" or "leavers," with little attention paid to the variety of post-departure options. Yet, the departing student may exhibit a *lateral transfer* (to another four-year institution) or a *reverse transfer* (to a two-year institution) (Adelman, 2006). The student may also *stop out*, remaining non-enrolled for a period with the idea of returning to college later (Horn & Caroll, 1998). Overlooking such patterns not only limits the scope of insights on the mobility issue, but may result in estimation biases in predicting mobility. This study seeks to provide a more understanding of student mobility, clarifying not only *why* students leave, but *where* they go (the type of mobility) after leaving their initial four-year institutions.

The second contribution of this study is an examination of the interaction of financial aid with race/ethnicity and socioeconomic status (SES). Greater college departure rates for socially disadvantaged students—Blacks, Hispanics and low-income students in particular—are an enduring problem (Tinto, 2004), resulting in significant inequities in degree-completion rates. As such, disadvantaged groups may experience departures that are more likely to hinder timely completion and eventual graduation, such as early interruptions in enrollment. They may experience departure patterns that result in degrees with lower status and prestige, due to transferring from a four- to two-year institution, which may have the additional effect of lowering degree-completion rates (Goldrick-Rab & Pfeffer, 2009).

As a means to equalize college opportunity, financial aid is expected to play an instrumental role in leveling the playing field for students from disadvantaged backgrounds (Cabrera & LaNasa, 2001). While there is extensive research on the ways financial aid may influence students from different backgrounds in their decisions to go to college or not, which college to go to, and whether to persist after initial enrollment (e.g., Hu & St. John, 2001; Paulsen & St. John, 2002), no study has focused on how financial aid affects multiple patterns of mobility after initial enrollment. For minority and low-income students, the relative burden involved with different aid packages (e.g., accumulated debt) is an especially salient issue

(McDonough & Calderone 2006). High-burden packages such as unsubsidized loans may increase the risk for disadvantaged students, more than advantaged ones, of stopping out or transferring to two-year institutions in search of better aid alternatives or lower tuition. Similarly, low-burden options such as tuition waivers and gift aid (grants and scholarships) may help improve the chances of persistence more for disadvantaged students than for advantaged ones (e.g., Kim, 2007; Goldrick-Rab & Pfeffer, 2007).

Conceptual Framework

Tinto's interaction theory (1975) has been recognized as the most studied of all departure theories (Braxton & Hirschy, 2005) and is the first to incorporate the role of the institution in retention studies that look at students' voluntary departure (Wolf-Wendel, Ward, & Kinzie, 2009). In Tinto's model, students' entry-level characteristics influence their integration into college, and the extent to which they can integrate into the campus community eventually influences their persistence. Tinto subsequently expanded his integration model to account for the role finances play in student persistence. He originally specified financial considerations as a factor in the initial enrollment decisions (Tinto, 1987), and later argued that finances influenced adjustment to college after the initial college enrollment (Tinto, 1993).

In a more recent effort, Paulsen and St. John (2002) developed a "financial nexus" model that incorporates student characteristics, social/academic integration processes, and financial factors in explaining college mobility. The nexus model accounts for student background, perceptions of cost during the college choice process, college engagement and integration, and student finances. By linking two previously separate topics of inquiry—namely, initial college choice, and subsequent persistence—the nexus model addresses how a "sequence" of student choices may lead to the eventual decision to depart or persist in a given institution (Paulsen & St. John, 2002). Factors influencing which college to attend tend to affect student experiences in college, which in turn affect the likelihood of departure or persistence. Therefore, the financial nexus approach is not only more comprehensive than earlier perspectives, but stresses the importance of the two consequential stages of the college mobility process: the extent to which the student perceives financial variables as important at the time of college choice and the actual role of financial variables in the student's subsequent decision to persist (Paulsen & St. John, 2002).

Drawing on the financial nexus model, this study highlights three sequential stages in the process of persistence. Factors that influence the first stage of *access* include basic student background and pre-college factors, such as race/ethnicity, socioeconomic status, and academic performance in high school. The degree of advantage or disadvantage in these areas has consistently and continuously affected not just student interest in college, but the perceptions of financial issues and college experiences. The variables that primarily influence the *choice* stage, which are also continuously influential on the persistence decisions, are student perceptions of campus life, academic and professional features of

prospective colleges, and most importantly, the availability of financial aid. These factors structure the relative attractiveness of alternative institutions considered by the student and his/her family (Gross, Hossler, & Ziskin, 2007). The third and final stage is the *persistence* stage, where institutional characteristics, individual experiences, and academic success modify or reinforce the student's goal commitment. Positive experiences (both social and academic) can enhance the student's perception of economic and non-economic benefits of a college degree and increase the desire to stay at the same college. Negative experiences, including a tuition hike, tend to have the opposite effect. While all factors that are identified are particularly salient for each stage of college-choice process, they are also expected to be significant predictors of eventual persistence or departure decision.

The Interplay of Financial Aid with Race/ Ethnicity and Socioeconomic Status

An important goal for financial aid is to alleviate financial difficulties for disadvantaged students. Most studies in this area focus on the effects of aid on college enrollment, choice, and a dichotomous measure of college persistence (e.g., Hossler, Braxton, & Coopersmith, 1989; Paulsen & St. John, 2002). This study takes a different perspective and addresses the consequences of aid in terms of multiple mobility patterns. Since financial aid is the primary policy tool to help equalize college opportunities, it is particularly important to address how aid may influence the likelihood of different departure patterns for disadvantaged minority (e.g., blacks and Hispanics) and low-income students, who traditionally experience a greater risk of leaving their initial institutions (Tinto, 2004). The degree of debt burden) is an issue for all students, but it is likely to matter more for disadvantaged ones. However, while few studies have considered the interplay between student aid and disadvantage statuses (e.g., Hoyt & Winn, 2004; McDonough & Calderone, 2006), little is still known about how different types of aid may interact with race/ethnicity and SES to affect the chances of different departures.

Existing research offers a number of important inferences about how the effects of different aid types, and their associated debt burden, may differ by race/ethnicity and SES. First, given their disadvantaged economic situations and concerns over accumulating debt, many minority and low-income students receiving loans may experience a greater risk of stopping out or transferring to two-year institutions in search of better aid alternatives or lower tuition. Grants or scholarship may, on the other hand, have a more pronounced benefit in terms of persistence for these students compared to more advantaged students (Goldrick-Rab & Pfeffer, 2007; Perna & Titus, 2004; Price, 2004; Zarate & Pachon, 2006). Also, minority and low-income students may avoid loan options altogether, limiting their choices to receiving no aid or receiving only scholarships or grants (Kim, 2007; Nora & Crisp, 2005; Trent, Lee, & Owens-Nicholson, 2006). Thus, it is important to examine the effects of financial assistance on mobility for such students, who often depend largely on grants and scholarships (Cabrera & LaNasa 2001; Dowd & Coury, 2006; Oosterbeek & Van Den Broek, 2009).

In addition, disadvantaged students are likely to enjoy significant psychological benefits from grants and scholarships. As McDonough and

Calderone (2006) note, while tuition waivers and grants nurture self-confidence on the part of any student, such types of aid tend to impart a higher degree of self-esteem and pride for minority and low-income students. These benefits are likely to foster loyalty and attachment to the institution, increasing the chances of persistence (Trent et al., 2006). Finally, these types of aid options often limit uncertainties and fears about college expenses among disadvantaged students more than among other students, particularly by reducing the pressure for employment while in school (Cabrera, Nora, & Castaneda,, 1992; Malcom, 2008; Nora, & Crisp, 2005). With reduced concerns for securing employment, disadvantaged students may have more time to devote to academic work, lowering the chances of departure (Nora, Barlow, & Crisp, 2006).

Altogether, these insights warrant the explicit examination of the mobility patterns related to the interplay of financial aid with demographic background characteristics. This study takes a step in this direction by asking whether race/ethnicity and SES interact with various aid types (i.e., grants, loans, work study, and tuition waivers) and if the interactions are associated differently with persistence, lateral transfers, reverse transfers, and stop outs.

Data and Methods

Data sources

The Education Longitudinal Study of 2002 (ELS: 2002) from National Center for Educational Statistics (NCES) served as the primary data source for this study. ELS: 2002 followed students from high school to college, collecting data at three points: when they were high school sophomores (2002 base year), high school seniors (2004 first follow-up), and two years after their expected high school graduation date (2006 second follow-up). Base year and first follow-up data addressed students' individual and family backgrounds and second follow-up data addressed students' college pathways and interruption in enrollment. This study focused on white, black, Hispanic, and Asian students who began their post-secondary education in a four-year institution in September, 2004. Because delayed enrollment is negatively related to persistence and degree completion (Adelman, 2006; DesJardins, Ahlburg, & McCall, 2006; Dowd, 2004; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008), this study avoided confounding factors by including only those students who did not delay their college enrollment, resulting in this study's sample of 5,675 students.

Outcome measure

The highest level of attrition in college occurs between years one and two (Bradburn, 2002; Reason, 2009), making the connection between enrollment from the first year to the second crucial for student retention efforts. Against this background, this study considered the student's *first year departure pattern* as an outcome measure (see Table 1). Specifically, mobility is measured by examining the departure pattern by September, 2005, a year after initial enrollment in 2004. The 2005 information was collected through the 2006 second follow-up of ELS. Four specific outcomes were considered: whether the student (1) remained enrolled in

the initial institution (persistence), (2) transferred to another four-year institution (lateral transfer), (3) transferred to a two-year institution (reverse transfer), or (4) were not enrolled in any post-secondary institution (stop out).

Predictors

Variables included demographic characteristics (race/ethnicity, SES, gender), pre-college academic performance (standardized 10th grade math score), parental aspirations for student success, and the students own expectations for success (see Table 1). Race/ethnicity was coded in four categories: white, black, Asian, and Hispanic. Measures that are particularly relevant for the choice stage included the perceived importance of two specific issues when choosing the initial four-year institution: (1) financial issues (a combination of concerns for low expenses and availability of aid), and (2) success after college (a combination of concerns for successful job placement and graduate school placement).

The ELS data also contained information on whether the student was offered specific types of aid from their first institution. The specific types of aid are grants (all grants including federal, state, and institutional grants), loans (all loans except PLUS), tuition waivers (total tuition waivers), and work study (all forms of work study). This study relies on the type of financial aid *offered*, as opposed to the type of aid *awarded* (i.e., actually received by students), because the aid offered provides more accurate information about the student's unobserved characteristics that influences the decision to accept the offer. Aid awarded, on the other hand, reflects the decision made after the aid offer, which is subject to endogeneity bias (DesJardins, Ahlburg, & McCall, 2002).

Employment experiences were measured by the number of hours per week worked while enrolled during the first year. Enrollment intensity was measured by a dummy indicator for full- versus part-time enrollment. For integration measures, the frequency of conversations with faculty and involvement in extracurricular activities on campus were included. Lastly, several institutional characteristics were obtained from IPEDS (the Integrated Postsecondary Education Data System) 2004, when the initial college enrollment was measured in this study. Variables from IPEDS data include size (fulltime equivalent [FTE] enrollment), institutional control (public/private), selectivity (prestige), tuition (in-state tuition and fees), and the ratio of per FTE grant aid to the total published in state tuition and fees.

While there are numerous measures that represent student affordability in the financial aid literature (e.g., the total aid-to-total costs ratio), this study used the aid-to-tuition ratio recognizing the significant differences in tuition by institutional control and relatively similar expenses for room and board, books and other activities across all institutions. The aid-to-tuition ratio is considered an appropriate indicator of student affordability for attending a particular institution.

Table 1. Descriptive Statistics

	Mean	*SD*
Mobility		
Persistence	0.809	0.392
Lateral transfer	0.069	0.253
Reverse transfer	0.047	0.210
Stop out	0.075	0.263
Access		
White (BYRACE)	0.702	0.457
Black (BYRACE)	0.103	0.304
Hispanic (BYRACE)	0.078	0.268
Asian (BYRACE)	0.116	0.320
SES (F1SES2QR)	0.041	0.676
Male (BYSEX)	0.475	0.499
Parental aspirations for success (BYPARASP)	0.974	0.157
Student expectations for success (F1STEXP)	6.770	0.858
Mathematics achievement (BYTXMQU)	3.230	0.892
Choice		
Importance of financial issues (F1S52A, F1S52B)	2.209	0.618
Importance of success after college (F1S52I, F1S52J)	2.429	0.598
Persistence		
Enrolled fulltime (F2PS1FTP)	0.971	0.269
Talked with faculty on academic matters (F2B18A)	2.147	0.601
Participated in extracurricular activities (F2B18G)	2.140	0.765
Grant (F2IGRANT)	0.730	0.456
Loan (F2ILOAN)	0.602	0.489
Waiver (F2IWAIVR)	0.098	0.297
Work study (F2IWKSTY)	0.310	0.462
Hours worked weekly (F2C26P)	2.125	1.077
School size (FTE)	13786.050	11673.310
Selectivity (SELC)	3.281	0.644
Tuition (CHG2AY3, in-state)	10671.110	8617.808
Aid/tuition ratio ((FGRNT_A+IGRNT_A)/CHG2AY3)	1543.000	1.433
Initial institution out-of-state (F2PS1OUT)	0.266	0.422
Private institution (CONTROL)	0.348	0.476

Note: School size, selectivity, tuition, aid/tuition ratio, and private control were obtained from IPEDS. The rest of the measures were obtained from ELS:2002. Original variable tags shown in parentheses.

Finally, the location of the institution (whether the school is located in the students' home state) was included in the analysis. Previous literature (Groen, 2003; Tornatzky, Gray, Tarant, & Zimmer, 2001) suggests that students who attend out of state institutions are likely to become more mobile in terms of their employment location after they complete their college education. Therefore, the location of the institution will show if students who are mobile at the stage of college choice are more or less mobile in terms of college departure.

Statistical Modeling

Given the categorical nature of our outcome measure, we conducted a multinomial regression model that predicts effects of predictors on the odds of different mobility patterns. All estimates were adjusted for the Education Longitudinal Study sampling design (i.e., sample strata and clustering) using the appropriate weight (F2BYWT). Following NCES's recommendation for adjusting the estimation for survey design effects (Broene & Rust, 2000), the *mlogit* command with the *svy* prefix was used in the statistical software, STATA 10.1. The full multinomial regression model was specified as:

$$M_i = \alpha + \sum_n \beta_n A_{ni} + \sum_n \Psi_n C_{ni} + \sum_n \Omega_n P_{ni} + \sum_n \Phi_n (SES_i F_{ni}) + \sum_n \sum_m \lambda_{nm} (R_{ni} F_{mi}) + \varepsilon_i \qquad (1)$$

where *i* represents the individual student and *M* is the four-category outcome variable, including 1 = stay at the initial four-year institution, 2 = transfer to another four-year institution, 3 = transfer to a two-year institution, and 4 = stop out. The students who stayed at the same institution were specified as the baseline category. *A* is a vector of predictors associated with the factors that are particularly salient in access stage. *C* represents choice factors. And, *P* denotes persistence factors. Given our interest in the interplay of financial aid with race/ethnicity and SES, the model included two sets of two-way interactions, namely between financial aid and SES $(SES_i F_{ni})$ and between financial aid and race/ethnicity $(R_{ni} F_{mi})$. White students were left out as the reference category for race/ethnicity. Finally, ε_i represents the random error for student *i*.

Results

Of the 5,675 students who were freshmen in 2004, 4,593 (nearly 81%) persisted in their initial four-year institutions, 391 (about seven percent) undertook a lateral transfer, 264 (almost five percent) exhibited reverse transfer, and 427 (nearly eight percent) were not enrolled in a higher education institution in the fall of 2005. In other words, among students who would be considered as "leavers" from the conventional stay/leave standpoint, 36% were actually enrolled in other four-year institutions, 24% transferred to two-year institutions, and about 40% left their initial institutions but did not enroll in higher education the following year. This finding reinforces the need to further explore multiple departure patterns.

Lateral Transfer Variables

Table 2a displays results concerning student who transfer laterally, from the initial four-year to another four-year institution. Being male reduces the

odds of lateral transfer by 45% ($e^{-0.600} = 0.548$, $p < 0.010$), indicating that female students are more likely to transfer to another four-year institution than their counterpart male students. This finding is surprising given that female students have consistently been found to have higher degree completion rates (National Center for Education Statistics, 2007). This finding may be related to the types and/or the timing of college departures. For instance, insights from research on career choice and consumer behavior indicates that net of race/ethnicity, class, social status and age, females tend to be quicker than males in responding to dissatisfaction with employment and consumption decisions and in taking corrective action (e.g., Phillips & Imhoff, 1997; Thompson, 1996). Therefore, female students dissatisfied with their initial institutional choices may be faster than males in making the decision to transfer out to another four-year institution. Considering this finding, female students may be able to avoid any possible negative effects of transferring to other institutions. From a different angle, this finding also supports previous literature (e.g., Goldrick-Rab, 2006) that suggests a lateral transfer, in contrast to other types of college departures, does not necessarily lead to a negative consequence (e.g., lowering degree completion rates) to students. Of the college experience variables, social and academic integration into college significantly reduces the odds of lateral transfer, which is consistent with Tinto's (1975) original view. Specifically, talking with faculty on academic matters reduces the odds of transferring to another four-year institution by about 44% ($e^{-0.574} = 0.563$, $p < 0.010$). Participation in extracurricular activities reduces the odds of transferring to another four-year institution by 30% ($e^{-0.371} = 0.690$, $p < 0.010$).

Of the institutional characteristics, a higher in-state tuition decreases the odds of lateral transfer by nearly 62% ($e^{-0.970} = 0.379$, $p < 0.010$). While tuition costs are commonly viewed as an important impediment to persistence (Paulsen & St. John, 2002), our findings suggest that students who start college at a four-year institution with higher tuition are less likely to transfer to another four-year institution in their freshman year compared to those who start at four-year institutions with lower tuition. However, it should be noted that the negative effect of higher tuition is only for lateral transfer (see Tables 2b and 2c for non-significant tuition effects), indicating that students who transfer to other four-year institutions may do so not because of tuition or financial reasons but because of other personal, social, or academic program related reasons. The aid/tuition ratio also reduces the odds of a lateral transfer by 52% ($e^{-0.733} = 0.480$, $p < 0.010$). Combined with the negative effect of tuition level, this finding suggests that current policy moves favoring the "high tuition / high aid" approach to college finance may work well—from an institutional perspective—in reducing lateral transfer rates (e.g., Griswold & Marine, 1996; Guess, 2009; Nishimura, Watkins, & Burbank, 2009). However, the "high tuition / high aid" approach may not be as effective in addressing reverse transfers, since neither tuition nor the ratio of grant aid to tuition has a significant effect on reverse transfer (see Table 2b).

Finally, students starting at out-of-state four-year institutions have about 80 percent greater odds ($e^{0.590} = 1.803$, $p < 0.010$) of transferring to other four-year institutions than do students attending in-state institutions. This

Table 2a. Multinomial Model: Later Transfer vs. Persistence

	Coeff.	*SE*	Odds Ratio	
			Main	Interaction
Black	0.863	(0.659)	2.369	
Hispanic	1.186	(0.778)	3.273	
Asian	1.264	(0.700)	3.540	
SES	0.066	(0.159)	1.068	
Male	-0.600 **	(0.210)	0.549	
Parental aspirations for student's success	0.600	(0.842)	1.822	
Student expectations for success	0.154	(0.132)	1.167	
10th grade mathematics achievement	0.093	(0.136)	1.098	
Importance of financial issues	-0.323	(0.195)	0.724	
Importance of success after college	0.373	(0.200)	1.453	
Enrolled fulltime	-0.510	(0.527)	0.600	
Talked with faculty on academic matters	-0.574 **	(0.161)	0.563	
Participated in extracurricular activities	-0.371 **	(0.139)	0.690	
Grant	-0.060	(0.312)	0.942	
Tuition waiver	0.275	(0.408)	1.316	
Loan	-0.244	(0.274)	0.784	
Work study	0.436	(0.275)	1.546	
Hours worked weekly	0.212	(0.109)	1.236	
School size	-0.179	(0.155)	0.836	
Selectivity	-0.186	(0.205)	0.830	
Tuition	-0.970 **	(0.372)	0.379	
Aid/tuition ratio	-0.733 **	(0.235)	0.480	
Out-of-state	0.590 **	(0.238)	1.804	
Private	-1.017	(0.530)	0.361	
Interaction terms				
Grant*black	-0.524	(0.627)	0.592	1.404
Grant*Hispanic	-0.049	(0.837)	0.953	3.118
Grant*Asian	-2.214 **	(0.856)	0.109	0.387
Waiver*black	-2.383 **	(1.090)	0.092	0.219
Waiver*Hispanic	-1.759 **	(0.777)	0.172	0.564
Waiver*Asian	0.312	(0.958)	1.366	4.836
Loan*black	0.532	(0.663)	1.703	4.035
Loan*Hispanic	-1.326	(1.048)	0.266	0.869
Loan*Asian	0.260	(0.791)	1.296	4.589
Work study*black	-0.907	(0.620)	0.404	0.957
Work study*Hispanic	-0.426	(0.827)	0.653	2.137
Work study*Asian	-1.155	(0.900)	0.315	1.115
Constant	8.543 **	(3.054)		
Log likelihood	-1648.194			
Chi-square	462.771 **			
Pseudo R-squared	0.122			

Note: F2BYWT used as regression weight. School size and tuition measures are logged.
$^{**}p < 0.01$. $^{*}p < 0.05$.

Table 2b. Multinomial Model: ReverseTransfer vs. Persistence

			Odds Ratio	
	Coeff.	*SE*	Main	Interaction
Black	-1.056	(0.860)	0.348	
Hispanic	-0.246	(1.296)	0.782	
Asian	0.100	(0.784)	1.105	
SES	-0.391 *	(0.194)	0.676	
Male	-0.420	(0.232)	0.657	
Parental aspirations for student's success	0.940	(0.589)	2.560	
Student expectations for success	-0.040	(0.139)	0.961	
10th grade mathematics achievement	-0.222	(0.136)	0.801	
Importance of financial issues	-0.508 **	(0.194)	0.602	
Importance of success after college	0.060	(0.181)	1.062	
Enrolled fulltime	-0.127	(0.340)	0.881	
Talked with faculty on academic matters	-0.788 **	(0.182)	0.455	
Participated in extracurricular activities	-0.289	(0.166)	0.749	
Grant	-0.101	(0.263)	0.904	
Tuition waiver	0.227	(0.466)	1.254	
Loan	0.278	(0.267)	1.321	
Work study	-0.361	(0.317)	0.697	
Hours worked weekly	0.268 **	(0.107)	1.308	
School size	-0.321 **	(0.133)	0.725	
Selectivity	-0.296	(0.197)	0.744	
Tuition	0.034	(0.347)	1.034	
Aid/tuition ratio	-0.055	(0.084)	0.946	
Out-of-state	0.304	(0.299)	1.355	
Private	0.534	(0.522)	1.705	
Interaction terms				
Grant*black	0.502	(0.815)	1.652	0.574
Grant*Hispanic	-0.378	(1.288)	0.685	0.536
Grant*Asian	-1.164	(0.801)	0.312	0.345
Waiver*black	-1.183	(1.113)	0.163	0.057
Waiver*Hispanic	1.257	(1.072)	3.516	2.750
Waiver*Asian	-0.639	(1.233)	0.528	0.583
Loan*black	0.323	(0.836)	1.381	0.480
Loan*Hispanic	-0.678	(1.354)	0.507	0.397
Loan*Asian	-0.173	(0.704)	0.841	0.929
Work study*black	0.511	(0.742)	1.667	0.580
Work study*Hispanic	-0.074	(1.334)	0.929	0.726
Work study*Asian	1.177	(0.675)	3.245	3.586
Constant	3.906	(3.324)		

Note: F2BYWT used as regression weight. School size and tuition measures are logged. Model fit information for these findings are shown in Table 2a.
$^{**}p < 0.01$. $^{*}p < 0.05$.

finding is consistent with the existing literature (e.g.,Gansemer-Topf & Schuh, 2006; Goldrick-Rab & Pfeffer, 2009; Porter, 2003) and points to the fact that students attending out-of-state institutions may experience more difficulties in adjusting to new environments, psychologically (e.g., being away from family and friends) and financially (e.g., paying for out-of-state tuition, and additional living and travel expenses). Not only may these factors that stem from attending out-of-state institutions "push" students into lateral transfers, but students may also have extra "pull" factors from their home state institutions, which might be an alternative for lower financial burdens and the possibility of getting back to their families and friends (Porter, 2003).

Reverse Transfer Variables

The findings concerning students who experience reverse transfers (shown in Table 2b), are considerably different from those regarding lateral transfer. SES is a significant predictor, indicating that a one unit increase in SES results in a 33% decrease ($e^{-0.391} = 0.676$, $p < 0.050$) in the odds of reverse transfer over persistence, meaning that students from lower SES are more likely to experience a reverse transfer. This finding, in contrast to the non-significant effect of SES on lateral transfer, demonstrates the importance of examining multiple departure patterns and that if departure patterns are not specified to multiple categories, the effect of SES could generate misleading findings.

Another interesting finding is that only the student perception of the importance of financial issues in choosing college has a significant negative effect on mobility, decreasing the odds of a reverse transfer over persistence by 40% ($e^{-0.508} = 0.601$, $p < 0.010$). This variable is a composite measure of the perceived importance of financial aid availability and lower tuition in college choice. Students with greater concerns about financing college may make more prudent decisions about where they attend college. They may understand the extra financial burdens involved with transferring elsewhere, and thus are less likely to transfer, particularly to two-year institutions.

Talking with faculty about academic matters reduces the odds of transferring to a two-year institution by 55% ($e^{-0.788} = 0.454$, $p < 0.010$). On the other hand, the non-significant effect of the number of hours worked per week on lateral transfer become significant when looking at reverse transfer, increasing the odds by 30% ($e^{0.268} = 1.308$, $p < 0.010$). This positive effect of employment is unsurprising, as it may indicate not only the effect of financial strain, but also the lack of class choice options, poor academic performance, or lack of social and academic involvement in college that often accompany working extensively (American Council on Education, 2006; Horn & Berktold, 1998). Finally, the negative effect of school size is consistent with other research, which suggests that retention rates tend to increase as institutional size increases (Kamens, 1971; Sjoberg, 1999, Titus, 2004). Institutions with larger enrollment may have stronger socialization processes (Kamens, 1971), which in turn influence student integration and increase retention.

Stop Out Variables

As depicted in Table 2c, a one unit increase in SES decreases the chances of student stop out by 49% ($e^{-0.682} = 0.505$, $p < 0.010$). And, a one unit increase in 10th grade mathematics performance decreases the odds of stopping out by about 25% ($e^{-0.284} = 0.753$, $p < 0.010$). The lower risk of mobility for Asians, higher SES groups, and students who are academically better prepared for college is consistent with findings from the existing literature on persistence (Goldrick-Rab, 2006; Goldrick-Rab & Pfeffer, 2007; Ishitani, 2006). However, our results go a step further, suggesting that the significant effects of these variables are not true for lateral transfer or reverse transfer as they are for stop out.

Unsurprisingly, talking to faculty on academic matters and participation in extracurricular activities both reduce the odds of stop out by about 50% ($e^{-0.710} = 0.491$, $p < 0.010$) and 30% ($e^{-0.353} = 0.702$, $p < 0.010$) respectively. An increase of one hour of employment per week increases the odds of stop out by 55% ($e^{0.444} = 1.558$, $p < 0.010$). This is nearly twice the size of the effect the same predictor has on the odds of reverse transfer, while it has no significant effect on lateral transfer. In other words, the consequence of working more hours per week becomes more profound as the mobility pattern changes from lateral to reverse transfer, and to stop out. This pattern of an increasingly negative effect of employment on lateral, revere, and stop out, entails increasingly problematic consequences in terms of eventual degree completion rates (Goldrick-Rab & Pfeffer, 2007).

Lastly, starting out in a four-year private institution noticeably lowers the odds of stopping out by 63% ($e^{-0.991} = 0.371$, $p < 0.010$). This finding is consistent with existing studies that suggest private institutions tend to demonstrate greater persistence and degree completion rates (Astin & Oseguera, 2002). By focusing on multiple departure patterns, however, this finding indicates more detailed information, suggesting that the primary reason of private institutions having higher retention and graduation rates might be related to their lower stop out rates, not necessarily due to lower lateral or reverse transfer rates.

Aid Types and Student Backgrounds

Table 3 shows the interplay pattern of multiple mobility patterns by race/ethnicity and SES. Consistent with previous findings, black, Hispanic, and low SES students have the lower persistence rates than Asian, white, and higher SES students. For instance, only 72% of blacks persist in their initial four-year institution while 13% exhibit lateral or reverse transfer and about 15% stop out by the end of their first year in college. The mean SES for students who persisted is 3.20, as opposed to 2.61 for those who stopped out.

These differences in departure patterns have considerable implications for eventual completion rates (Goldrick-Rab, 2006). Since financial assistance is an important means to help level the playing field in higher

Table 2c. Multinomial Model: Stop out vs. Persistence

	Coeff.	*SE*	Odds Ratio	
			Main	Interaction
Black	0.644	(0.542)	1.904	
Hispanic	0.585	(0.615)	1.796	
Asian	-0.397	(0.899)	0.672	
SES	-0.682 **	(0.177)	0.506	
Male	-0.236	(0.197)	0.790	
Parental aspirations for student's success	0.009	(0.391)	1.009	
Student expectations for success	-0.114	(0.119)	0.892	
10th grade mathematics achievement	-0.284 **	(0.106)	0.753	
Importance of financial issues	0.133	(0.181)	1.142	
Importance of success after college	0.069	(0.168)	1.072	
Enrolled fulltime	-0.139	(0.345)	0.870	
Talked with faculty on academic matters	-0.710 **	(0.170)	0.492	
Participated in extracurricular activities	-0.353 **	(0.139)	0.702	
Grant	-0.199	(0.252)	0.820	
Tuition waiver	0.352	(0.386)	1.422	
Loan	0.247	(0.249)	1.280	
Work study	-0.256	(0.260)	0.774	
Hours worked weekly	0.444 **	(0.106)	1.558	
School size	-0.066	(0.133)	0.936	
Selectivity	-0.176	(0.199)	0.838	
Tuition	-0.508	(0.307)	0.602	
Aid/tuition ratio	-0.064	(0.037)	0.938	
Out-of-state	-0.213	(0.285)	0.808	
Private	-0.991 *	(0.467)	0.371	
Interaction terms				
Grant*black	-0.018	(0.537)	0.982	1.870
Grant*Hispanic	-0.671	(0.677)	0.511	0.918
Grant*Asian	-0.754	(0.971)	0.471	0.316
Waiver*black	-1.900	(1.159)	0.150	0.285
Waiver*Hispanic	-0.592	(1.197)	0.553	0.993
Waiver*Asian	-2.327	(1.204)	0.098	0.066
Loan*black	-0.692	(0.548)	0.501	0.953
Loan*Hispanic	-0.971	(0.622)	0.379	0.680
Loan*Asian	-1.185	(1.004)	0.306	0.206
Work study*black	-0.053	(0.554)	0.949	1.806
Work study*Hispanic	0.995	(0.658)	2.704	4.857
Work study*Asian	1.558	(1.050)	4.748	3.192
Constant	5.441	(2.894)		

Note: F2BYWT used as regression weight. School size and tuition measures are logged. Model fit information for these findings are shown in Table 2a.
$^{**}p < 0.01$. $^{*}p < 0.05$.

Table 3. Multiple Mobility Patterns by Race/Ethnicity and SES

	Persistence	Lateral transfer	Reverse transfer	Stop out
White	0.799	0.068	0.053	0.080
Black	0.715	0.072	0.065	0.148
Hispanic	0.770	0.064	0.060	0.106
Asian	0.898	0.055	0.021	0.026
Chi-square	61.988 **			
Mean SES	3.193	3.004	2.851	2.611
F value	26.610 **			

Note: Percentages reported for race/ethnicity. The chi-square score pertains to differences across all percentages. Means reported for SES differences among mobility types. The F value pertains to differences across the means. All results are based on weighted estimates where F2BYWT is used as the weight variable.
$^{**}p < 0.01$.

education, it is important to examine whether financial aid interacts with student background characteristics to affect multiple mobility patterns. Despite our expectations, SES did not systematically interact with any of the financial aid in the preliminary analysis and thus we included only the interaction terms for financial aid and race/ethnicity in the final statistical model.

Interestingly, significant interaction effects are found only regarding lateral transfer and the significant effects are uniformly negative and involve only the interplay of low burden aid types (i.e., grant and tuition waiver) with minority status. This finding is consistent with our expectation that grants or tuition waivers are likely to be more beneficial for certain student populations than others (see Table 2a). Given that white students are treated as the reference group in the analysis, the main effects of financial aid types in Model 2 represent the effects of different aid options for white students. For black students, receiving tuition waivers, as opposed to having no waivers, reduces the odds of lateral transfer by nearly 78% ($e^{0.863-2.383} = 0.219$, $p < 0.010$). Tuition waivers appear to have a similar effect for Hispanic students, reducing the risk of lateral transfer by about 44% ($e^{1.186-1.759} = 0.564$, $p < 0.010$). Finally, Asians with grants are 61% less likely than those without grants to experience a lateral transfer ($e^{1.264-2.214} = 0.387$, $p < 0.010$).

Altogether these findings indicate that while the degree of burden associated with financial aid may matter for all students, certain types of financial aid appear to be particularly important for black, Hispanic, and Asian students. This finding is likely to be related to the psychological benefits (e.g., perceived meaning of different types of financial aid as well as greater self-confidence and self-esteem) associated with grants or tuition waivers or with reduced pressures for working while in college, allowing

students to integrate with the college environment by spending more time and effort on their academic work and involvement.

Discussion and Implications

This study extends the existing literature in two ways. First, instead of a dichotomous view of student mobility involving an either stay or leave concept, this study incorporates a multifaceted view that distinguishes between lateral and reverse transfers, as well as stop outs. Second, this study addresses the interplay of financial aid—the primary policy lever to equalize college opportunities—with race/ethnicity in predicting multiple mobility patterns.

When examining lateral transfers we see that SES or race/ethnicity do not have independent effects but that tuition and aid/tuition ratio are important negative factors. On the other hand, the effects of SES are much stronger in predicting reverse transfers and stop outs but tuition level and aid/tuition ratio are not significant. This raises a question of whether the policy of "high tuition / high aid" approach is an efficient and equitable tool in higher education finance (Griswold & Marine, 1996; Hearn & Longanecker, 1985; Nishimura et al., 2009). The proponents of this approach argue that rationalizing the tuition level does not negatively influence college enrollment and persistence of the students from middle and upper-income families because they tend to be less responsive to changes in tuition than others from low-income families. At the same time, the increased tuition revenue can be redistributed to the financially needy students in the form of increased institutional aid since low-income and disadvantaged students are more sensitive to changes in price (particularly in a low-burden aid format) (DesJardins, Ahlburg, & McCall, 2002). While our finding suggests that the "high tuition / high aid" approach may be an effective means to divert students from moving to another four-year institution, the same may not be true for reverse transfers or stop outs. From an institutional perspective, therefore, institutions that experience high lateral transfer rates may consider high tuition/high aid policy as a viable option to retaining its students, but this policy should not be considered by institutions that tend to lose their students to other two-year institutions or to stopping out.

Another important finding is that out-of-state enrollment (students who start college out of their home state), increases the odds of lateral transfer. Research and policy debates may need to address what prompts these mobile students to become mobile again. Due to data limitations, we were unable to examine whether these students who leave their initial out-of-state institutions go back to their home state or not (or to the institutions with higher or lower tuition charges).

Many states today have implemented state-sponsored financial aid to encourage students to attend in-state public (and sometimes private) colleges to promote the long term economic benefits of having college graduates within state borderlines such as better tax revenue and improved labor markets (Schmidt, 1998; Tornatztky et al., 2001). Therefore, addressing the deeper reasons behind such lateral mobility and the destinations of lateral transfers (e.g., whether the students return to their

home state to enroll in four-year institutions or move to another out-of-state four-year institutions) is important for strengthening state policies designed to help retain out-of-state students or to recruit those students attending out-of-state institutions back home (Groen, 2003; Tornatzky et al., 2001). From this perspective, the significant positive effect of out-of-state enrollment on lateral transfer may *not* be as bad a thing. If out-of-state freshmen tend to transfer to four-year institutions in their home-states, then that may potentially improve their chances of timely degree completion because they are likely to have more resources available in the form of family and social support, familiarity with the local context, and social networks (Nora et al., 2006; Trent et al., 2006). In essence, our findings hint at the potential concept of "productive mobility," which is students use mobility as a way to ensure successful college outcomes including degree completion and thus becoming more productive, and further exploration of this concept requires student data tracking (i.e., how students flow through college both within and across states).

It is worth noting the negative effect of financial considerations in choosing college on reverse transfer. One possible explanation can be making more "prudent" financial decisions when choosing college (for example, with regard to tuition and costs) could inherently lower the chances of switching to two-year institutions, particularly in search for lower expenses. As Paulsen and St. John (2002) note, having a realistic view of financial issues while making college choices is critical in subsequent persistence. Our findings indicate, however, that this may be important in avoiding only reverse transfer, but not lateral transfer or stop out. Since students who misjudge financial obstacles and prospects may leave four-year institutions for two-year ones at a greater rate, higher education administrators could help students make more informed decision on the costs involved in different college choices which in turn improve persistence rates for institutions and increases timely degree completion rates for individual students.

Lastly, this study found that tuition waivers and grants would help Asian, black, and Hispanic students, particularly with regard to lowering their lateral transfer. Therefore, institutional policy makers may consider securing discretionary funds for those types of financial aid that could be strategically used for targeted student populations to lower lateral transfer and to increase persistence rates, particularly for those who traditionally have lower persistence rates (Bowen, Chingos, & McPhearson, 2009). Institutions with large number of students who transfer to other four-year institutions could gain the most benefit by utilizing this approach. Future studies can take a more comprehensive approach and consider the interplay of financial aid with other student background characteristics in light of this study's extended models that account for access to and utilization of different aid types and aid amounts by different groups. With this, the reasons why certain student groups are more likely than others to benefit from particular aid packages will be clarified.

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