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Supporting quality data and decisions for higher education.

Letter from the Editor

Nuance. It's a simple word that does not adequately seem to reflect the complexity it represents.

In reflecting upon the three articles presented in this volume, it is the first word that came to mind. The work of selecting peers, defining discounting, and discussing expectations all require attention to nuance, and these articles suggest important reasons why this is the case. As our world becomes ever-more informed by data, there is an ability to better understand the complexity of issues, yet at the same time there exists a belief that more data will make issues easier to understand and explain in simple formats.

The Obama Administration's focus on college scorecards, rankings, and shopping sheets to guide the college selection process—and the metrics that comprise these efforts—serve as examples of a perception of simplicity. Yet as D'Allegro and Zhou point out, selecting peers at the institutional level requires complex analysis. One would think that students' selection processes would consist of more exploration than simply clicking on a criteria or two as well. This assumes, of course, that the data elements have common definitions and are operationalized the same way. However, that assumption is not accurate, as highlighted by Davis and Redd and by Seifert, Wells, Saunders, and Gopaul.

I am reminded that appropriate use of data requires an appreciation for nuance. I believe that after reading the fine work presented in these three papers you will regain your appreciation for it as well.

Sincerely,

Christopher M. Mullin

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ARTICLE 132

Association for Institutional Research

A CASE STUDY TO EXAMINE PEER GROUPING AND ASPIRANT SELECTION

Mary Lou D'Allegro, Kai Zhou

About the Authors
Mary Lou D'Allegro is the associate vice-president for Academic Affairs, Institutional Effectiveness at Siena College. Kai Zhou is the institutional research analyst at Siena College.

Abstract
Peer selection based on the similarity of a couple of institutional parameters, by itself, is insufficient. Several other considerations, including clarity of purpose, alignment of institutional information to that purpose, identification of appropriate statistical procedures, review of preliminary peer sets, and the application of additional metrics need to be part of the process.

At the heart of the paper is a detailed description of a mixed-methods approach deployed to identify institutional peer and aspirant groups for a private nonprofit 4-year liberal arts college. As part of the methodology, an aspirant index is proposed and explained by the authors. This coefficient is applied to a preliminary set of institutions to further refine the aspirant list.

This paper inventories the methods documented in other research and resources that can be used to select peers. This compendium is intended to inform customized amalgamation of methods that could potentially augment future peer selection endeavors and benchmarking studies.

INTRODUCTION

Peer comparisons have become increasingly common (Gater, 2003; Huxley, 2009; McLaughlin, Howard, & McLaughlin, 2011; Trainer, 2008). Comparative analyses address the demand for accountability, provide benchmark targets, justify budget and planning decisions, and complement competitor appraisals (McLaughlin & Howard, 2005). Accordingly, comparisons with other institutions seem to be gaining legitimacy (Eckles, 2009).

Yet there seems to be no expectation to perfectly match an institution with other colleges and universities (Anderes, 1999), hence the reliance is on identifying peers or institutions with similar characteristics. Institutions without existing associations that are similar in certain delineating factors are deemed as peers (Anderes, 1999; Trainer, 2008). Regardless, the challenge lies with the definition of "similar." This is evident from the variety of previously reported selection methodologies. Some of those methodologies—such as nearest neighbor and cluster analysis statistical techniques, as well as looking at the efficacy of only using institutional characteristics—are addressed in this paper.

The peer selection described in this paper was conducted because the existing set of peers was identified before the college revised its mission and strategic plan. Furthermore, the current strategic plan differed from previous plans. The new sets of peer and aspirant institutions were much more aligned with the college's mission, goals, and stretch targets in the case of the aspirants because of several rigorous methodologies invoked for the selection.

This research paper consists of three sections. First, the authors give an in-depth explanation of the methods and overall process of selecting a set of institutional peers, peers that are relevant and useful for comparative analysis and benchmarking. The constant exploration, examination, and deliberate choice of data and information to collect and use are evident throughout this paper. The peer selection culminates with the

two statistical methodologies, nearest neighbor to select peer institutions, and a two-step cluster analysis to determine aspirants. Second, alternative methodologies not used in the applied research project are described. Third, an inventory of existing tools is provided that may enhance a peer analysis or serve as an acceptable substitute. The paper concludes with a brief discussion on the future direction of peer selection and analysis.

METHOD

Peer selection is a multi-tier and iterative process (McLaughlin et al., 2011). This study undertook a hybrid approach, amalgamating the methodologies of previous peer analysis case studies reported in the literature. Using multiple methods for this applied research project affords a practical balance between stakeholder judgment and statistics (Trainer, 2008). The balance achieved better credibility than if either was used in isolation. Faculty and staff on the peer selection design were consulted at the beginning of the applied research project and regularly at each step. Methodology was often adjusted based on their insightful suggestions. Hence, the mixed method approach used for this case study is the result of a failed approach at discerning a relevant peer group from only a few institutional characteristics early in the process and the necessity to assert another method. Several additional methods were used in response to feedback from constituents.

For this peer selection, seven steps were undertaken: (1) determination of an initial peer set, (2) collection of data on the initial set of institutions, (3) variable standardization, (4) parsing the initial peer set into several subsets, (5) suitability determined by use of collected and transformed data elements, (6) identification of the best variables to use, and (7) selection of peers and aspirants. The ground work for the aspirant selection was laid by the first six steps. The two selection methodologies differed only by one step. A cluster analysis was substituted for the nearest neighbor strategy for the selection of aspirants. (Note that the institution under investigation will be referred to in this paper as the target institution.)

1. Determination of an Initial Peer Set

The initial set of institutions was chosen from an original list of private, nonprofit institutions that submitted data to the Integrated Postsecondary Education Data System (IPEDS) from the Data Center website (NCES, 2013b). The list was generated using the EZ group option (National Center for Education Statistics [NCES], 2012). Data for these institutions were collected for 2010 and 2011, the most recent data available at the time of the study. All 4-year private nonprofit institutions were included at this initial stage if each met the following criteria: (a) highest degree awarded a bachelor's, a master's, or both, (b) enrolled full-time undergraduate students, (c) Baccalaureate: Arts & Sciences, or Baccalaureate: Balanced Arts & Sciences, diverse fields Carnegie Classifications, (d) Title IV participant (federal financial aid eligibility), (e) located in the United States or designated as a U.S. Service School (e.g., U.S. Naval Academy), and (f) not a tribal college. This is on par with selection parameters recommended by previous studies (Anderes, 1999). As a result of applying these criteria, 285 institutions were selected.

2. Collection of Data on the Initial Set of Institutions

Key performance indicators (KPIs) are metrics used to measure quality—the institution's quality. Quality is defined within the context of the institution's mission and its priorities. Peer selection should be based on information that relates to the mission and priorities of the institution (Anderes, 1999; Cohodes & Goodman, 2012). Therefore, the data collected for the target institution's KPIs would be the information also needed for the other institutions.

Before deciding which KPIs to use, some exploratory analysis was undertaken. First, each institutional KPI was classified based on how it affected institutional quality: (a) Influencer-Input (e.g., SAT scores, admission yield rates), (b) Influencer-Concurrent (e.g., academic engagement, crime statistics), or (c) Performance Indicator – Output (e.g., retention rates, number of conferred bachelor's degrees). Next, a group of faculty and staff were asked to rate the importance of each KPI as it related to institutional quality. Data slated to be collected, hence, were informed by the KPI classifications and the faculty and staff importance ratings.

The caveat was that these data had to be readily available and easily accessed for the other 285 institutions. For this

institution, KPI data were gathered from a variety of sources, primarily from national consortiums, surveys, and IPEDS. Data from the former included (a) National Survey of Student Engagement (NSSE) benchmarks, (b) American Association of University Professors (AAUP) faculty salary data, (c) Noel Levitz Student Satisfaction Inventory (NLSSI), and (d) U.S. News & World Report rankings (U.S. News & World Report, 2011). However, not all 285 institutions participate in the NSSE or NLSSI, and AAUP data at the individual institution level are not available. Consequently, the variables used in the peer analysis were primarily sourced from IPEDS and the U.S. News & World Report rankings. Those variables are shown in Appendix A. Descriptions of each are provided in Appendix B. Examples of data that were collected as a result of availability include tuition, total price of attendance, total enrollment, financial expenditures, SAT scores, admit yield, and quality of faculty.

3. Variable Standardization

After a preliminary examination of the data, it was discovered that the enrollment and number of applicants at the target institution were almost double that of most of the other institutions. To control for institutional size, each institution's reported full-time equivalent (FTE) enrollment was divided into some of the data elements to eliminate the bias that may result from differences in enrollment size (Gater, 2003; Huxley, 2009). Examples of data elements that were standardized by dividing by FTE include the number of conferred bachelor's degrees, number of applicants, unduplicated annual enrollment, instructional expenses, and endowment.

The researchers had access to both full-time and part-time faculty counts. These were combined into one data element—the proportion of full-time faculty to full-time plus part-time faculty. Some variables were not converted. Retention and graduation rates were not altered. The percent of classes with 20 or fewer students was not changed; the data element is not affected by the differences in size of enrollment among institutions. Likewise, admissions yield and alumni giving rates, expressed as proportions, were not transformed. Faculty salaries were already reported as an average and, therefore, were not changed. Similarly, downloaded SAT score percentiles remained unaltered. The percent of transfer students was classified into two categories—low and high.

4. Parsing the Initial Peer Set into Several Subsets

A workable peer group size was sought to abet further analysis and peer selection. Depending on purpose, a reasonable peer group size has been identified to be between 5 and 40 institutions (McLaughlin et al., 2011). Five subgroups were assembled based on institutional characteristics gleaned from the school's Carnegie Classification: (a) Catholic affiliation, (b) primarily baccalaureate, (c) highly residential, (d) low proportion of transfer students, and (e) more selective (Carnegie Foundation, 2010). Previously identified peer and competitor groups formed the basis for these subgroup categories. Aggregate information was compiled for the data elements collected in Step 2, and standardized if appropriate, for all 285 institutions and the five institution subsets.

5. Suitability Determined by Use of Collected and Transformed Data Elements

To better clarify the many comparisons to be made in the following steps, a mean was computed for the data elements listed in Appendix A and standardized when applicable for each subgroup. These means were compared to the target institution's data.

The target institution was similar to the subgroups in some aspects but noticeably different on other parameters. As such, no group clearly emerged as comparable. For example, total price of attendance was similar to the target institution for all subgroups, but the target institution had better 1-year retention rates and 6-year graduation rates for all subgroups except for the more-selective subgroup. On the other hand, the target institution had a smaller proportion of full-time faculty and alumni giving rate than the institutions in the more selective sub-group. Although no tests of significance were used, statistical testing could have quantified these differences and possibly better determined the adequacy of each subgroup as a potential peer set.

Therefore, an additional reference group was formed by combining three of the above criteria: (a) low proportion of transfer students, (b) highly residential, and (c) more selective.

Again, no definitive peer set emerged. As these comparisons demonstrate, selecting an initial set of peers based on institutional characteristics may seem to be a practical and logical approach, but can be ineffectual (Shin, 2009).

6. Identification of the Best Variables to Use

The committee of faculty and staff was instructed to identify the KPI performance measures that best aligned with the priorities of the college. Three KPIs were identified: (a) 1-year retention rate, (b) 6-year graduation rate, and (c) proportion of students to bachelor's degrees awarded. Variables for peer selection would be determined by their predictive power of the three KPI performance measures.

Several regression models were identified for each KPI. This was accomplished in two phases. First, the data elements were classified into five categories: (a) admissions, (b) faculty, (c) enrollment, (d) institutional characteristics, and (e) finance. Ordinary least square (OLS) regression models using a single-step enter method in SPSS were compiled separately for the five variable categories for each KPI, a total of fifteen models. Because the analysis was still exploratory at this stage, the single-step enter method was preferred over other models. This afforded the inclusion of all category variables in the model, enabling comparisons among the variables (SPSS, 2008). Directed by previous research, the resulting regression coefficients were the determinants of data elements that would be used for peer selection (Hom, 2008).

In the second phase, an overall regression model for each KPI was computed using the best predictor or predictors from each of the five category regressions. The variable with the smallest significance level associated with the standardized beta coefficient was deemed to be the best predictor. The significance of a beta weight indicates if the variable is a predictor relative to the variable's absence in the model (Cohen & Cohen, 1983). In most cases, only one variable from each category was chosen for the three overall models because of the relatively high correlations among the variables within their categories. In effect, this reduced the relatedness or redundancy of the variables in the three overall models. It also maximized the potential predictive strength of each variable. Additionally, a balance

Table 1. Overall OLS Regression Models for the Three Performance Indicators: Ratio of Conferred Bachelor's Degrees to FTE, 1-Year Retention Rate, and 6-Year Graduation Rate

Category	Variable*	Standardized Beta Weight
Ratio of Conferred Bachelor's Degrees to FTE		
Admissions	25th Percentile Mathematics SAT	.348*
Faculty	Average Faculty Salary	–.142
Enrollment	Estimated Fall Enrollment to FTE	–.053
Institutional Characteristics	Selectivity	.282**
Finance	Instructional Expenses	.166
1-Year Retention Rate		
Admissions	25th Percentile Mathematics SAT	.465***
Faculty	Average Faculty Salary	.135
Enrollment	FTE	.064
Institutional Characteristics	Selectivity	.301***
Finance	Instructional Expenses	.065
6-Year Graduation Rate		
Admissions	Percent of First Time Federal Grant Aid Students	–.145**
Faculty	Average Faculty Salary	.211**
Enrollment	FTE	.090
Institutional Characteristics	Selectivity	.178***
	Proportion of Transfer Students	–.104**
Finance	Total Price of Attendance	.007
	Instructional Expenses	.224***
	Alumni Giving Rate	.186*

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

of institutional metrics for peer selection was sought by using the best predictors from each of the five variable categories rather than five best predictors regardless of category. The best predictors for each KPI regression model by category are listed in Table 1.

Two different admissions data elements were identified for the overall models. The 25th percentile Mathematics SAT variable was the best predictor for both the ratio of conferred bachelor's degree to FTE and the 1-year retention rate overall models. For the 6-year graduation rate, percent of first-time federal grant aid students was best.

Curiously, average faculty salary reigned supreme for all three overall models. In fact, this faculty data element was the only significant data element for the bachelor's degree to FTE regression model ($\beta = .400$, $p \leq .001$). The standardized beta weight far exceeded the other faculty data elements in the 1-year retention rate model ($\beta = .622$, $p \leq .001$). The faculty data element with the next-largest standardized beta weight in the 1-year retention rate model, percent of full-time instructors, was perceptibly smaller ($\beta = .165$, $p \leq .01$). Similar results were observed for the 6-year graduation rate model with the standardized beta weight for percent of full-time instructors smaller than the average faculty salary standardized beta weight ($\beta = .176$, $p \leq .001$, $\beta = .630$, $p \leq .001$, respectively).

In the enrollment category, FTE was the best predictor for two of the models: 1-year retention rate and 6-year graduation rates. The transformed variable, estimated fall enrollment to FTE, had the best beta coefficient significance level for the ratio of conferred bachelor's degree to FTE. Not surprisingly, selectivity was the institutional characteristic with the best beta coefficient significance level for all three overall models. The proportion of transfer students was also an equally significant institutional characteristic for the 6-year graduation rate overall model. For the finance category, instructional expenses bubbled to the top for ratio of conferred bachelor's degree to FTE and 1-year retention rate models. Three finance variables fared best for the 6-year graduation model: (a) total price of attendance, (b) instructional expenses, and (c) alumni giving rate.

The data elements, FTE, and estimated fall enrollment to FTE, are highly correlated. ($r = .874$, $p \leq .001$). The latter data element may be perceived as confusing and is not as commonly used as FTE. Therefore, estimated fall enrollment to FTE was eliminated from further consideration. Nine data elements, the strongest predictors of the three KPIs, remained and were the basis for the analysis in the next and final step: (a) 25th percentile Mathematics SAT, (b) percent of first-time students receiving federal grant aid, (c) average faculty salary, (d) FTE, (e) selectivity, (f) proportion of transfer students, (g) instructional expenses, (h) total price of attendance, and (i) alumni giving rate. In short, nine variables that were statistically the best predictors of the college's priorities as deemed by a consensus of faculty and staff will be the basis of the peer selection. Moreover, these predictors are representative of the inputs and outputs that affect institutional quality.

7. Selection of Peers and Aspirants

Use of the nearest neighbor statistical technique to compute proximity index. Nearest neighbor methodology is a multi-step process: (a) determining the most relevant parameter calculations, (b) computing the numerical difference between the reference and target institutions on each of those parameters, and (c) deciding the range that constitutes a proximate or "near neighbor" difference. As such, peer institutions are determined by having metrics that are proximate to the target institution (McLaughlin et al., 2011).

For the peer selection, the numeric difference between the target and each comparison institution was determined for the nine variables. In turn, these differences determined peer proximity or nearest neighbor. A proximity score was compiled using the standard deviation of each predictor to measure nearness as shown in Figure 1. Specifically, a proximity score of 1 was assigned to any institution that was between one-half and one standard deviation of target institution's metric, and a score of 2 if the institution was within one-half standard deviation. The average of the nine equally weighted proximity scores derived the proximity index. Generically, these computations can be represented by two simple equations:

$$PS_{var1} = (TI_{varx} - CI_{varx}) / SD_{varx} \quad (1)$$
$$varx \in \{1, \ldots 9\}$$

$$PI_{institution} = \text{average } (PS_{var1} \ldots PS_{var9}) \quad (2)$$
$$institution \in \{1, \ldots 285\}$$

Where:

PS = Proximity Score

PI = Proximity Index

TI = Target Institution

CI = Comparison Institution

Var1 – Var9 = Predictors

0 reassigned to PS when: PS > 1 or PS < –1

1 reassigned to PS when: –1 < PS < –.5 or .5 < PS < 1

2 reassigned to PS when: —.5 < PS < .5

This case study departs from the nearest neighbor methodology (McLaughlin et al., 2011). A small number of data elements was used to compute the proximity index, which is an aggregate score of the nine predictor variables. Furthermore, the variables were weighted equally, a decision made by the researchers. Nevertheless, these changes are warranted. A large number of variables that are highly correlated may make the meaning of the proximity index difficult to decipher and obscure the advantage of its use (Gater, 2003; Lorr, 1983).

The average proximity scores—the proximity indices—for the 285 institutions range from 0 to 1.78. Examining first the range of proximity indices and then the resulting percentiles for these institutions, two peer sets emerged. The first set of peers, given the moniker "near peers," comprised the 19 institutions having proximity indices corresponding to the 95th percentile or higher. Another 19 institutions constituted the next tier of peer institutions, dubbed "almost near peers." These almost near peers had proximity indices between the 90th and 95th percentiles. These two sets of peers are shown in Appendix C.

Figure 1. Proximity and Aspirant Index Numeric Assignments for Differences Between Reference College and Institution

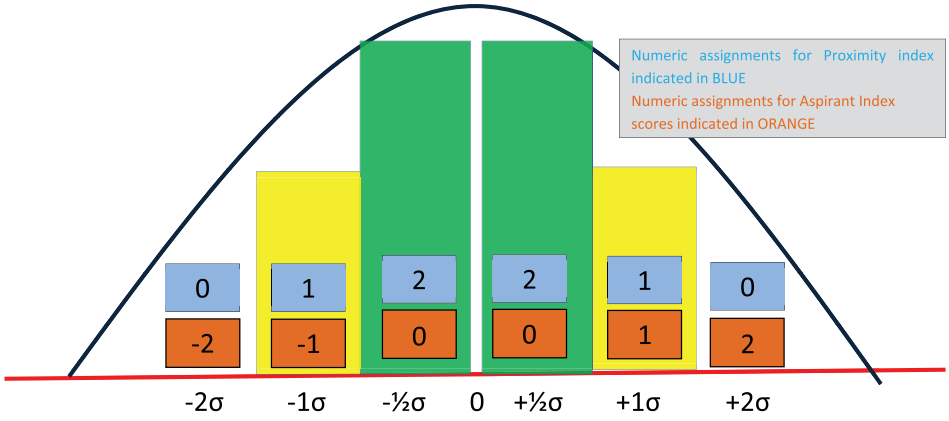
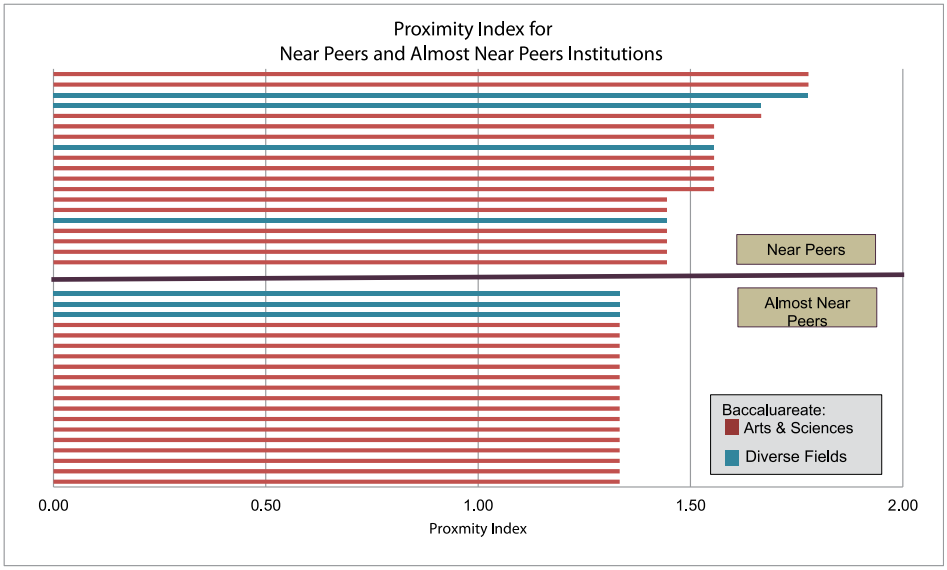


Figure 2. Proximity Index and Carnegie Classification for Near Peer and Almost Near Peer Institutions



As seen in Figure 2, the basic Carnegie Classification for four of the near peer institutions and three of the almost near peers are Baccalaureate: Diverse Fields. The remaining peers are Baccalaureate: Arts and Sciences, which is the same as the target institution.

Aspirant selection determined by cluster analysis. Most studies evaluated for this paper had a singular focus (peer selection or aspirant identification, but not both). Accordingly, none distinguished the differences between

peer group formation methodology and the process to determine aspirant institutions. In this respect, this case study differs from previous research. A different statistical method—cluster analysis—was used to determine a list of aspirant institutions. That said, the same nine predictor variables and KPIs used for the nearest neighbor analysis were used for the aspirant analysis.

In preparation, quartile cut scores were identified for each KPI for the initial set of institutions. Institutions were then assigned to their corresponding quartiles, one for each KPI. Next, a two-step cluster analysis using the likelihood distance method was performed for each KPI. This was accomplished by using the best predictors for each KPI from the five categories listed in Table 1. In a two-step cluster analysis, individual institutions are consecutively combined to form clusters subsequent to an initial pass (SPSS, 2008). Figure 3 shows the three cluster panels, one for each KPI. Each panel consists of two or three columns, one for each cluster. Listed in each column are the predictor means or variables used to construct the cluster followed by the average KPI quartile category assignment, designated as the evaluation field.

The ratio of conferred bachelor's degree to FTE and 1-year retention rate KPIs yielded three clusters, whereas the 6-year graduation KPI cluster analysis was less discerning and produced only two clusters. For these first two KPIs, approximately one-third (35.4%) of the institutions were in the cluster with the best KPI quartile category average, the aspirant cluster. The 6-year graduation rate cluster rate was less distinguishing. For this KPI, the aspirant cluster represented more than half (52.5%) of the institutions as possible aspirants.

The same cluster variables were used for the ratio of conferred bachelor's degrees to FTE and 1-year retention rate KPI cluster analyses. The cluster assignments among the institutions were the same for these two cluster analyses and, therefore, the cluster analyses are essentially identical. Because the underlying goal is to identify a reasonable number of aspirants, and two of the cluster analyses produced a smaller identical set of aspirant institutions than the third, the clusters from the two identical clusters were examined further.

Figure 4 depicts the distance of the predictor variables among the clusters graphically. Since the clusters were redundant, only one set of clusters is portrayed but with seven

Figure 3. Cluster Size and Means for Each Cluster Associated with the Evaluation Fields
Note: Orange highlight indicates best or "aspirant" cluster.

KPI: Bachelor's Degree to FTE			
Cluster	3	2	1
Description	3. ABOVE the Mean: Bachelor's Degree to FTE	2. AT the Mean: Bachelor's Degree to FTE	1. BELOW the Mean: Bachelor's Degree to FTE
Size	35.4% (n=80)	44.47% (n=101)	19.9% (n=45)
Inputs	Selectivity: More Selective	Selectivity: Selective	Selectivity: Inclusive
	SAT Math 25th Percentile Score, 2010-11: Mean= 571.55	SAT Math 25th Percentile Score, 2010-11: Mean= 465.15	SAT Math 25th Percentile Score, 2010-11: Mean= 406.44
	Instructional Expenses per FTE: Mean= $15,724.06	Instructional Expenses per FTE, Mean-= $7,628.18	Instructional Expenses per FTE: Mean= $5,782.85
	Average Full-Time Faculty Salary (All ranks): Mean= $76,156.18	Average Full-Time Faculty Salary (All ranks): Mean= $56,271.03	Average Full-Time Faculty Salary (All ranks): Mean= $51,876.53
	FTE, Fall 2010: Mean= 1,966.21	FTE, Fall 2010: Mean= 1,584.70	FTE, Fall 2010: Mean= 1,455.20
Evaluation Field (KPI)	Bachelor's Degree to FTE	Bachelor's Degree to FTE	Bachelor's Degree to FTE

Bold indicates most frequent category or mean for cluster. Darker shades indicate more important inputs

KPI: 1 Year Retention Rate			
Cluster	3	2	1
Description	3. ABOVE the Mean: 1 Year Retention Rate	2. AT the Mean: 1 Year Retention Rate	1. BELOW the Mean: 1 Year Retention Rate
Size	35.4% (n=80)	44.47% (n=101)	19.9% (n=45)
Inputs	Selectivity: More Selective	Selectivity: Selective	Selectivity: Inclusive
	SAT Math 25th Percentile Score, 2010-11: Mean= 571.55	SAT Math 25th Percentile Score, 2010-11: Mean= 465.15	SAT Math 25th Percentile Score, 2010-11: Mean= 406.44
	Instructional Expenses per FTE: Mean= $15,724.06	Instructional Expenses per FTE, Mean= $7,628.18	Instructional Expenses per FTE: Mean= $5,782.85
	Average Full-Time Faculty Salary (All ranks): Mean= $76,156.18	Average Full-Time Faculty Salary (All ranks): Mean= $56,271.03	Average Full-Time Faculty Salary (All ranks): Mean= $51,876.53
	FTE, Fall 2010: Mean= 1,966.21	FTE, Fall 2010: Mean= 1,584.70	FTE, Fall 2010: Mean= 1,455.20
Evaluation Field (KPI)	1 Year Retention Rate	1 Year Retention Rate	1 Year Retention Rate

Bold indicates most frequent category or mean for cluster. Darker shades indicate more important inputs

KPI: 6 Year Graduation Rate		
Cluster	2	1
Description	2. ABOVE the Mean: 6 Year Graduation Rate	1. BELOW the Mean: 6 Year Graduation Rate
Size	47.5% (n=96)	52.5% (n=106)
Inputs	Selectivity: More Selective	Selectivity: Selective
	Total Price (In-District Students), 2011-12: Mean= $49,411.96	Total Price (In-District Students), 2011-12: Mean= $37,474.40
	Instructional Expenses per FTE: Mean= $15,663.95	Instructional Expenses per FTE, Mean-= $7,749.11
	Average Full-Time Faculty Salary (All ranks): Mean= $76,441.92	Average Full-Time Faculty Salary (All ranks): Mean= $56,838.32
	% FT Students Receiving Federal Aid: Mean= 22.02%	% FT Students Receiving Federal Aid: Mean= 41.75%
	Alumni Giving Rate: Mean= 31.11	Alumni Giving Rate: Mean= 18.31
	Transfer Proportion: Low Transfer	Transfer Proportion: Low Transfer
	FTE, Fall 2010: Mean= 1,964.60	FTE, Fall 2010: Mean= 1,611.24
Evaluation Field (KPI)	6 Year Graduation Rate	6 Year Graduation Rate

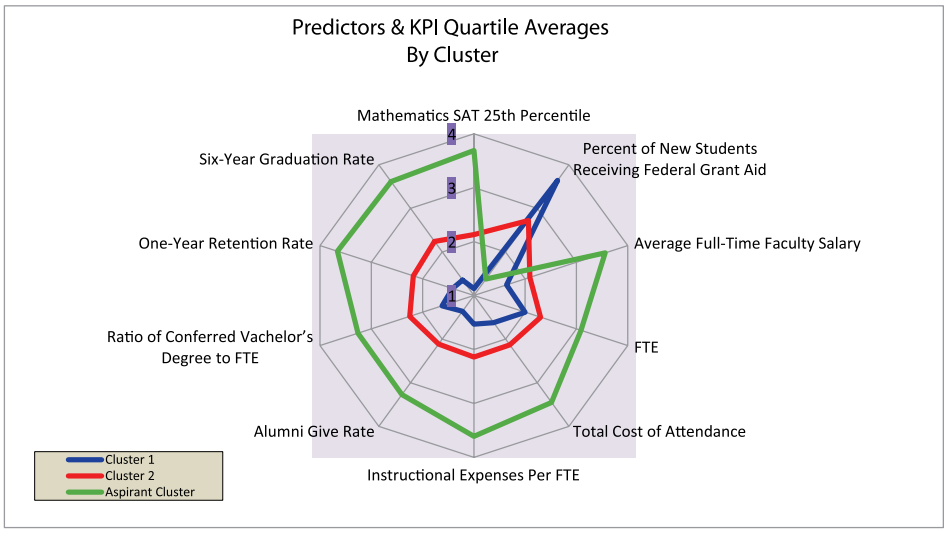
Bold indicates most frequent category or mean for cluster. Darker shades indicate more important inputs

cluster variables from the two cluster models. Specifically, the seven cluster continuous scaled variables were each separately converted to quartile categories similar to the transformation made for the three KPIs (McLaughlin et al., 2001; Merisotis & Shedd, 2001). Selectivity and proportion of transfer students, both ordinal scale variables, were not included in this graphical representation. The resulting average quartile category for each cluster for the seven cluster variables and three KPIs is plotted using the cluster categories assigned to the institution. The distinction among clusters is noticeable and much clearer in the radar chart in Figure 4 than discerned in the separate cluster panels in Figure 2.

The aspirant cluster has the largest quartile averages for every predictor except for percent of new students receiving federal grant aid. Conversely, Cluster 1 has the smallest average for nine of the ten plotted variables. This cluster has the largest quartile average for the percent of new students receiving federal grant aid.

Although the two identical cluster analyses yielded a smaller set of aspirant institutions than the 6-year graduation rate cluster analyses, not all were part of the latter aspirant group. Therefore, only the 52 institutions that were in all three aspirant clusters would be considered as potential aspirants. Somewhat unmanageable in size, an aspirant index was computed for these 52 schools. In concept, the aspirant index is similar to the proximity index with four germane distinctions: First, nine KPI predictors were the basis of the proximity index, but the proximity scores for the actual KPIs were excluded from the proximity index. However, the aspirant scores for each KPI were included in the aspirant index calculations. Second, the proximity index gave more credence to small differences, and the aspirant index more weight to large positive differences. For the proximity index, larger numerical values were assigned to institutions that were close to the target institution than to those that were not. However, the aspirant schema awarded larger absolute values to large differences between the target and comparison institutions than those that had small differences. Third, the direction of that difference is unimportant in the proximity index calculation but is at the heart of the aspirant index calculation. That is, if the aspirant metric was greater than the target institution's value, a positive aspirant score was assigned. Fourth, the standard deviations used to determine aspirant scores were only compiled for the 52 schools in the aspirant clusters.

Figure 4. Quartile Means for Each Cluster



As such, standard deviation was computed for each KPI for the aspirant cluster institutions. An aspirant score of one was assigned to any institution that was between one-half and one standard deviation above the target institution's metric, and a score of two was given if the institution was greater than one standard deviation. Correspondingly, if the institution's value was between one-half and one standard deviation below the target institution's score, a negative one was assigned, and if the institution was greater than one standard deviation below the target institution a negative two was assigned. A zero was given to an institution's metric within one-half the standard deviation above or below the target institution. Figure 1 provides a visual depiction of the numerical assignments.

The average of the three equally weighted aspirant scores comprised the aspirant index. The equations used in the aspirant score described above and aspirant index computations

are similar to the proximity index calculations. That is,

$$AS_{KPIx} = (TI_{KPIx} - CI_{KPIx}) / SD_{KPIx} \quad x \in \{1, 2, 3\} \tag{3}$$

$$AI_{aspirant\ institution} = \text{average}\ (AS_{KPI1} \ldots AS_{KPI3}) \quad \text{aspirant institution} \in \{1, \ldots 52\} \tag{4}$$

Where:

AS = Aspirant Score

AI = Aspirant Index

TI = Target Institution

CI = Comparison Institution

Var1 – Var9 = Predictors

–2 reassigned to AS when AS: < -1

–1 reassigned to AS when AS: $-1 < AS < -.5$

0 reassigned to AS when AS: $-.5 < AS < .5$

1 reassigned to AS when AS: $.5 < AS < 1$

2 reassigned to AS when AS: > 1

Results were as follows: 12 institutions had a negative aspirant index and were removed from the initial aspirant list, 27 institutions posted a zero aspirational index, and 13 institutions of the preliminary 52 aspirant institutions had an aspirant index greater than zero. The latter constituted the aspirant list or Tier I aspirant institutions. The former set of institutions is ancillary and comprises the Tier II aspirant list. These lists are shown in Appendix C. The basic Carnegie Classification for all institutions on the two aspirant lists is Baccalaureate: Arts and Sciences.

OTHER REFERENCE GROUP SELECTION METHODOLOGIES

Deciding on the most appropriate method requires both the knowledge of the statistical procedure and the purpose of the eventual comparison(s). Two statistical methodologies were used for this case study: (a) nearest neighbor and (b) two-step cluster analysis. However, other techniques should be considered either singularly, or as a mixed methods approach as with this case study. Other techniques may be better suited to the anticipated purposes of the peer analysis. Although not exhaustive, other techniques documented in the literature are provided below. This listing provides a more comprehensive collection of peer and aspirant selection techniques than has been discussed thus far in this paper and in the literature.

Cluster analysis. At least two cluster analysis techniques have been employed to determine peer institutions. First, as the name implies, two-step cluster analysis entails two iterations—one to decipher the cluster and corresponding cluster centers and another to determine cluster assignment among institutions. Second, hierarchical cluster analysis can be deployed when a small number of initial institutions are being considered. In this method, the distance between institutions on a set of parameters is computed (Hom, 2008). Euclidean distance and correlations are the most common, although the latter is discouraged (Lorr, 1983). Based on these distance designations, the researcher can determine clusters by assigning membership, often manually.

Data envelopment analysis (DEA). This statistical procedure determines the most efficient institutions, often indicated by financial indicators (Eckles, 2009). A disadvantage of this selection tool is that the identification of benchmark institutions is relative to the original list of selected institutions regardless of their actual efficiency (Taylor & Harris, 2004).

Discriminant analysis. This statistical technique classifies institutions into one or more mutually exclusive groups. Accomplished in two steps, a classification rule is first developed using institutions for which group membership is known. Next, institutions are sorted into groups based on the classification rule (SPSS, 2008). The first phase may render this technique unworkable. For peer selection, group membership is seldom established or known, rendering this technique impractical (Huxley, 2009).

Factor analysis. Institutions are classified by factors determined by the correlations or covariances among institutional parameters. As with discriminant analysis, prior knowledge of the institutions and the associations among institutional parameters is necessary.

Nearest neighbor. The determination of the best matches or nearest neighbors varies but the crux of this methodology is to decipher the extent to which an institution is a peer (McLaughlin et al., 2011). This is accomplished by computing the distance between institutions on targeted predetermined parameters.

Subject matter experts (SME). Engaging faculty and staff that have a vested interest in assembling a set of peers not only is a sound method to validate a proposed set of peer institutions, but also may increase the likelihood of the reference group's acceptability and use. This method is recommended for specific purposes rather than as a general institutional peer selection.

Variable match. Reference group formation does not necessarily require sophisticated statistical procedures, making this technique popular. In fact, alignment by a few institutional parameters may be sufficient (Anderes, 1999). This review should start with the mission of each institution under consideration. Subsequently, an examination of comparability of other institutional characteristics should ensue. This may include enrollment size, degree level and program mix, type of students served, setting (urban, suburban, rural), expenditures, and selectivity.

EXTERNAL PEER SELECTION TOOLS

Web peer selection applications have proliferated recently. The authors posit that these tools can also be useful and certainly provide data and comparative analysis beyond that described for this applied research project. In fact, many of the applications were discovered during the design of this case study and some were used for preliminary investigations.

The purpose of including a brief mention of these web sources is threefold. First, knowing the existence of these resources may save time and the effort of conducting a peer selection from scratch. Most of these websites have comparative capabilities, and therefore may be perfectly capable and sufficient for the intended purpose. Second, awareness of these resources equates to knowing where to locate needed data and information. In turn, this will help to lessen the time needed for one of the most time-consuming of the steps of a peer selection: finding the data elements and acquiring that information for the institutions under consideration. Third, exploration of the resources could uncover additional data elements not mentioned in this applied research study. For ease of reference, brief descriptions and the web addresses for each are provided in Appendix D.

CONCLUSIONS

Self-labeled as mixed methods, eight steps in total were needed to select a set of institutional peers and aspirants. This was partially due to modifications made during the study based on stakeholder feedback, and in part due to trial and error. For example, the subsets of peers in Step 4 were collectively subpar, and were not comparable to the target institution. Subsequently, however, a superior set of peers was determined by a multi-layered statistical approach that helps to unearth the institutional characteristics that best aligned with the college's priorities. To that end, the following techniques were used: (a) data element standardization, (b) parsing standardized data elements into several categories, (c) using several regression models to determine the standardized data elements that are best correlated with key institutional attributes, (d) computing proximity scores with the standardized data elements determined from the regression models to be the most appropriate, and (e) compiling a cumulative proximity index. This study does not, per se, add to the list of selection methodologies, but rather reinforces the value of using multiple methods. Furthermore, this study demonstrates that a multi-method approach is preferable to a single-method approach.

The change in process during the course of the study illustrates both the ease and the flexibility of the process itself. Importantly, examining the set of institutions gleaned by each method affords both a comparison of the appropriateness of each institution as a peer and the set of institutions as a reasonable peer group. The researchers conjecture that the latter analyses further strengthen the utility of the final set of peers and/or aspirants.

Therefore, and as this study demonstrates, peer selection based on institutional characteristics alone is inferior to a multi-staged approach. Determining institutional peers based on both the parameters that reflect institutional performance priorities and data elements that are indicative of those priorities may be a better approach. The engagement of faculty and staff to identify the information and procedures used in this applied research project helped to select peers that were better aligned with those institutional imperatives. Moreover, the inclusiveness of the process improved the credibility and eventual use of the final peer and aspirant lists. Tangentially, the inclusion of several stakeholders in the process had the added benefit of debunking the perceived superiority of several data elements. For example, previous to this study endowment, percentage of faculty holding terminal degrees, percentage of classes enrolling fewer than 20 students, and total price

of students living on campus were frequently cited as determinants of student success. Furthermore, the U.S. News & World Report rankings are often cited as an indicator of quality. As this study has shown for this set of initial peers, these institutional characteristics all contribute to an institution's U.S. News & World Report ranking but are not necessarily indicative of quality.

Admittedly, the data elements, especially the variables chosen for the peer and aspirant selection statistical procedures, were highly correlated. For example, the correlation between instructional expenses per FTE and alumni giving rate was fairly high ($r = .76$, $p < .001$) as was the correlation between average faculty salaries and percent of full-time faculty with terminal degree ($r = .617$, $p < .001$). The five variable classifications and the designation of one or a few variables from each in the final regression models were designed to mitigate this phenomenon. Hence, the potential multi-collinearity among the variables was diminished somewhat by instituting five categories and limiting variable inclusion.

Availability of data from IPEDS and other sources continues to expand. In addition, linked information from diverse resources is readily available (Trainer, 2008). This expansion of data access may be the provocation responsible for the increase in the popularity of peer analysis. Additionally, institutions and state systems of higher education have responded to public scrutiny by using peer comparisons, a familiar embodiment of quality.

RECOMMENDATIONS

The importance of the selection of data elements and statistical techniques cannot be overstated. It is imperative to consider both the type of institution and the purpose of the peer selection (Shin, 2009). In short, five factors that should be considered before selecting a set of peers were identified in this applied research project: (a) target institution mission and institutional type, (b) ultimate purpose of peer analysis, (c) ease of the collection of data and information, (d) stakeholder understanding and perception of alignment to campus priorities, and (e) timing. To the last point, use of historical information, data trends, or the most current data are posited as options but may not all be appropriate.

Engaging multiple methods may address the limitations of a single approach. As with this study, a mixed-methods paradigm yielded the most appropriate fit of potentially disparate purposes of the peer and aspirant lists. Moreover, the iterative process revealed the weakness of selecting peer institutions on appearances or similar characteristics versus choosing peers based on performance and indicators of quality. Collectively, each peer and the peer set as a whole can be explicitly justified. Furthermore, the list is validated by informed and interested stakeholders. Likewise, the choice of aspirant institutions is unambiguous, based on institutional providence. Importantly, mixed-methodologies glean peers and aspirants that are meaningful and practical.

Despite data availability, data element selection, and breadth of methodologies, the cluster analysis identified more than 50 aspirant institutions, an impractical size. This reinforces that even the most sophisticated statistical techniques and unfettered availability of data can replace neither a clearly stated purpose of the comparison nor input from various stakeholder groups. The former provides irreplaceable selection criteria, and the latter helps to confirm the legitimacy of institutions as members of the peer or aspirant groups. For this applied research study, an aspirant index was devised to further pinpoint a reasonable number of aspirants. Following the logic of the nearest neighbor, the aspirant index was changed slightly to identify the best-performing institutions. Because of its similarity to the nearest neighbor and its simplicity, the aspirant index should be considered as another potential valuable statistical technique.

Published studies about peer selection are scarce; as a result, clear direction on peer selection methodology is limited. Peer selection models, differentiated by institutional type and function, could evolve with additional evidence. Furthermore, the impact of peer comparisons on institutional quality and improvement is unknown. Little guidance exists on the evaluation of peer selection and subsequent peer comparisons (Powell, Gilleland Suitt, & Pearson, 2012). Further research should evaluate the effects of peer comparisons, if any, on institutional quality. Only with further investigation will the impact of peer comparisons on institutional quality be known.

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Appendix B. Data Element Used for Peer and Aspirant Selection: Descriptions

Admissions

Admit Yield: Number of enrolled divided by number admitted.

Number of Applicants, Total: Number of first-time, degree- or certificate-seeking undergraduate students who applied (full or part time). Includes early decision, early action, and students who began studies during the summer prior to that fall.

Percent of Applicants Admitted: Number of admitted divided by total applicants.
SAT Critical Reading 25th Percentile Score: Includes new students admitted the summer prior to that fall.
SAT Critical Reading 75th Percentile Score: Includes new students admitted the summer prior to that fall.

SAT Math 25th Percentile Score: Includes new students admitted the summer prior to that fall.

Appendix A. Data Elements Used for Peer and Aspirant Selection: Time Frame, Indicator Type, and Source

Variable	Time Frame	Indicator Type	Indicator Source
Admit Yield	2011-12	Admissions	IPEDS
Number of Applicants, Total	2011-12	Admissions	IPEDS
Percent of Applicants Admitted	2011-12	Admissions	IPEDS
SAT Critical Reading 25th Percentile Score	2010-11	Admissions	IPEDS
SAT Critical Reading 75th Percentile Score	2010-11	Admissions	IPEDS
SAT Math 25th Percentile Score	2010-11	Admissions	IPEDS
SAT Math 75th Percentile Score	2010-11	Admissions	IPEDS
Bachelors Degrees Conferred	2010-11	Completions	IPEDS
Estimated Fall Enrollment	Fall 2010	Enrollment	IPEDS
Full-Time Equivalent (FTE)	Fall 2010	Enrollment	IPEDS
Total Enrollment, Unduplicated	2010-11	Enrollment	IPEDS
Percentage of Classes Enrolling Fewer Than 20 Students	2011-12	Enrollment	US News & World Report
Average Salary Equated to 9-Month Contracts of Full-Time Instructional Staff - All Ranks	2011-12	Faculty	IPEDS
Full-Time Primary Instruction Head Count	Fall 2011	Faculty	IPEDS
Part-Time Primary Instruction Head Count	Fall 2011	Faculty	IPEDS
Percentage of Faculty Holding Terminal Degrees	2011-12	Faculty	US News & World Report
Endowment (FASB)	2009-10	Financial	IPEDS
Instructional Expenses Per FTE (FASB)	2009-10	Financial	IPEDS
Tuition- Total Price for In-District Students Living on Campus	2011-12	Financial	IPEDS
Alumni Giving Rate	2011-12	Financial	US News & World Report
Percent of Full-Time Undergraduates Receiving Federal Grant Aid	2010-11	Financial Aid	IPEDS
Carnegie Classification- Basic (Arts & Sciences or Diverse Fields)	——	Institutional Characteristic	IPEDS
Carnegie Classification- Enrollment Size & Setting	——	Institutional Characteristic	IPEDS
Carnegie Classification- Undergraduate Profile (Transfer and Full-Time proportions)	——	Institutional Characteristic	IPEDS
Geographic Region	——	Institutional Characteristic	IPEDS
Level	——	Institutional Characteristic	IPEDS
Religious Affiliation	——	Institutional Characteristic	IPEDS
Tribal College	——	Institutional Characteristic	IPEDS
Graduation Rates, Total Cohort (6Years)	As of 8/31/10	Student Success	IPEDS
Retention Rates, Total Cohort (1 Year)	Fall 2010	Student Success	IPEDS

SAT Math 75th Percentile Score: Includes new students admitted the summer prior to that fall.

Completions

Bachelor's Degrees Conferred: Awards/degrees conferred.

Enrollment

Estimated Fall Enrollment: Early estimate of enrollment for all levels for full- and part-time students.

Full-Time Equivalent (FTE): The FTE of the institution's part-time enrollment is estimated and then added to the full-time enrollment of the institution. The FTE of part-time enrollment is estimated by multiplying the part-time enrollment by factors that vary by control and level of institution and level of student.

Total Enrollment, Unduplicated: The sum of students enrolled for credit with each student counted only once during the reporting period, regardless of when the student enrolled.

Percentage of Classes Enrolling Fewer than 20 Students: The percentage of undergraduate classes, excluding class subsections, with fewer than 20 students enrolled during fall semester.

Faculty

Average Salary Equated to 9-Month Contracts of Full-Time Instructional Staff–All Ranks: Derived by summing the equated 9-month outlays for each rank and dividing by the total faculty on both 9/10 month and 11/12 month contracts.

Full-Time Primary Instruction Head Count: Instructional faculty are instruction/research staff employed full time (as defined by the institution) whose major regular assignment is instruction, including those with released time for research.

Part-Time Primary Instruction Head Count: Faculty reported to have a primary function of instruction that does not exceed 50 percent.
Percentage of Faculty Holding Terminal Degrees: The percentage of full-time faculty members with a doctorate or the highest degree possible in their field or specialty during the academic year.

Financial
Endowment (FASB): Endowment assets (year-end) per FTE enrollment for public and private not-for-profit institutions using Financial Accounting Standards Board (FASB) standards is derived as follows: Endowment assets (year-end) divided by 12-month FTE enrollment. Endowment assets are gross investments of endowment funds, term endowment funds, and funds functioning as endowment for the institution and any of its foundations and other affiliated organizations. Endowment funds are funds whose principal is nonexpendable (true endowment) and that are intended to be invested to provide earnings for institutional use. Term endowment funds with the following stipulation by the donor: the principal may be expended after a stated period or on the occurrence of a certain event. Funds functioning as endowment (quasi-endowment funds) are established by the governing board to function like an endowment fund but that may be totally expended at any time at the discretion of the governing board. These funds represent nonmandatory transfers from the current fund rather than a direct addition to the endowment fund, as occurs for the true endowment categories.

Instructional Expenses per FTE (FASB): Includes all expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public services that are not separately budgeted. Includes general academic instruction, occupational and vocational instruction, special session instruction, community education, preparatory and adult basic education, and remedial and tutorial instruction conducted by the teaching faculty. Also, includes expenses for both credit and noncredit activities. Excludes expenses for academic administration if the primary function is administration (e.g., academic deans).

Tuition—Total Price for In-District Students Living on Campus: Cost of attendance for full-time, first-time degree/certificate seeking in-district undergraduate students living on campus for the academic year. It includes in-district tuition and fees, books and supplies, on-campus room and board, and other on-campus expenses.

Alumni Giving Rate: The average percentage of undergraduate alumni (full- or part-time students) who donated money to the college or university for either current operations or capital expenses during the specified academic year. Rate is calculated by dividing the number of alumni donors during a given academic year by the number of alumni of record for that same year.

Financial Aid
Percent of Full-Time Undergraduates Receiving Federal Grant Aid: Percent of undergraduate students receiving grant aid from the federal government. Undergraduates are students enrolled in a 4- or 5-year bachelor's degree program, an associate degree program, or a vocational or technical program below the baccalaureate.

Institutional Characteristics
Carnegie Classification–Basic (Arts & Sciences or Diverse Fields): Includes institutions where baccalaureate degrees represent at least 10 percent of all undergraduate degrees, institutions that award fewer than 50 master's degrees or fewer than 20 doctoral degrees per year. Excludes special focus institutions and tribal colleges.

Carnegie Classification–Enrollment Size & Setting: School sizes are classified by very small, small, medium, large. Also indicates proportion of students living in campus housing.

Carnegie Classification–Undergraduate Profile (Transfer and Full-Time Proportions): Used in this case study to determine selectivity.

Geographic Region: U.S. region school where institution is located.

Level: A classification of whether an institution's programs are 4-year or higher (4 year), 2-year and less than 4-year (2 year), or less than 2-year.
Religious Affiliation: Indicates religious affiliation (denomination) for private nonprofit institutions that are religiously affiliated.

Tribal College: These institutions, with few exceptions, are tribally controlled and located on reservations, and are all members of the American Indian Higher Education Consortium.

Appendix C. Siena College Peers and Aspirant Lists

Near Peers	Almost Peers
Institution	Institution
Allegheny College	Augustana College
Cedarville University	Birmingham Southern College
Champlain College	Calvin College
College of Saint Benedict	Carroll College
Concordia College at Moorhead	Goucher College
Cornell College	Hampshire College
Gordon College	Houghton College
Hartwick College	Lake Forest College
Hope College	Lasell College
Juniata College	Linfield College-McMinnville Campus
Messiah College	Luther College
Oglethorpe University	Muhlenberg College
Saint Michael's College	Saint Anselm College
Stonehill College	Saint Vincent College
Susquehanna University	Southwestern University
Transylvania University	St. Olaf College
Wentworth Institute of Technology	Trine University
William Jewell College	Washington College
Wofford College	Westmont College

Tier I Aspirants	Tier II Aspirants
Institution	Institution
Amherst College	Barnard College
Bowdoin College	Beloit College
Carleton College	Bucknell University
Claremont McKenna College	Centre College
Colby College	Davidson College
Gustavus Adolphus College	Denison University
Hamilton College	DePauw University
Kenyon College	Dickinson College
Pomona College	Furman University
Saint Mary's College	Grinnell College
Swarthmore College	Kalamazoo College
Vassar College	Macalester College
Williams College	Rhodes College
	Saint John's University
	Skidmore College
	The College of Wooster
	Skidmore College
	Wellesley College
	Whitman College

Student Success

Graduation Rates, Total Cohort (6 Years): The number of students from the adjusted conferred bachelor's degree–seeking cohort who completed a bachelor's degree within 150 percent of normal time (6 years) divided by the adjusted cohort. The adjusted cohort is the revised cohort minus exclusions as reported by the institution as of 150 percent of normal time (6 years).

Retention Rates, Total Cohort (1 Year): The full-time retention rate is the percent of the (fall full-time cohort from the prior year minus exclusions from the fall full-time cohort) that reenrolled at the institution as either full- or part-time in the current year.

Appendix D. Peer Selection Websites

American Association of University Professors (AAUP): One of the most frequently requested comparisons is that of faculty compensation. The AAUP provides aggregated information from the Faculty Salaries Survey (AAUP, 2012). The provided link is a user-friendly interface developed by the Chronicle of Higher Education. http://chronicle.com/article/faculty-salaries-data-2012/131431#id=144050

Association of Governing Boards (AGB): This subscription service provides financial metrics primarily sourced from IPEDS (AGB, 2012). Multiple years of data are available for over 4,000 institutions. http://agb.org/benchmarking-service

CollegeBoard: Both search and comparison capabilities are available on bigfuture by the CollegeBoard©: Compare Colleges website (CollegeBoard, 2012). Information is limited, probably due to the fact that the primary audience is prospective

students and their parents. For example, information about faculty or instructional expenses is not available. Additionally, a maximum of only three colleges can be compared simultaneously. https://bigfuture.collegeboard.org/compare-colleges

College Factual: The website provides a rating based on a scorecard of statistics of user selected colleges (College Factual, 2013). Ratings are based on metrics weighted by the user. Again, the intended audience is prospective students and their parents. http://www.collegefactual.com/

CollegeInsight: Hosted by The Institute for College Access & Success (TICAS), this website provides aggregated financial aid information (TICAS, 2013). Although the focus of this application is affordability, information on enrollment, diversity, and student success is also available. The search engine is flexible, affording selection on multiple values for one or more of the following: sector, geographic location, enrollment sizes, percent of Pell recipients, and tuition. Additionally, several years of data are available. http://ticas.org/

College Measures: Several key institutional indicators are automatically aggregated by state and nationally on this website (College Measures, 2013). Institutional information is displayed as a performance scorecard that must be viewed separately for each school. http://www.collegemeasures.org/

College Miner: This website is unique because it reports alumni salary information (College Miner, 2013). Simultaneous comparisons can only be made for a maximum of three institutions. The target audience is prospective students and parents. Priority of this application is ease of use and colorful graphics over data. http://collegeminer.com/research/outcomestool.aspx

College Navigator: Provided by NCES, this tool narrows college peers by level of award, institutional type, and geographic location (NCES, 2013a). Because of the information available and the interface, this tool and the IPEDS Data Center website described below are recommended by the authors. http://nces.ed.gov/collegenavigator/

College News: As with the CollegeBoard, College News has a repository of college information named Compare Colleges. The online application provides the rankings of several publications, including the U.S. News & World Report (College News, 2013). Also shown is information about enrollment size, acceptance rates, and tuition. Although visually appealing, the interface is somewhat confusing and cumbersome. http://www.collegenews.com/

College Results Online: Sponsored by The Education Trust, the origin of the data is the same as for this case study, primarily IPEDS (The Education Trust, 2012). Institution type and geographic location limits the number of peers that can be selected at one time. http://www.collegeresults.org/search_group.aspx

IPEDS Data Center: The IPEDS Data Center, also supported by NCES, provides access to data for multiple institutions simultaneously (NCES, 2013b). The list of frequently used and derived variables makes access to an otherwise vast and unwieldy inventory of data elements somewhat easier. Early released data to IPEDS key holders can be obtained by request. Most of the data for this case study are from the IPEDS Data Center. http://nces.ed.gov/ipeds/datacenter/

National Assessment of Service and Community Engagement (NASCE): NASCE provides comparisons among participants regarding student service engagement (NASCE, 2012). Available data are derived from a survey of student service activities and attitudes. http://www.siena.edu/pages/5628.asp National Association of College and University Business Officers (NACUBO): Comparative information sourced from several NACUBO surveys is available to member institutions (NACUBO, 2012). A peer selection tool is among the site's capabilities. http://www.nacubo.org/research/NACUBO_benchmarking_tool.html

U.S. News & World Report: For a fee, additional data provided to U.S. News & World Report can be downloaded for participating institutions (U.S. News & World Report, 2011). Rankings aside, some of the information that can be acquired from U.S. News & World Report is not readily available elsewhere. Among the data elements unique to the U.S. News & World Report ranking are (a) awarded financial aid packages, (b) class size, and (c) high school GPA of entering students. http://premium.usnews.com/best-colleges.

PROFESSIONAL FILE

ARTICLE 133

Association for Institutional Research

TRACKING THE DISCOUNT
Tuition Discount Rates, Net Tuition Revenue, and Efforts to Inform Institutional Practices

Natalie Pullaro Davis, Kenneth E. Redd

About the Authors
Natalie Pullaro Davis is manager, Research and Policy Analysis, of the National Association of College and University Business Officers. Kenneth E. Redd is director, Research and Policy Analysis, of the National Association of College and University Business Officers.

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Abstract
This article uses findings from the 2012 Tuition Discounting Study (TDS) conducted by the National Association of College and University Business Officers (NACUBO) to provide a framework for institutional researchers to develop and adapt their own custom tuition discounting definitions and formulas.

Under tuition discounting, colleges and universities use a portion of their gross tuition and fee revenue dollars to provide academic merit scholarships and other grants to reduce undergraduate students' tuition and fee charges. Higher education institutions typically use discounting to attract undergraduates who would otherwise be unable or unwilling to pay to enroll. Although discounting practices are often used successfully, they have the potential to erode net tuition revenue (gross tuition and fees – grant aid) in some circumstances. Institutional researchers and others on campus should continually monitor their enrollment and tuition and fee prices to gauge their institutions' competitiveness in the market. The article begins with a detailed description of tuition discounting and then uses data from the TDS to answer five research questions: (1) What is the annual tuition discount rate at 4-year private colleges and universities? (2) What revenue sources are used to fund institutional grants? (3) Has the rising discount rate led to increasing net tuition and fee revenue at private colleges and universities? (4) What effect has discounting had on overall enrollments of undergraduate students and on enrollments at different types of institutions (small, comprehensive/doctoral, and research institutions)? (5) What share of institutional grant dollars is used to meet students' demonstrated financial need?

The article concludes with advice for institutional research offices that want to use the data and trends presented as a basis for analyzing trends in institutional grant aid and net tuition revenue at their own campuses.

INTRODUCTION: WHAT IS TUITION DISCOUNTING?

Over the past two decades, institutional aid has been one of the fastest-growing expenditures for higher education. Between academic year (AY) 1991–

1992 and AY 2010–2011, institutions increased their grant aid dollars to undergraduates by 253% in inflation-adjusted (2011) dollars.[1]

Expenditures for instruction, in contrast, grew 205% in roughly the same period (The College Board, 2012a; National Center for Education Statistics [NCES], 2012).

For AY 2011–2012, according to the College Board (2012a), higher education institutions provided $32.8 billion in scholarships, fellowships, and other grants to help undergraduates pay their college expenses. These grants accounted for 18% of the total amount of financial aid students received that year (The College Board, 2012a). While many public colleges award institutional grants, the majority of this aid—roughly 70.3% in AY 2009–2010—is awarded by private nonprofit 4-year colleges and universities (NCES, 2010).

A number of private educational institutions have used a portion of their funding for financial aid for many decades (Davis, 2003; Redd, 2000; Russo, 2000). Prior to the 1970s, most of these institutions awarded the majority of their grant aid to financially needy students (Davis, 2003; McPherson & Schapiro, 1998; Russo, 2000). These 4-year private colleges and universities generally used complex formulas that measured family income, financial assets, and other factors to determine which students were eligible for awards and how much they would receive (McPherson & Schapiro, 1998; Russo, 2000). As a result, most aid dollars were distributed to students based on their demonstrated financial need. Consequently, the majority of financial aid dollars went to students from low- and moderate-income families (Russo, 2000).

Beginning in the 1970s, institutions began relying on enrollment managers who developed complex strategies designed to distribute institutional grant aid dollars to students based on academic merit or other criteria other than financial need (Davis, 2003). Many private institutions adopted these new criteria, in part because they felt compelled to increase grant aid for middle- and upper-income students who increasingly expressed concerns about college affordability (National Commission on the Cost of Higher Education, 1998). Indeed, over the period from 1982 to 2012 listed tuition prices at 4-year private institutions increased 166.5%, on average, in inflation-adjusted value, whereas family incomes for households most likely to have college-age children increased only 11.5% (The College Board, 2012b; U.S. Census Bureau, 2012).

Pressures on private colleges and universities to use their aid dollars more strategically also increased as U.S. News and World Report's annual ranking of higher education institutions began to use methodologies that emphasized the proportion of entering first-year students with high college admissions test scores and other demonstrated abilities (Morse & Flanigan, 2000). Accordingly, many 4-year private institutions now devote more of their institutional aid dollars to enticing the best and brightest students to enroll on their campuses (Lapovsky & Hubbell, 2000; McPherson & Schapiro, 1998; Winston & Zimmerman, 2000).

The strategies employed by many private colleges and universities to award institutional aid dollars are referred to as "tuition discounting" plans. Under tuition discounting, colleges and universities use part of their revenue to provide academic merit scholarships and other non-need-based grants, which reduce the tuition and fee charges students would otherwise be unable or unwilling to pay to attend those institutions. Need-based and non-need-based grants may be funded by gross tuition and fee revenue (the collective amounts of tuition and fees that students [and their families] pay to attend postsecondary education institutions), donations from alumni or other private sources, and income from institutional endowments (NACUBO, 2012; Redd, 2000). Tuition and fee revenue, however, is most often used as the basis of analysis because this revenue is most often the largest source of funds used to support these institutional programs. A 2002 study (National Association of Student Financial Aid Administrators [NASFAA] & The College Board, 2002) found that 67% of total institutional grant awards were supported by tuition and fee revenue, 21% were funded by endowment earnings, and just 9% came from donations and other financial gifts to the institutions; 3% were unknown or not identified. Tuition discounts also may be unfunded tuition waivers, whereby colleges and universities simply forego all or part of the total tuition and fee charges that students otherwise would have had to pay to attend their institutions (Allan, 1999, 2005).

Under tuition discounting strategies, colleges and universities hope to use their institutional grant dollars

1 For many institutions, the AY is the period between August or September of one year through May or June of the following year. Institutional grant expenditures and tuition and fee revenue for the TDS are reported based on the full AY as of the fall for each year. That is, institutional aid data and tuition and fee revenue for AY 2011–12 are based on amounts reported as of fall 2011.

to encourage a greater number of students to enroll on their campuses. Under these plans, institutional grant recipients and amounts are based on students' admissions test scores, grades or other forms of academic merit, musical or other artistic talents and abilities, and/or other factors other than—or in addition to—demonstrated financial need. Some colleges and universities may use up to six different criteria (in addition to financial need) to award their institutional grants (NASFAA & The College Board, 2002).

At the same time, most private institutions still seek to enroll students from various income levels and racial/ethnic backgrounds (Pérez-Peña, 2012; Redd, 2000). As such, 4-year private colleges and universities generally use tuition discounting for several distinct purposes:

- to strengthen their campus diversity efforts by encouraging students from low-income families, racial/ethnic minorities, and other underrepresented groups to enroll;
- to enhance their enrollment management goals by using non-need-based aid to entice students with high academic achievement or other talents to attend their institutions;
- and (perhaps most important to campus administrators) to bring in more revenue in the long run.

Many administrators believe that providing the discounts to students who pay part of the tuition and fees is better than having empty classroom and dormitory space, which generates no additional revenue (McPherson & Schapiro, 1998). Institutional grant dollars, if spent strategically and wisely, can help increase revenue from tuition and fees and might raise total enrollments to levels above what they would have been had no aid been provided (Baum, 2000; McPherson & Schapiro, 1998).

To meet enrollment and revenue objectives, private colleges and universities seek to set an appropriate tuition discount rate. Institutions and their institutional research (IR) departments can calculate the discount rate in a number of ways. (These various rate calculations are discussed in the Research Methodology section of this article.) Generally, the rate is based on the dollar amount of total institutional grant aid awarded (need- and non-need-based aid combined) divided by total gross tuition and fee revenue (Redd, 2000).

While tuition discounting may have benefits for colleges and universities, many higher education analysts have expressed concerns about its unintended effects. Various studies from the late 1990s, for example, indicate that discounting has led to a shift of institutional aid toward undergraduates from middle- and upper-income families (Baum, 2000). Heller and Nelson Laird (1999) discovered that during the 1990s the number of need-based institutional grants provided to undergraduates from higher-income families grew by 79%, while the number of grants provided to undergraduates from low-income families rose by just 1%. A more recent study by Davis (2003) suggests that "*on a national basis* tuition discounting appears to limit affordability and choice for many low-income students" (p. 5; emphasis in original) because much of the aid is distributed to academically meritorious students from middle- and upper-income families at the expense of need-based grant dollars that could have gone to students from low-income families. Earlier research has also suggested that rapid increases in discount rates have resulted in steep losses in net tuition and fee revenue for some 4-year private colleges and universities. For example, Redd (2000) found that colleges and universities with above-average increases in discount rates lost $306 per full-time equivalent undergraduate as a result of their increased spending on institutional grant aid. These losses came because the institutions lost enrollment despite increasing grant aid or because their growth in grant awards exceeded any increases in enrollment or tuition and fee revenue.

RESEARCH BACKGROUND AND RESEARCH QUESTIONS

The rise of tuition discounting and its potentially adverse effects has led to several questions about its use:

- What is the annual tuition discount rate at 4-year private colleges and universities?
- What revenue sources are used to fund institutional grants?
- Has the rising discount rate led to increasing net tuition and fee revenue at private colleges and universities?
- What effect has discounting had on overall enrollments of undergraduate students and on enrollments at different types of institutions (small, comprehensive/doctoral, and research institutions)?
- What share of institutional grant dollars is used to meet students' demonstrated financial need?

To answer these five research questions, the National Association of College and University Business Officers (NACUBO) has conducted a Tuition Discounting Study (TDS) each year since 1994. The TDS grew out of a regional study conducted by the Eastern Association of College and

University Business Officers (Davis, 2013; Lapovsky & Hubbell, 2000). The annual TDS has become a widely used source of information on institutional grants to undergraduates who attend 4-year private nonprofit colleges and universities in the United States.

Research Methodology

The annual TDS measures tuition discount rates and other indicators of institutional grant awards provided to undergraduate students by 4-year, private, nonprofit colleges and universities. The TDS calculates two discount rates: the freshman rate, based on awards to first-time, full-time, degree-seeking first-year undergraduates; and the discounting among all undergraduates.

Both rates are calculated in a similar way: total institutional grant aid awarded as a percentage of gross tuition and fee revenue. This rate can be determined in one of two ways:

Direct formula: Total institutional grants for freshmen divided by total gross tuition and mandatory fee revenue for freshmen. Gross tuition and mandatory fee revenue is equal to the tuition and fee price multiplied by the total number of freshmen.

Component formula: The product of the percentage of freshmen aided and the average freshman grant as a percentage of tuition and mandatory fees.

By definition, both methods of calculation will yield the same tuition discount rate for each individual institution.

The freshman rate is based on total grants and tuition and fee revenue for first-time freshmen exclusively. Total institutional grant aid in the NACUBO study includes all institutionally funded or administered need- and non-need-based scholarships, fellowships, and other grant awards (including tuition waivers and athletic scholarships) provided to undergraduate students. That is, the survey data are designed to include all grants that are either funded by institutional resources or awarded to students based on institutionally developed criteria.

This definition includes grants, scholarships, and fellowships funded by tuition and fee revenue, endowment spending, general investment earnings, donations, and other forms of support revenue. It also includes so-called unfunded tuition waivers. It does not include tuition remission (generally provided as a benefit of employment at an institution and thus not considered financial aid available to all undergraduates) or tuition exchange programs (usually awarded as part of an exchange agreement between two or more institutions, but not considered as part of the general financial aid expenditures). Additionally, NACUBO's definition does not include institutional matches to federal or state financial aid programs, because colleges and universities do not develop the criteria used to award aid under such programs.

NACUBO collects data for the TDS via a Web-based survey instrument. The 2012 survey instrument (Davis, 2013) contained 14 questions. It asked institutions to report the following:

- Final total undergraduate institutional grant expenditures and gross tuition and fee revenue for AY 2011–2012, and preliminary estimates of these data for 2012–2013
- Percentage of their fall 2011 and fall 2012 total undergraduate enrollment and enrollment of first-time, full-time, degree- or certificate-seeking freshmen
- Institutional grants that were funded by endowment income in 2011–2012
- Percentage of their total awarded institutional grant dollars that met students' demonstrated financial need in 2011–2012 (based on the institution's definition of need)
- Incoming freshman admissions acceptance and yield rates in fall 2011

The 2012 survey instrument also included open-ended questions that allow chief business officers (CBOs) to share their thoughts on their institution's discounting strategies and other comments they think will help share an understanding of what is happening on their campuses. (Selected responses appear in the Research Results section of this article.)

Data collected for the 2012 TDS are based on information available as of each institution's fall census date. Although the survey is sent to the CBO on campus, much of these data are provided by the IR, financial aid, and admissions offices.[2]

The Research Results section of this article provides more details on the 2012 TDS results, including the data from AY 2000–2001 to 2012–2013 (to account for the period prior to, during, and after the economic recession of 2008–2009), and tables with year-to-year comparisons, where appropriate. The study results look

2 The fall census date is the date by which institutions have their final enrollment data, and is generally the same date as the census date used for the Integrated Postsecondary Education Data System (IPEDS) fall enrollment and other surveys.

at discount rates over this 12-year period for all participating institutions and for institutions by three NACUBO constituent groups:

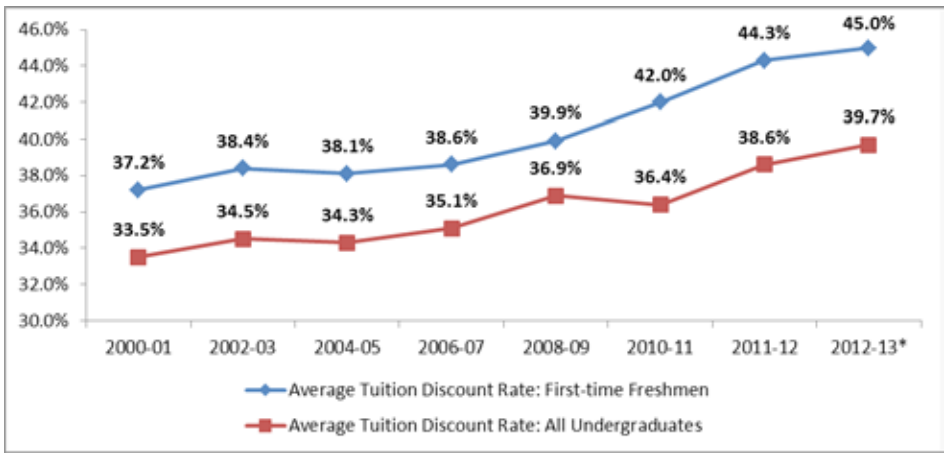
1. Small institutions (Small): Colleges and universities with total enrollment under 4,000. The baccalaureate is the highest degree awarded at most of these institutions.
2. Comprehensive/doctoral institutions (Comprehensive/Doctoral): Master's- and doctoral degree–granting colleges and universities with enrollment above 4,000.
3. Research institutions (Research): Doctoral degree–granting research universities.

Survey Participation

Each year, NACUBO e-mails a link to the TDS survey instrument to its primary representatives (typically, the CBO) at all 4-year private, nonprofit colleges and universities that are members of NACUBO as of September. For the 2012 study, the survey was sent to 1,070 private nonprofit institutions. The survey was launched in mid-September 2012 and responses were collected through mid-November.

Roughly 36% (383) institutions submitted usable responses by the end of the survey data collection period. While there are some differences in the distribution of the survey participants when compared with the total population, these differences do not appear to be statistically significant ($\alpha = 0.05$). Roughly 9% of the respondents came from research institutions, versus 7% of the survey population. Approximately 78% of the responses came from small institutions, compared with 84% of the total survey population. Finally, about 13% of the survey responses came from comprehensive institutions, compared with 9% of the population.

Figure 1. Average Tuition Discount Rate for First-Time, Full-Time Freshmen and All Undergraduates, AY 2000–2001 to AY 2012–2013*



Source: Davis (2013).
Note: Figures represent the AY as of the fall census date. Due to revisions in NACUBO's database of historical survey database, minor adjustments from prior years' reports are to be expected. *Preliminary estimate.

Survey participants received a complimentary copy of the report (nonparticipant NACUBO members pay $50, and nonmembers pay $200), as well as access to an online benchmarking tool where institutions can see their submitted data alongside a group of self-selected peers. (The tool is described more fully in the Considerations for Applying This Research to Your Campus section of this article.)

Institutional participation in the TDS has grown from 148 institutions in 2000 to 383 in 2012. To increase participation, NACUBO staff involved in the survey's administration interact more with prospective participants. NACUBO sends several e-mails to announce the survey and remind institutions to respond. Improved participation can also be attributed to better maintenance of the database of survey contacts and organization-wide communication about the TDS to NACUBO members.

RESEARCH RESULTS

Research Question 1: What is the annual tuition discount rate at 4-year private colleges and universities?

The average tuition discount rate has long been a measure of an institution's ability to remain competitive in the marketplace (Davis, 2013). It is a core measure that CBOs often use to measure their institutional grant expenditures and changes in tuition revenue against their peer institutions. Measured as the share of gross tuition and fee revenue used for institutional grant aid, it essentially quantifies how much of the gross tuition and fee revenue is foregone by an institution. It is also a potential proxy for the fiscal health of private colleges and universities (Moody's Investors Services, 2012).
As Figure 1 illustrates, the early and

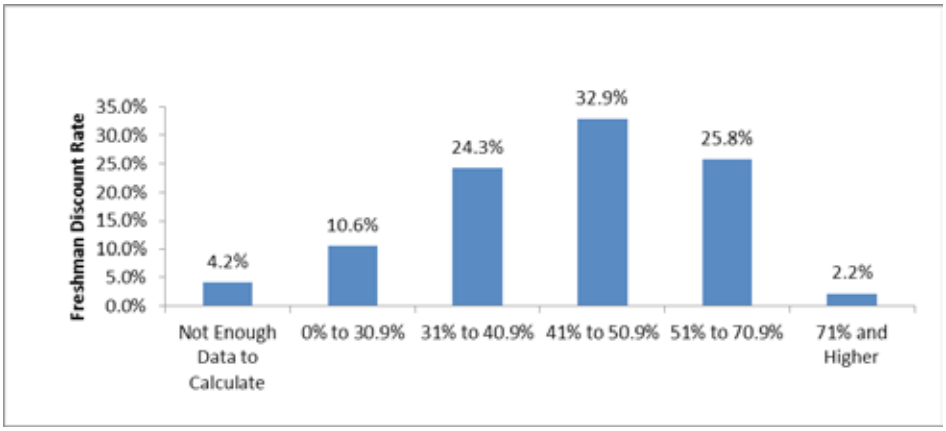
mid-2000s marked a period of stability in the discount rate: the freshman rate hovered between 37% and 38% and the rate for all undergraduates ranged from 34% to 35%. However, the severe economic recession that began in late 2007 and the sluggish recovery from 2009 to 2010 appear to have ushered in an era of large spurts in the average discount rate for both freshmen and all undergraduates. This growth in discount rate has continued despite the fact that the recession has officially ended. From 2010–2011 to 2011–2012 the average discount rate for first-time freshmen jumped from 42% to 44.3%; this 2.3 percentage point rise is the largest 1-year increase in the history of the TDS.

Why did the discount rate increase so dramatically between 2010–2011 and 2011–2012? The weak recovery from the recession appears to be the primary culprit. According to the U.S. Federal Reserve (2012), the median value of inflation-adjusted pretax income fell 7.7% from calendar year 2007 to calendar year 2010, and median net worth of families fell 38.8%. Declines in family income and net worth tend to increase college students' need for financial aid. At the same time, several states reduced their state financial aid programs for students (National Association of State Student Grant and Aid Programs [NASSGAP], 2012). In many cases, institutions have bridged the gap in funding from the state, meaning they have to use more of their own revenue to increase grant-based funding to students.

Distribution of Freshman Tuition Discount Rates

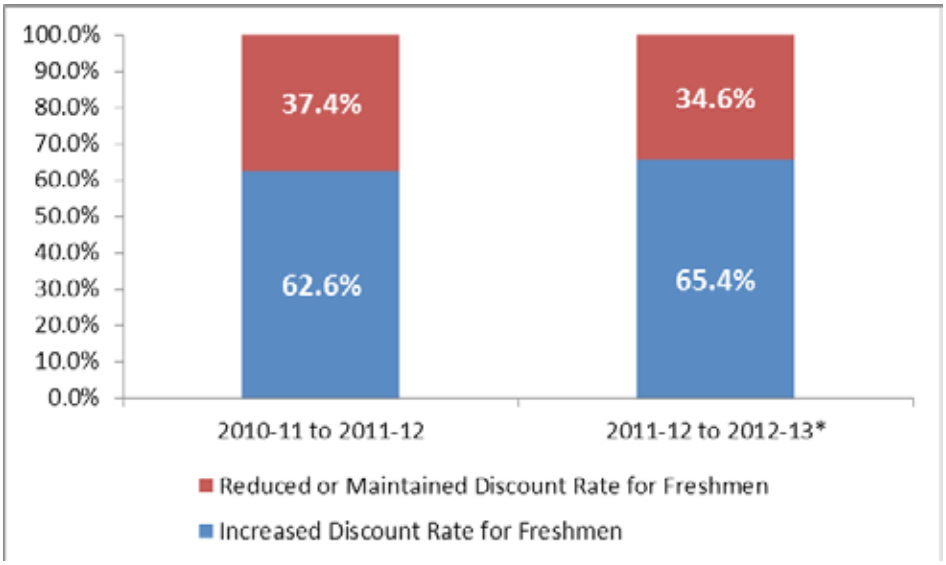
While the average 2011–2012 discount rate for first-time freshmen was 44.3%, the rate by individual school varied greatly, as Figure 2 reveals. In 2011–2012, 10.6% of TDS respondents had a freshman discount rate that ranged from 0% to 30.9%, 24.3% had a rate from 31% to 40.9%, 32.9% had a rate from 41% to 50.9%, and 25.8% had a rate from 51% and 70.9%. A small portion of schools did not provide enough data elements to calculate a freshman discount rate for 2011–2012.

Figure 2. 2012 TDS Participating Institutions by AY 2011–2012 Freshman Discount Rate



Source: Davis (2013).
Note: Figures represent the AY as of the fall census date.

Figure 3. Percentage of Institutions that Increased or Decreased or Maintained Their Tuition Discount Rate for First-Time, Full-Time Freshmen from AY 2010–2011 to AY 2011–2012, and from AY 2011–2012 to AY 2012–2013*

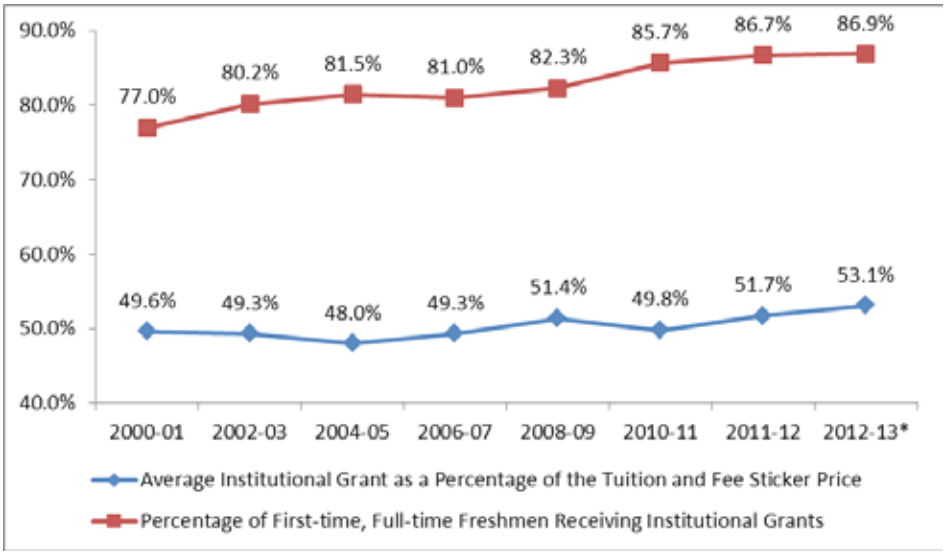


Sources: Davis (2013); NACUBO (2012).
Note: Data for AYs are as of the fall census date for each respective year. *Data for 2012–2013 are preliminary estimates.

Movement in the Discount Rate from AY 2011–2012 to AY 2012–2013

While the average discount rate has increased over the past year, a great deal of variation occurred in the movement of discount rates from

Figure 4. Percentage of First-Time, Full-Time Freshmen Receiving Institutional Grants and the Average Institutional Grant for First-Time, Full-Time Recipients as a Percentage of Tuition and Fees



Source: Davis (2013).
Note: Due to the nature of NACUBO's living database of historical survey data, minor adjustments from prior years' reports are to be expected. Figures represent AY as of the fall census date. *Preliminary estimate.

AY 2011–2012 to AY 2012–2013. As Figure 3 shows, 34.6% of institutions reduced their discount rate from AY 2011 to AY 2012. In contrast, the 2011 TDS results (NACUBO, 2012) found that 37.4% of institutions decreased their discount rate from 2010 to 2011. Many institutions that decreased their discount rate did so because they were uncomfortable with a high discount rate or because they believed their discount rate was unsustainable.

As a CBO at a small institution in the Plains region remarked, "FY2013 marks a turning point for [the institution]. With a discount rate climbing near an unsustainable 65%, a comprehensive strategy is being discussed to rein in aid costs and increase net tuition revenue. Changes will be implemented for the entering class in 2014" (Davis, 2013, p. 33). For other institutions, such attempts had a steep cost. As a CBO from a small institution in the Great Lakes region noted, "We attempted to reduce our discount rate. Enrollment plunged" (Davis, 2013, p. 33).

Larger Grant Awards, More Recipients

As tuition discount rates have jumped, the portion of tuition and fees covered by the average institutional grant award has been steadily growing. This indicates that institutional grant awards have been rising faster than listed tuition and fee charges (see Figure 4). Institutional grant aid as a percentage of tuition and fee charges is calculated by dividing the aggregate institutional grant dollars awarded to full-time freshmen by the product of the number of full-time freshmen receiving institutional aid and the tuition and mandatory fee rate.

In AY 2000–2001 the average institutional grant covered 49.6% of the average tuition and fee sticker price. By AY 2012–2013 the average institutional grant will cover an estimated 53.1% of the average sticker price, the highest percentage recorded in the history of the TDS.

In addition, the percentage of first-time, full-time students who received institutional grants has been on the rise. Between 2008–2009 and 2012–2013 the percentage of freshmen receiving an institutional grant grew from 82.3% to 86.9% (Figure 4). This unprecedented growth in the percentage of freshmen receiving an institutional award illustrates how higher education institutions have responded to rising student financial need during and after the economic recession. Although most economists have declared the recession over, the percentage of freshmen receiving aid has not returned to prerecession levels, signaling a new normal for private colleges and universities.

Research Question 2: What revenue sources are used to fund institutional grants?

Beginning in 2009, the TDS began collecting information on the amount of endowment income used to fund institutional grant programs. According to the 2012 NACUBO–Commonfund Study of Endowments (NCSE), many endowments remain relatively small: the median total endowment reported in fiscal year (FY) 2012 (based on the value of college and university endowment assets values as June 30, 2012, the FY end date of many institutions) was about $90 million. In addition, most schools do not withdraw a large amount of income from their endowments to support institutional aid programs or other expenditures

3 The data include institutional grants funded by restricted and unrestricted endowments.

(NACUBO and Commonfund Institute, 2013).

As Table 1 shows, in 2011–2012 just 10.4% of total institutional grant aid, on average, was funded directly from endowment income. [3] This is down slightly from 2010–2011, when endowments supported 10.6% of grants (NACUBO, 2012).

There is a positive relationship between an institution's endowment level and the percentage of institutional grants funded by endowment income. On average, survey respondents with endowments greater than $1 billion reported their endowment income provided 32.5% of the funding for institutional grants, compared with 6.2% at institutions with endowments less than $25 million.

While the TDS does not ask respondents to report funding of aid from other sources (such as alumni donations), these data suggest that, even at institutions with the largest endowments, the vast majority of institutional grant aid is unfunded. That is, no dedicated revenue source supports the bulk of institutional grant aid expenditures (Allan, 2005).

Research Question 3: Has the rising discount rate led to increasing net tuition and fee revenue at private colleges and universities?

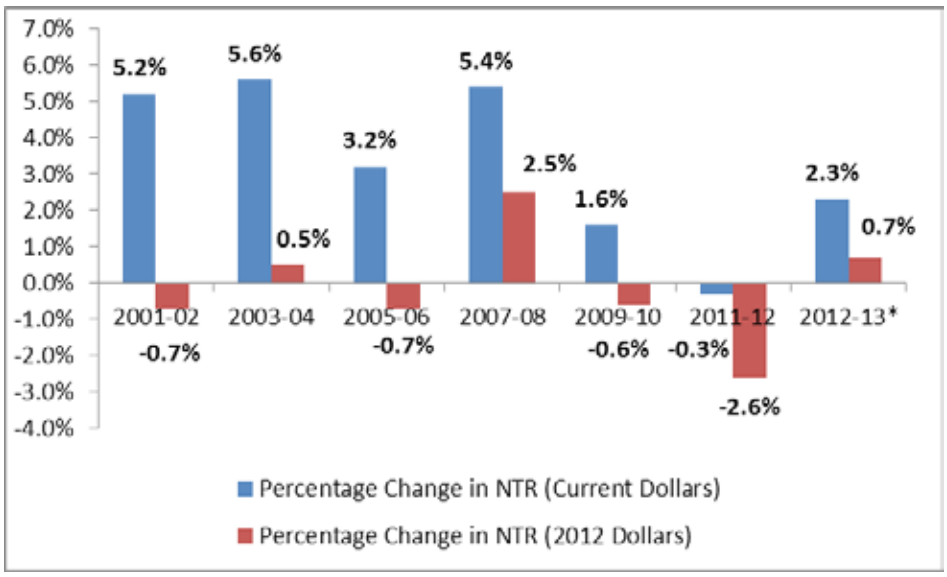
Net tuition revenue per student is an important measure to understand the revenue generated per student on campus. In the TDS, net tuition revenue is equal to the aggregate gross tuition revenue for full-time, freshmen students minus institutionally funded grants for full-time freshmen, divided by the number of full-time freshmen. Net tuition revenue does not include

Table 1. Percentage of Total Undergraduate Institutional Grant Aid Funded by Endowment Income, by Institutional Endowment Level

FY 2012 Endowment Level	AY 2009–2010	AY 2010–2011	AY 2011–2012
Over $1 billion	22.6%	33.9%	32.5%
$500 million to $1 billion	24.2%	23.2%	21.6%
$100 million to $500 million	13.2%	13.0%	9.8%
$50 million to $100 million	7.2%	7.8%	9.0%
$25 million to $50 million	7.9%	9.4%	7.0%
Under $25 million	3.7%	3.8%	6.2%
Unknown endowment level	7.2%	5.5%	n/a
All Institutions	**9.7%**	**10.6%**	**10.4%**

Sources: Davis (2013); NACUBO (2012).
Note: Endowment levels are based on the amounts of endowment assets reported by institution as of June 30, 2012.

Figure 5. Average Change in Net Tuition Revenue per Full-Time Freshman and Inflation-Adjusted* (HEPI) Average Change in Net Tuition Revenue per Full-Time Freshman



Source: Davis (2013).
Note: Dollars adjusted using the HEPI. *Data for 2012–2013 are preliminary estimates. NTR = net tuition revenue.

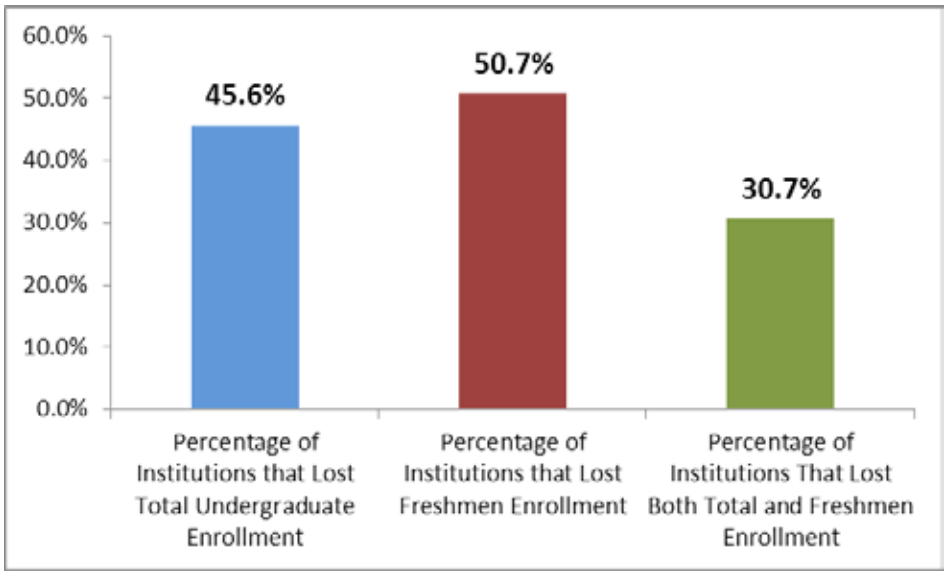
any amounts an institution receives for room, board, or other charges.

As Figure 5 reveals, when net tuition revenue dollars are converted to constant (2012) dollars using the Higher Education Price Index (HEPI), institutions have essentially had flat net tuition revenue over the past 12 years.[4] In other words, the inflation-adjusted value of gross tuition and fee price increases has largely been offset by increased grant aid to students. And in some years, especially 2008, institutions, on average, reported declines in net tuition revenue, as increases in grant aid exceeded any increases in tuition revenue.

Although private colleges and universities had falling net tuition revenue on average as a sector, not all institutions lost net tuition and fee revenue. Some institutions increased their net tuition revenue by increasing their enrollment and/or the price of tuition. One institution in the Far West region with strong enrollment growth reported, "We increased the dollar value of merit scholarships. The resulting increase in enrollment also resulted in increased net tuition" (Davis, 2013, p. 39).

Note that at some institutions declines in net tuition revenue do not translate into a decrease in overall revenue; schools can generate additional support from charitable contributions and other gifts, auxiliary services (such as foodservice programs, bookstores, parking, and student housing), and other sources. Nonetheless, because on average private colleges and universities derive approximately 29% of their total funding from net tuition revenue as of AY 2010–2011 (NCES, 2012), losses in this revenue

Figure 6. Percentage of Participating Institutions That Experienced a Decline in Undergraduate Enrollment* from Fall 2011 to Fall 2012



Source: Davis (2013).

source are a particular concern. It is likely that a number of private colleges and universities have had to draw on other sources of support to fund their educational and general operations.

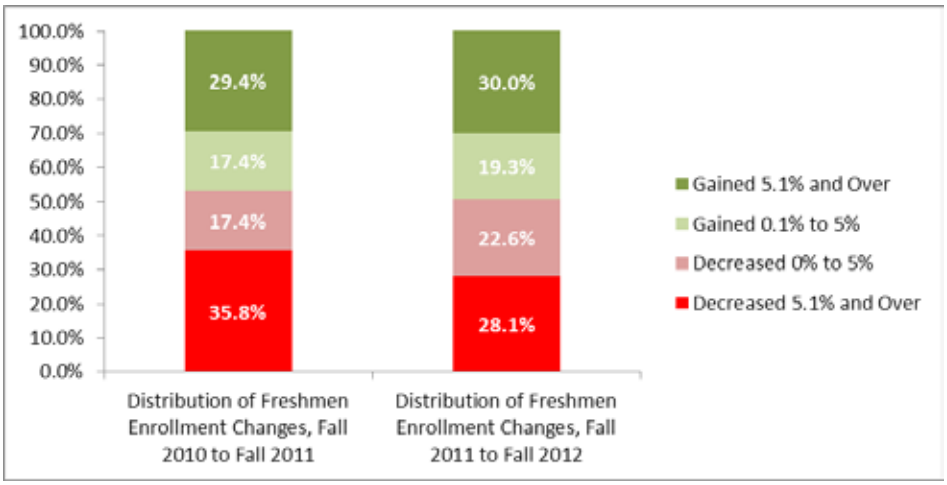
While preliminary estimates for 2012–2013 show an increase in net tuition revenue of 2.3% in nominal dollars (0.7% in inflation-adjusted value), this gain is far below the 5% annual gains in revenue that generally occurred in the years before the economic downturn. It does not appear that institutions will be returning to prerecession growth in net tuition revenue anytime soon. As a January 2013 report from Moody's Investors Service says, "The [higher education] sector will need to adjust to the prospect of prolonged muted revenue growth. . . . Families remain willing to pay for college but their capacity to pay higher prices has been largely tapped and has dramatically dampened the sector's capacity to grow tuition revenue" (Moody's Investors Services, 2013, pp. 1–2).

Research Question 4: What effect has discounting had on overall enrollments of undergraduate students and on enrollments at different types of institutions (small, comprehensive/doctoral, and research institutions)?

Rising discount rates and falling net tuition revenue are especially concerning to institutions with softening enrollment demand. Private colleges and universities experiencing diminished demand may have to continually discount their tuition and fee sticker prices to fill classroom seats. When an institution discounts too deeply to meet enrollment goals, however, it may not raise enough tuition revenue to offset the cost of educating all students. In other words, institutions can lose enrollment in spite of efforts to increase both their tuition

4 HEPI measures changes in prices for goods and services typically purchased by colleges and universities (Commonfund Institute, 2013).

Figure 7. Distribution of Freshmen Enrollment Changes, Fall 2010 to Fall 2011 and Fall 2011 to Fall 2012



Source: Davis (2013).

discount rates and institutional grant awards.

A number of private, nonprofit colleges and universities appear to be in this situation. Among the institutions that participated in the 2012 TDS, 50.7% reported a decline in first-time freshmen enrollment between fall 2011 and fall 2012, while 45.6% had declines in total undergraduate enrollment and 30.7% had declines in both first-time students and total enrollment (see Figure 6).

Note that the categories of "lost freshmen enrollment" and "lost total undergraduate enrollment" in Figure 6 are not mutually exclusive and should not be considered a subset of one another. An institution can lose freshmen enrollment but gain a large number of upperclassmen through transfer or other enrollment strategies, thereby gaining total enrollment.

Figure 7 looks more closely at the enrollment of first-time freshmen and examines the distribution of change in enrollment of these students among fall 2010 to fall 2011 and fall 2011 to fall 2012 TDS participants. First-time freshmen are examined more closely here because this enrollment trend is often a key ingredient in colleges' and universities' plans for future enrollment growth, as these new students have the potential to stay enrolled 4 years or longer, providing a source of tuition revenue for several years to come.

From fall 2010 to fall 2011, 53.2% of schools lost freshmen enrollment (Figure 7). More importantly, 35.8% of schools had enrollment losses of 5.1% or greater, while 29.4% had enrollment gains of 5.1% or greater.

In 2012, 50.7% of institutions reported a decline in their numbers of new first-year students, but a smaller share of schools experienced large enrollment declines. Instead, institutions were more likely to have experienced smaller declines, between 0% and 5%, from the year before. There was also a small gain in the proportion of institutions with a large gain in enrollment between 0.1% and 5% when compared with the year prior.

Still, it appears a number of 4-year private colleges and universities have declining numbers of first-time freshmen in spite of the rising discount rates. Many factors contribute to this loss of student enrollment. First, these declines may be the beginning signs of a major demographic shift. From 2012 to 2023 the number of high school graduates will generally decline, according to the Western Interstate Commission for Higher Education (WICHE, 2012), and an even greater share of schools may see falling first-time enrollments due to this population dip. Private colleges and universities also face greater competition for new students from public institutions, as well as shifting public opinion about the value of a college degree, concerns about rising levels of student indebtedness, and fears about the inability of new college graduates to find employment (Moody's Investors Services, 2012). As a result, "nearly half of all universities are reporting lower enrollment for fall 2012. . . . [E]nrollment declines are concentrated in colleges with smaller enrollment size, high tuition dependence, weak selectivity/yield rates, and soft regional demographics" (Moody's Investors Services, 2013, p. 4).

Not all losses in student enrollment that institutions experienced, however, were due to economic issues. Some colleges purposefully pared down enrollment to become more selective, to correct for years where enrollment was very large, or for other reasons. We cannot determine the exact percentage of schools intentionally becoming smaller (Davis, 2013). Nonetheless, a dip in enrollment often results in declines in net tuition revenue. While some institutions indicated they had planned for reduced or flat enrollment, reductions in net revenue were not the intended outcome. Thus, strategies

Table 2. Percentage of Total Awarded Undergraduate Institutional Grant Dollars that Met Students' Financial Need, by NACUBO Constituent Group and Endowment

	AY 2010–2011		AY 2011–2012	
NACUBO Constituent Groups	Number of Participating Institutions	Percentage of Total Institutional Grant Aid Awarded that Met Students' Financial Need	Number of Participating Institutions	Percentage of Total Institutional Grant Aid Awarded that Met Students' Financial Need
Small	217	72.8%	210	71.7%
Comprehensive/Doctoral	39	68.7%	39	67.2%
Research	24	82.3%	24	84.0%
All Institutions	280	73.0%	273	72.1%
	AY 2010–2011		**AY 2011–2012**	
FY 2012 Endowment Level	Number of Participating Institutions	Percentage of Total Institutional Grant Aid Awarded that Met Students' Financial Need	Number of Participating Institutions	Percentage of Total Institutional Grant Aid Awarded that Met Students' Financial Need
Over $1 billion	22	88.4%	20	90.6%
$500 million to $1 billion	16	83.3%	16	75.9%
$100 million to $500 million	74	78.0%	76	74.5%
$50 million to $100 million	47	73.2%	53	73.2%
$25 million to $50 million	33	68.5%	44	67.0%
Under $25 million	16	65.1%	53	62.2%
Unknown Endowment Level	72	64.7%	11	78.8%
All Institutions	280	73.0%	273	72.1%

Source: Davis (2013).
Note: Endowment levels are based on the amounts of endowment assets reported by institution as of June 30, 2012. Grant aid that met students' need includes merit and other non-need-based scholarships awarded to students with any demonstrated financial need, in addition to need-based grants.

to increase net tuition revenue in the face of declining enrollment had mixed results.

For example, one survey respondent in the Great Lakes region offered this observation: "As an institution, we planned for a modest decrease in enrollment for our full-time freshman population and budgeted for a flat discount rate. A targeted population was identified late in the cycle, and institutional aid dollars were redeployed in order to increase net tuition revenue. This program was moderately successful" (Davis, 2013, p. 16). In contrast, another respondent reported this experience: "We tried

to increase net tuition revenue by enrolling more students on campus with increasing the amount of financial aid offered. Our strategy was not successful as we saw a drop in overall yield even with an increase on our first-year discount" (Davis, 2013, p. 16).

Research Question 5: What share of the institutional grant dollars is used to meet students' demonstrated financial need?

While higher education institutions use a variety of criteria to award scholarships and grants, they generally disburse these awards based on two general classifications: (1) students' demonstrated financial need and (2) students' academic merit or other non-need-based criteria, such as athletic or artistic ability (NASFAA & The College Board, 2002). Eligibility for need-based grants is usually based on a financial aid application that collects information on a student's family income, assets, and other measures of financial circumstances.

Institutions can use one of several methodologies to determine student eligibility for need-based grants (NACUBO, 2011): the federal methodology (FM), an institutionally developed methodology (IM), a combination of FM and IM, or some other methodology. In the 2010 TDS—the last time the question was asked—63.5% of respondents reported using the FM exclusively to determine eligibility for need-based institutional grants. Another 8.5% relied on IM exclusively, while 2.5% used a combination of both methods. Approximately 25.5% of schools opted not to report which methodology they used (NACUBO, 2011).

The 2012 TDS asked participants to report the percentages of their total institutional grant dollars awarded in 2011 that they distributed to undergraduates who had any financial need. Institutions were directed to include grants that may have been non-need-based in their selection criteria, but that were awarded to undergraduates with any financial need. [5] Grants were classified in this way for the 2012 TDS to better understand the share of total institutional grant dollars that met students' financial need, regardless of the criteria for which the grants were awarded.

Based on this classification, the vast majority (72.1%) of total institutional grant aid awarded was used to meet students' financial need in 2011–2012, a slight decrease from the year before when 73% of institutional grants met student need (see Table 2).

The portion of dollars awarded that met need varied by NACUBO constituent group. On average, comprehensive/doctoral institutions reported that 67.2% of their institutional grant dollars met student need, compared with 84% at research institutions and 71.7% at small institutions. Research institutions are the only constituent group that increased the share of institutional grants that met need, and that increase was by 1.7 percentage points.
There also appears to be a positive relationship between the size of the responding institutions' endowment and the portion of dollars meeting financial need. Institutions with endowments $1 billion or greater used 90.6% of their institutional grant dollars to meet student need, while schools with endowments of under $25 million used 62.2%. Institutions with endowments that exceeded $1 billion made up the only group that increased its share of grants meeting need from 2010–2011 to 2011–2012. Many of these institutions were research institutions. Schools with higher endowments tend to have higher tuition and fee charges, so more of their students have some financial need.

Because only two years' worth of data are available, it is impossible to determine if the decrease in dollars that met need represents a trend. Comments from CBOs suggest that some institutions are using merit- and other non-need-based scholarships to attract prospective students earlier in the admissions process. As one institution's CBO reported, "[We were] more aggressive with merit awards, which increased freshmen discount rate, freshmen class, and net tuition revenue. . . . We feel certain that some students who likely have need don't bother to apply if they have received a significant merit award. As a result, for those students we do not have verifiable data on whether or not they have need" (Davis, 2013, p. 47).
On the other hand, some institutions are shifting dollars toward grants that meet need in order to increase their enrollments. One CBO at a small institution mentioned his university's strategy to leverage need-based aid and the impact on the enrollment and discount rate: "We attempted this year to put more resources into need-based programs and less into our academic top-level scholarships, in an effort to attract more students in the 25%–75% SAT range, and to reduce our discount rate. Ultimately we had [fewer] Presidential (top-level) scholarships and more middle level. We also had [fewer] at the lower level of our entering class.

5 The wording of this question changed in the 2011 survey (2010 data) so only two years of data are available for analysis.

Lastly, our freshmen class declined about 4 percent from fall 2011. We were able to decrease our discount rate slightly" (Davis, 2013, p. 48).

An East Coast institution took a different approach: "We worked with [our enrollment consultant group] every year to identify opportunities to increase net tuition revenue. The main strategy used with [our enrollment consulting group] is to cut back on percentage of need met in cells where we offered too high a percent of need met. This worked in some cells and [in] others it didn't. We increased our net tuition revenue in our commuter population by pulling back some aid in areas [where] we were offering too much" (Davis, 2013, p. 48).

As more institutions continue to tinker with their need- versus non-need-based aid strategies, and as college costs rise, it is increasingly clear that the need- versus non-need-based categorization of aid is becoming a false dichotomy. Colleges may call their grants "merit based" but shift the aid to "need based" depending on the students' level of need and which category colleges think will be more attractive to prospective students. This suggests that need- and non-need-based categories are becoming irrelevant to many business officers.

CONSIDERATIONS FOR APPLYING THIS RESEARCH TO YOUR CAMPUS

The results of the 2012 TDS are designed to help inform institutional practices. The study shows that private institutions continue to see an increase in the discount rate for freshmen and the larger undergraduate population. At many institutions, discount rates are rising at the same time that total enrollments and enrollments of first-time freshmen are contracting. As a result, net tuition revenue is constrained.

These issues are challenging institutional researchers at a number of campuses—both public and private nonprofit. Often, IR professionals work with financial aid and admissions officers, CBOs, enrollment managers, and other leaders on campus to develop institutional grants and other financial benchmarks that will compare their expenditures with those of peer institutions.

To assist IR offices with these efforts, NACUBO has developed an online benchmarking tool, a complimentary member benefit that enables NACUBO member institutions to create customized reports and compare their tuition discount rates against national averages by Carnegie classification and by region. The tool also allows users to create up to 18 self-selected peer groups for analysis that is more individual and customized. The tool, developed by NACUBO and the Exeter Group using IBM/Cognos Business Intelligence software, was unveiled in 2007 and has been expanded and updated annually.[6]

This article has presented the definitions, variables, and formulas used by NACUBO to construct our discount rates and net revenue information. While this methodology has been widely used, we recommend that IR professionals consider the following issues when calculating their own institution's discount rates and net revenue data and comparing the resulting data with the national and constituent group averages from the 2012 TDS.

Determining Dollars of Institutional Aid Awarded

IR offices at public colleges and universities should consider including state pass-through grants in their institutional aid dollars. Because the NACUBO's annual TDS survey collects data only from private nonprofit colleges and universities, it does not account for state appropriations and other grants that states may award to public colleges for use as institution-based financial aid awards. Inclusion of state-funded grants in the calculations may make comparisons of discount rates and institutional grant awards between public and private nonprofit institutions difficult.

IR offices at public and private institution should also consider whether to include tuition waivers in their institutional grant calculations. The TDS includes these waivers as unfunded institutional grants. If your campus excludes these awards, your results could differ substantially from NACUBO's data.

Many institutions use both restricted and unrestricted endowment funds as a source for institutional grant aid and include these endowment funds in their discount rate calculations. Other schools do not include endowment funds, as they prefer to calculate a discount rate that is based on purely unfunded grants (i.e., grants funded by tuition and fee revenue exclusively). When compiling a comparison group, IR staff should determine which of their peer institutions include funded and which include unfunded grant aid.

6 For more information, including an instructional video that demonstrates the benchmarking tool's capabilities, see NACUBO (n.d.).

Colleges and universities use several different methodologies to categorize need- and non-need-based grants, and these methodologies may change over time. Take the changing definitions of need- and non-need-based into account when constructing these variables, and make note of periods when definitions of aid change.

NACUBO's data include institutionally administered athletic grants and scholarships. IR offices may want or need to exclude athletic aid based on their own institutions' definitions, funding sources, and circumstances.

Determining Revenue

NACUBO's calculation of discount rates includes only dollars from tuition and mandatory fees. IR offices may also consider including revenue from room and board charges along with tuition and fees, as on some campuses revenue from these sources may also be used to support institutional grant expenditures.

Similarly, schools and IR offices may include revenue from students in nondegree or certificate programs, which may be another source of institutional grants. This is particularly true for colleges and universities with large numbers of students enrolled in off-campus or nontraditional programs. If your college or university has differential tuition pricing, you may want to replace the calculation of number of students multiplied by sticker price with a total revenue figure. This will provide you a more accurate picture of revenue.

Determining the Type of Discount Rate to Use

NACUBO's tuition discounting methodology is best understood as an institutional discount rate: the college or university is the unit of analysis, and thus the rate includes only the institutional grant expenditures and the gross and net institutional tuition and fee revenue collected by the college or university. But the resulting discount rate does not take into account grants that students receive from federal, state, or other noninstitutional sources. Some IR offices may instead want to include all other grants that lower the cost of college for undergraduates. Inclusion of all grants is sometimes referred to as a "student discount rate" because it is based on the students' total cost of attendance (tuition, fees, room, board, books, educational supplies, and all other costs of postsecondary education) and all grants that lower this total cost (Allan, 1999). IR offices that want to report the effects of all grants on lowering the cost of attendance at their institutions may need to consider a student-centered discount rate rather than NACUBO's institutionally focused rate.

Public institutions may need to consider calculating a separate discount rate for their in-state resident students who may be more likely to receive institutional grant dollars that are tied to a state-residency requirement. If so, differences in tuition and fee revenue from, and grant dollars to, out-of-state students would need to be considered.

IR offices may also need to determine which group of students is the focus of your institution—first-time freshmen or all undergraduates. Many schools may want to calculate a discount rate for all undergraduates, while others may want to calculate separate rates for each student group. Schools with large populations of new incoming or continuing transfer students who are eligible for institutionally funded grants may need to consider a third separate rate for these students.

If your university has differential tuition pricing by college you may want to create a discount rate for each college. NACUBO's current TDS methodology does not include data based on differential tuition and fee price structures.

College and university presidents and other cabinet-level officers may want to compare their institutions' discount rates against self-identified peer institutions. IR officers who are tasked with these responsibilities may need to know how their peer groups' institutional aid policies and practices differ from their own. Knowing more about the aid policies—as opposed to simply the discount rates—could help you better understand trends in aid funding and distribution.

SUMMARY AND CONCLUSIONS

As tuition discounting has grown, the discount rate has become an important measure of an institution's ability to attract students, meet revenue goals, and remain competitive. While tuition discounting has been controversial due to the introduction of non-need-based and other grants, the strategies used to increase enrollment and revenue have helped many CBOs at similarly situated colleges and universities gauge their enrollment management effectiveness and thus enable many students to achieve higher education goals. Measured as the share of gross tuition and fee revenue used for institutional grant aid, the discount rate essentially quantifies how much of the gross tuition and fee revenue an institution forgoes.

In recent years, as the nation has struggled to fully emerge from the 2008–2009 financial crisis, many institutions have had difficulty finding

the right balance between remaining affordable to students and families while generating adequate net tuition revenue to meet educational and general expenses. This struggle, along with the access and equity arguments surrounding need- and non-need-based grant aid, will remain a challenge for 4-year private colleges and universities. IR offices will be called upon to provide CBOs and other leaders with the information to determine the appropriate balance among pricing, enrollment, and discounting to fulfill institutional missions.

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PROFESSIONAL FILE

ARTICLE 134

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UNREALIZED EDUCATIONAL EXPECTATIONS
A Growing or Diminishing Gender Gap? It Depends on Your Definition

Tricia A. Seifert, Ryan S. Wells, Daniel B. Saunders, Bryan Gopaul

About the Authors

Tricia A. Seifert is assistant professor in the Leadership, Higher and Adult Education department at the Ontario Institute for Studies in Education, University of Toronto. Ryan S. Wells is assistant professor in the Educational Policy, Research and Administration department at the University of Massachusetts, Amherst. Daniel B. Saunders is assistant professor in the Educational Leadership and Policy Studies department at the University of Texas, Arlington. Bryan Gopaul is postdoctoral research fellow in the Higher Education division at the University of Pennsylvania.

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Abstract

Past research has examined the widening gender gaps in college expectations and enrollment in the United States in which more women than men expect to continue their education and enroll in postsecondary institutions. A discrepancy exists between students' expectations and their enrollment behavior: more students expect to attend college than actually enroll. This discrepancy—effectively students' unrealized expectations and the commensurate gender gap—has recently gained the attention of the educational research community, but with inconsistent results. This inconclusiveness may be due in part to different operational definitions, assumptions, and/or methods researchers have used in analyzing this phenomenon. Using 35 years of nationally representative data from American high school graduates and two operational definitions for unrealized expectations, we explore how the gender gap has changed over time by race and socioeconomic status. We find the two operational definitions of unrealized expectations yield results that differ in direction and magnitude. These findings demonstrate that operational definitions of fundamental constructs can change the results and conclusions and recommendations made, particularly as these relate to educational expectation formation and realization. The paper concludes by asserting the value of using multiple operational definitions to best represent the complexity of educational phenomena.

INTRODUCTION

In the past three decades, women first drew even with men and then surpassed them in terms of educational expectations, application, enrollment, time to degree, and degree completion, effectively reversing the historic gender gaps that were a result of greater opportunities for men than for women (Buchmann & Dalton, 2002; Buchmann & DiPrete, 2006; King, 2010; National Center for Education Statistics [NCES], 2005; J. Reynolds & Burge, 2008; J. Reynolds & Johnson, 2011; Turley, Santos, & Ceja, 2007). Although much scholarly emphasis has been placed on educational expectations and postsecondary enrollment, a persistent discrepancy exists between these two factors: more students expect to attend than actually enroll (Buchmann & Park, 2009; Hanson, 1994; Hauser & Anderson, 1991; Schneider & Stevenson, 1999). For postsecondary institutional researchers, strategic planners and enrollment managers, this discrepancy has implications for developing effective bridge and transition programs with feeder high schools.

The discrepancy between students' expectations and subsequent enrollment behavior—effectively, students' unrealized educational expectations—may differ by gender as well as by other individual characteristics. Past research

is inconsistent, suggesting that men may be more likely than women to fail to realize their educational expectations (Hanson, 1994) or that women may be more likely than men to have unrealized expectations (J. Reynolds & Johnson, 2011). Because the increase in postsecondary expectations has been the greatest among historically underrepresented groups (Goyette, 2008; J. Reynolds & Burge, 2008; Rosenbaum, 2001; Schneider & Stevenson 1999), it stands to reason that racial minority students and students with lower socioeconomic status (SES) may be more likely than White students or students of higher SES to have unrealized educational expectations (Hauser & Anderson, 1991; MacLeod, 1995; J. Reynolds & Johnson, 2011) and that these differences may be further nuanced by gender. Together, this body of research suggests that social origin characteristics are likely associated with unrealized expectations, potentially leading to inequitable levels of educational attainment.

Mixed results concerning whether men or women are more likely to realize their postsecondary expectations may be due in part to researchers using different operational definitions, assumptions, and/or methods in analyzing this phenomenon. While a variety of definitions and methods can be useful in understanding complex phenomena, any individual study can easily overstate its claims due to the subjective decisions made by the researcher (Wells, Lynch, & Seifert, 2011). For example, what is meant by "realizing" one's educational expectations? How is realization measured? To what extent might the way one operationalizes "realized expectations" lead to different strategic policy decisions at the institutional level? The purpose of this paper is to explore how operational definitions of fundamental constructs can change the results and the conclusions and/or recommendations made. We examine the gender gap in unrealized expectations over time and how this gap has varied by students' race and SES to exemplify the importance of operationally defining constructs. Using 35 years of nationally representative data from American high school graduates we employed two different operational definitions for unrealized expectations: (1) expecting a 4-year degree and failing to enroll in a 4-year institution within 2 years of high school graduation, and (2) expecting any postsecondary education and failing to enroll in any postsecondary institution within 2 years of high school graduation. This analysis examines the following research questions: To what extent do research findings regarding the gender gap in unrealized expectations differ based on the operational definition used? Have these differences changed over time? The null hypothesis holds that the findings from the two operational definitions will differ only by chance variation.

Although the normative assumption in the United States is that "going to college" means attending a 4-year institution (Goyette, 2008; Rosenbaum, 2001), using two definitions allows institutional researchers and policymakers to understand the discrepancy in students' realization of their educational goals more inclusively, which can then better inform institutional strategic planning efforts. Two operational definitions (and two sets of results and related conclusions) also allow us to highlight the importance for researchers to be transparent in articulating their decisions and assumptions as these may influence the findings from any set of analyses and the commensurate recommendations.

In addition to our implications for operationally defining concepts, our example also generates new knowledge that is important for four reasons. First, to understand the present the research community must fully understand the past; this additional information will add nuance and complexity to our comprehension of historical trends in educational gender gaps. Second, institutional researchers, practitioners, and policymakers tend to assume steady reversals of the gender gaps over time. These gaps may take on more relevance, however, depending on how the unrealized expectation gender gap has changed over time and if these changes differ in direction or magnitude depending on how unrealized expectations have been defined. If women have been less likely to realize their expectations, then their gains in enrollment have been despite this fact. If women have been more likely to realize their expectations, then this may be a partial explanation of their enrollment gains. Third, if one gender has been less likely to realize expectations, especially if this has been consistent over time and irrespective of how unrealized expectations are defined, programs and policies (often designed in concert with high schools) to encourage postsecondary enrollment may need to consider the emphasis placed on expectation formation versus expectation realization. This has a clear impact on institutional strategic planning and enrollment management efforts. Fourth, all of these processes are complicated by race/ethnicity and SES. Understanding these factors in relationship to the unrealized expectations gender gaps over time and the extent to which the gaps differ in direction and magnitude based on one's definition of unrealized expectations may shed light on whether failing to realize expectations has been a reason for the even larger gender gaps experienced by students of color and students from lower SES backgrounds.

LITERATURE REVIEW

A body of literature has examined the gender gap in educational outcomes (see Buchmann & Dalton, 2002;

Buchmann & DiPrete, 2006; Buchmann, DiPrete, & McDaniel, 2008; DiPrete & Buchmann, 2006; Jacobs, 1996; King, 2000, 2006, 2010; J. Reynolds & Burge, 2002, 2008; Turley et al., 2007; Wells, Seifert, Padgett, Park, & Umbach, 2011; Wells, Seifert, & Saunders, 2013). These gaps are often differentially experienced by racial minority students and students from lower SES backgrounds compared to their White or higher-SES peers (Chang, Chen, Greenberger, Dooley, & Heckhausen, 2006; King, 2010; NCES, 2005; Turley et al., 2007). With the study's context set, we focus the present literature review on the methodological choices that researchers have made when examining constructs associated with unrealized educational expectations. We found researchers have defined the constructs differently both in terms of substantive definition and in terms of operationalized measurement. We discuss each of these differences in turn. Taken together, such definitional variety has implications for individual study results and interpretation. Such implications are compounded when one seeks to ascertain the weight of the research evidence within a body of literature in an effort to inform policy and practice.

Variations in Definition

The literature on educational expectations is complicated by the fact that there has been a debate about whether students were drawing on their idealistic "aspirations" or more realistic "expectations" in formulating a response to survey questions. Haller and colleagues (Haller & Butterworth, 1960; Haller, Otto, Meier, & Ohlendorf, 1974; Haller & Portes, 1973; Woelfel & Haller, 1971), in work that examined explicitly the social-psychological variables associated with status attainment research, tended to use goal-directed aspirations as opposed to the more concrete students' expected plans. More-recent studies and those that have used secondary data from NCES (Alexander, Bozick, & Entwisle, 2008; Feliciano, 2006; Frost, 2007) have used a more realistic account of students' educational expectations. J. Reynolds and Johnson (2011) used the term "educational ambitions" to refer to the postsecondary credentials that high school students expect to attain after high school graduation, although they note these ambitions are not necessarily synonymous with expectations. Wells et al. (2011) conducted a review of the literature in predominant journals in educational research, higher education, and sociology of education since 1980, and presented the varied use of the definitions of the terms "educational aspirations" and "expectations." They noted that those two terms are often used interchangeably and can lead to misinterpretations if the reader is not cautious in connecting the construct under examination with its specific definition. With regard to the construct of particular interest, the present study examines unrealized educational expectations, whereas past research has investigated this same construct from its more positive pole—that is, realized or fulfilled expectations (J. Reynolds & Johnson, 2011; Wells et al., 2013).

Measuring Expectations, Realized and Unrealized

Wells et al. (2011) noted three main ways that scholars, using quantitative methods, have operationalized educational expectations. First, they may ask students the number of years of education they expect to obtain, creating a continuous variable. Second, they may create a series of categories that correspond with common educational credentials—for example, obtaining a bachelor's degree. Third, they may use a series of questions about the likelihood of obtaining different educational thresholds in an effort to measure subjective probability distributions, or they may have students graph their expectations. These alternative methods of measuring expectations have often been in response to critiques levying that the "identification of decision processes from choice data must rest on strong maintained assumptions" (Manski, 2004, p. 1330); these alternative methods are often difficult to defend. Recognizing the tenuousness of students' expectations, Jacob and Wilder (2010) examined how students update their expectations based on new information they receive about their academic ability.

The different ways that researchers operationalize educational expectations can yield different results. Wells et al. (2011) operationalized educational expectations in a variety of ways (less-than-4-year degree, 4-year degree, graduate degree) and analyzed the data using ordinary least squares (OLS), binomial logistic, multinomial logistic, partial proportional odds, and sequential logit models. How educational expectations were operationally defined and the methods of analyses employed made a difference in the results, both in terms of magnitude of the predictors' coefficients and in the extent to which effects were identified as statistically significant. They asserted that researchers need to be aware of their methodological choices because these decisions may contribute to subtle yet important differences in research results and conclusions. Recognizing the importance of model dependence in statistical analysis, Wells et al. (2011) called on readers to use care when describing the "body of evidence" because results are not independent from the models employed to obtain them, in the same way that results are not independent from the context from which the data were collected.

While model specification and methods of statistical analysis are clearly important, the present paper focuses on how even broader, and often unexamined, assumptions concerning key concepts may affect a study's results and

conclusions. We demonstrate this by examining the gender gap in unrealized expectations over 35 years using two conceptualizations of expecting postsecondary education: attainment of a bachelor's degree or higher, or attainment of any level of postsecondary education. Recognizing cultural conditions may influence women's and men's expectations for postsecondary education, we further nuance the gender gap analysis by race/ethnicity and SES. We assert that examining two thresholds of unrealized educational expectations in terms of how the gender gap has changed over time for students of different racial/ethnic groups and different levels of SES provides greater nuance for policy and practice considerations and emphasizes the importance of couching one's conclusions and recommendations in a clear explanation of the definitions and assumptions that underpin the research.

METHODS

Data

In order to demonstrate the potentially misleading differences that can result from how key concepts are defined, we examined how the unrealized expectations gender gap has changed over time and across racial/ethnic group and SES. We analyzed four datasets that spanned 35 years, collected by the U.S. Department of Education's (ED's) National Center for Education Statistics (NCES) : (1) the National Longitudinal Study (NLS) (ED, 1972, 1974); (2) High School & Beyond (HS&B) (ED, 1980, 1982); (3) the National Educational Longitudinal Study (NELS) (ED, 1992, 1994); and (4) the Educational Longitudinal Study (ELS) (ED, 2004, 2006). These datasets were chosen because they used a nationally representative sampling strategy in estimating cohort characteristics of American students in Grade 12 and then 2 years after high school. Similar questions pertaining to educational expectations were asked at each data collection across the four cohorts examined, making them ideal for addressing our research questions. We provide the items used to create our variables in Table 1. For each dataset, we computed two original variables: (1) the unrealized expectations of enrolling in a 4-year institution; and (2) the unrealized expectations of enrolling in any postsecondary institution 2 years after high school. Each of these may be justifiably defined as not realizing one's postsecondary expectations.

The first dependent variable represented unrealized expectations if the student in Grade 12 expected to earn at least a bachelor's degree but did not enroll in a 4-year institution within 2 years after high school graduation. This is the most salient outcome given the normative assumption that "going to college" or continuing to postsecondary education in the American context means working toward a 4-year degree (Goyette, 2008; Rosenbaum, 2001). Because this assumption may have changed over time, however, and because of the multitude of non-4-year postsecondary options, we created a second dependent variable that represented unrealized expectations if the student in Grade 12 expected to pursue any postsecondary education but did not enroll in a postsecondary institution within 2 years after high school graduation.

Analyses

This descriptive example presents a comprehensive historical look at the unrealized expectations gender gaps over time, by race and SES, for high school graduates. [1] For each outcome and within each dataset, we first examined the educational expectations of Grade 12 students who graduated high school. Next we investigated the enrollment behavior 2 years after high school for Grade 12 students who had indicated they had (a) expectations for at least a 4-year degree or (b) expectations for some level of postsecondary education but less than a bachelor's degree. We then computed the percentage of students who failed to realize their expectations for each male and female subsample. Using these values, we computed the unrealized expectations gender gap by subtracting the percentage of women who failed to realize their expectations from the percentage of men who failed to realize their expectations. Within each unrealized expectations gender gap measure we examined how the gap differed by race and SES quintile (calculated by NCES using parents' education, family income, and parents' occupation). By computing the unrealized expectations gender gap in this way (see Figures 1–6), negative percentages indicate situations in which men failed to realize their expectations at a rate lower than women failed to realize theirs (i.e., men's advantage). Conversely, positive percentages indicate situations in which men failed to realize their expectations at a rate greater than women failed to realize theirs (i.e., women's advantage).

Limitations

We acknowledge unrealized expectations could be operationalized in a number of ways. As the focus of the present analysis was on the impact of operational definitions on results and recommendations within the context of gender gaps in unrealized expectations, it was important to have parallel questions across the four cohorts.

1 It is important to recognize that our findings are based strictly on students who earned their high school diploma. Among the population the sample for these analyses are drawn from, fewer men than women earn a high school diploma (ED, 2007).

Dataset	Expectations	Enrollment 2 Years after High School
NLS	To answer this question, circle one number for the highest level of education you would like to attain, and also circle one for the highest level you plan to attain. Response options: 1. Less than high school graduation 2. Graduate from high school but not go beyond that 3. Graduate from high school and then go to a vocational, technical, business, or trade school 4. Go to a junior college 5. Go to a four-year college or university 6. Go to a graduate or professional school after college	(The following questions were asked twice and then combined to operationalize behavior after high school.) What is the exact name and location of the current or most recent school you attended since October 1, 1979? What kind of school is this? 1. Vocational, trade, business or other career training school 2. Junior or community college (two-year) 3. Four-year college or university 4. Other (please describe: ___) When did you attend this school? (CIRCLE THE FIRST AND LAST MONTHS FOR EACH TIME PERIOD AT THIS SCHOOL. DRAW A LINE BETWEEN THE CIRCLED DATES.)
HS&B	As things stand now, how far in school do you think you will get? Response options: 1. Less than high school graduation 2. High school graduation only 3. Less than two years of school 4. Two years or more of school 5. A degree from a vocational, trade, or business school 6. Less than two years of college 7. Two years or more of college (including two-year degree) 8. Finish college (four- or five-year degree) 9. Master's degree or equivalent 10. PhD, MD, other 11. Don't know	Next we would like information about all of the schools you have gone to since you left high school. Please start with the first school you went to after high school. (BE SURE TO INCLUDE YOUR CURRENT SCHOOL.) If you attended two schools at the same time, please put them in separate columns. (Respondents were then prompted to answer the following question for each school named.) What kind of school is this? 1. Vocational, trade, business or other career training school 2. Junior or community college (two-year) 3. Four-year college or university 4. Other (please describe: ___)
NELS	As things stand now, how far in school do you think you will get? Response options: 1. Less than high school graduation 2. High school graduation only 3. Less than two years of school 4. Two years or more of school 5. A degree from a vocational, trade, or business school 6. Less than two years of college 7. Two years or more of college (including two-year degree) 8. Finish college (four- or five-year degree) 9. Master's degree or equivalent 10. PhD, MD, other 11. Don't know	(For up to five colleges and universities possibly attended after high-school through 1994, respondents were asked: Write the name and location of the university, college, or school attended. (Respondents were then prompted to answer the following question for each school named.) What type of institution is (was) this? 1. Public, 4-year or above? 2. Private nonprofit, 4-year or above? 3. Private for-profit, 4-year or above? 4. Public, 2-year? 5. Private nonprofit, 2-year? 6. Private for-profit, 2-year? 7. Public, less than 2-year? 8. Private nonprofit, less than 2-year? 9. Private for-profit, less than 2-year?
ELS	As things stand now, how far in school do you think you will get? (MARK ONE RESPONSE) Response options: 1. Less than high school graduation 2. GED or other equivalency only 3. High school graduation only 4. Attend or complete a 1- or 2-year program in a community college or vocational school 5. Attend college, but not complete a 4- or 5-year degree 6. Graduate from college (4- or 5-year degree) 7. Obtain a Master's degree or equivalent 8. Obtain a Ph.D., M.D., or other advanced degree 9. Don't know	Now, we want to know about any schools you may have attended since high school, even ones you have not already named. Since you received your high school diploma, have you attended a college, university, vocational-technical or trade school where you took courses for credit? (Please include all schools, even if you have not completed a course.) (Respondents were then prompted to answer the following question for each school named.) Is this school a . . . 1. Four-year college or university 2. Two-year community college 3. Vocational, technical or trade school

At the time of the analysis, degree completion data were not available from the ELS cohort. Thus, we examined unrealized expectations 2 years after high school. We recognize the limitation of looking at enrollment behavior only 2 years beyond high school; students may realize their expectations but may do so after this 2-year window. Research in the United States has found that students who delay entry have a much lower chance of completing a degree (Bozick & DeLuca, 2005) and completion rates continue to drop the longer students delay (Rowan-Kenyon, 2007; Turner, 2004). Therefore, we operationalized a delay in enrollment beyond 2 years after high school completion as unrealized expectations.

Failing to enroll at a 4-year institution is not necessarily misaligned with 4-year degree expectations, given the transfer function of 2-year institutions in the American context (Dougherty, 1994/2001). Past research (Adelman, 1999; C. Reynolds & DesJardins, 2009), however, has shown that students who expect to earn a bachelor's degree but begin at a 2-year institution and transfer to a 4-year institution are less likely to complete a 4-year degree than their peers who enroll in a 4-year institution at the start of their postsecondary career. We defined "unrealized expectations" as expecting a 4-year degree but initially attending a 2-year institution. Though alternative conceptualizations may be equally legitimate, this operational definition is supported by notions that community colleges may "cool out" students' expectations for a bachelor's degree (Brint & Karabel, 1989; Clark, 1960).

One could also consider those students who did not expect to attain any level of postsecondary education but who enrolled in a postsecondary institution as an over-realization of sorts, characterized by warming up expectations to enrollment (Alexander et al., 2008). Moreover, one could examine how students modify their educational expectations over time (see Alexander et al., 2008; Jacob & Wilder, 2010; Uno, Mortimer, Kim, & Vuolo, 2010). In this regard, we could have examined the variation of educational expectations beginning in Grade 8, following up again with responses in Grades 10 and 12, and then again, finally, 2 years after high school. This is a worthwhile line of investigation, but as with any line of longitudinal inquiry, it may be limited due to sample attrition.

Finally, our analysis examines unrealized expectations only insofar as students fail to enroll in a postsecondary institution consistent with their earlier identified educational expectations. It is important to note, however, that enrollment is a necessary but not sufficient condition to realize one's expectations fully. Students must also persist through to completion of their specified educational level in order to truly realize their expectations. Recent research has consistently shown women to outpace men in degree attainment (Buchmann & DiPrete, 2006; Charles & Luoh, 2003; DiPrete & Buchmann, 2006; Peter & Horn, 2005). Thus, any gender gaps in unrealized expectations identified in this study likely underestimate the magnitude if one were to examine realized expectations through to degree completion.

These delimitations allowed us to focus on the unique phenomena of unrealized expectations for a 4-year degree and some postsecondary education within 2 years of high school graduation. We acknowledge the limitations inherent in our operationalizations and assumptions. Future research should further the understanding of how operational definitions and assumptions influence results by examining different conceptions of unrealized expectations. All of our results and subsequent conclusions depend on these definitions and assumptions.

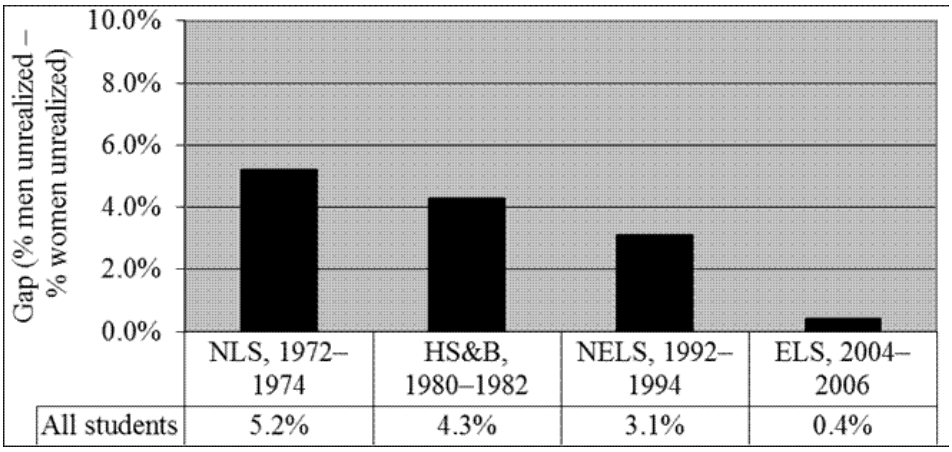
RESULTS

Four-year degree unrealized expectations gender gap

Consistent with past American research (Goyette, 2008; Schneider & Stevenson, 1999), both men and women have increased their educational expectations of attaining a bachelor's degree over the past 35 years. Women's expectations for a bachelor's degree outpaced men's expectations, however, increasing from 40% in 1972 to 75% in 2004 (an increase of 35 percentage points) while men's expectations for a 4-year degree over that same period increased by 17 percentage points, from 49% in 1972 to 66% in 2004. During this time, women's enrollment also increased at a faster rate than men's: women's 4-year enrollment increased from 31% to 53% while men's increased from approximately 34% to 47%.

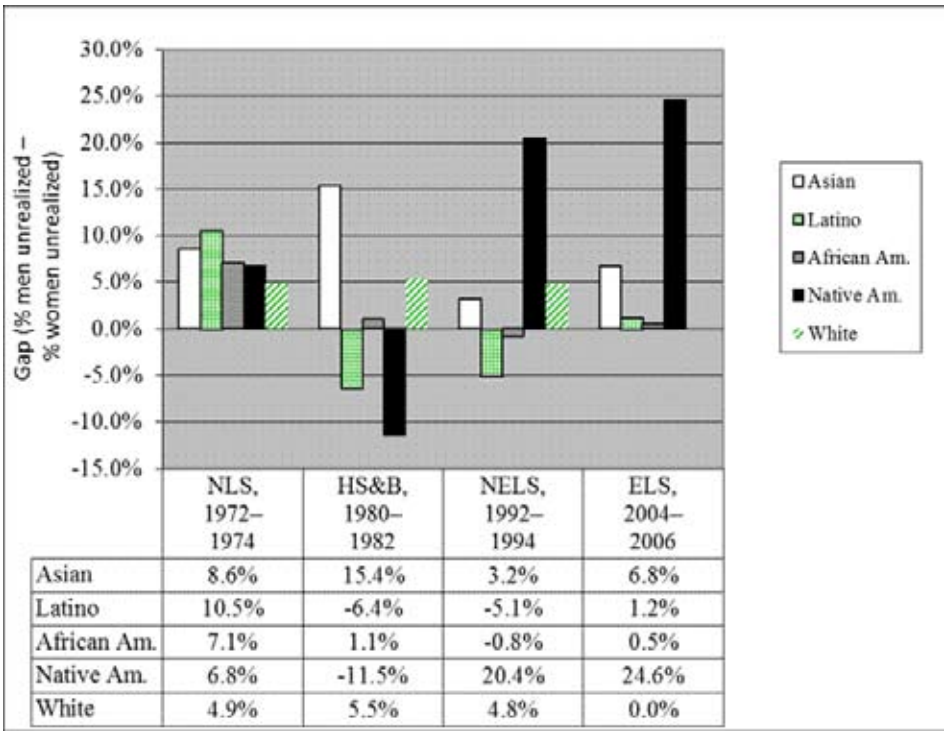
We drew from students' expectations and enrollment behavior to calculate the percentage of men and women from each cohort who had unrealized expectations according to the 4-year degree expectation operational definition. We then calculated the gap between these levels of unrealized expectations (e.g., percentage of men with unrealized expectations – percentage of women with unrealized expectations). Figure 1 shows a decreasing unrealized expectations gender gap for enrolling in a 4-year institution 2 years after high school. The fact that the gap is charted above 0% indicates that men have failed to realize their expectations at a rate greater than women—indicating a female advantage—since 1974. The percentage of men who failed to realize their expectations relative to women who failed to realize their expectations was larger in 1974 (5.2%) than in 2006 (0.4%). In 2006 the per-

Figure 1. Four-Year Degree Unrealized Expectations Gender Gap



	NLS, 1972–1974	HS&B, 1980–1982	NELS, 1992–1994	ELS, 2004–2006
All students	5.2%	4.3%	3.1%	0.4%

Figure 2. Four-Year Degree Unrealized Expectations Gender Gap by Race/Ethnicity



	NLS, 1972–1974	HS&B, 1980–1982	NELS, 1992–1994	ELS, 2004–2006
Asian	8.6%	15.4%	3.2%	6.8%
Latino	10.5%	-6.4%	-5.1%	1.2%
African Am.	7.1%	1.1%	-0.8%	0.5%
Native Am.	6.8%	-11.5%	20.4%	24.6%
White	4.9%	5.5%	4.8%	0.0%

centage of men and women who failed to realize their expectations by enrolling in a 4-year institution was approximately the same at 34%. Examining the unrealized expectation gap solely as a function of gender, however, assumes men and women experience educational expectation development, enrollment opportunities, and barriers in the same way. Yet, past research (Chang et al., 2006; Hanson, 1994) suggests men and women of different racial groups and levels of SES face different social realities. Next we explore the 4-year unrealized expectations gender gap differences by race and SES.

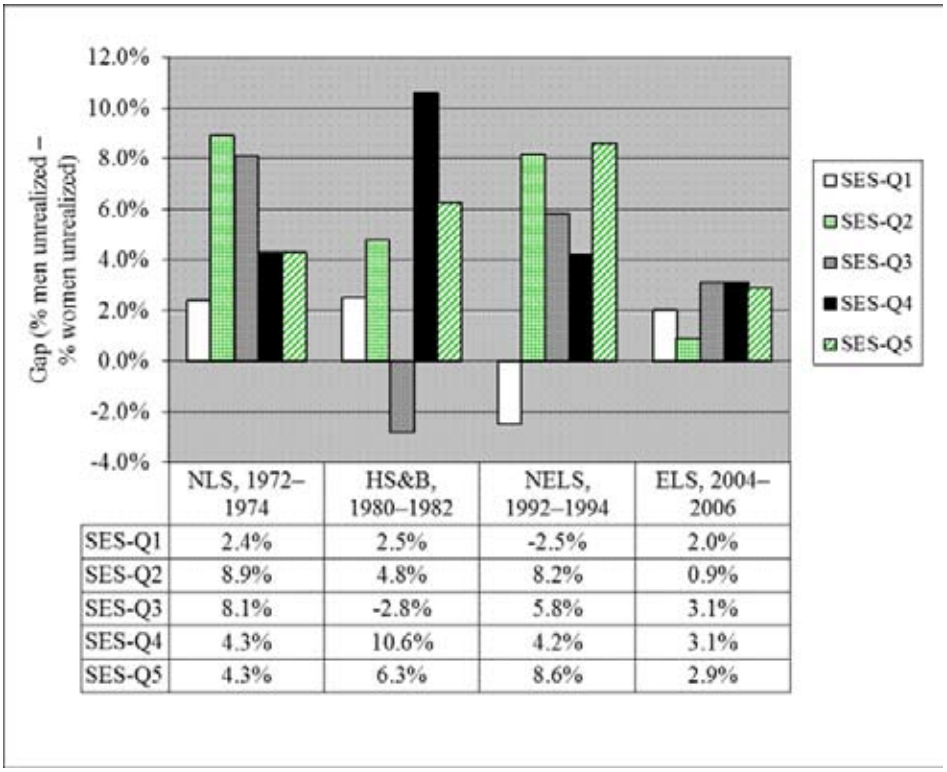
Four-year degree unrealized expectations gender gap by race/ethnicity

Figure 2 shows the variability of the unrealized expectations gender gap for enrolling in a 4-year institution 2 years after high school by racial group over time. The figure clearly depicts that women in the 1970s cohort irrespective of racial group were more likely to realize their expectations than men, thus the unrealized expectations gender gap ranged from 4.9% (for Whites) to 10.5% (for Latinos). By the 1980s and 1990s the unrealized expectations gender gap differed considerably across racial groups. For Latinos, the unrealized expectations gender gap reversed in the 1980s cohort, with women failing to realize their expectations at a rate greater than did their male peers. The unrealized expectations gender gap reversed also for Native Americans during this period but reversed again in the 1990s, with Native American men failing to realize their expectations at a rate greater than Native American women—a trend that has continued into the recent decade. Compared to African Americans and Whites, who have generally experienced a decrease in the unrealized expectations gender gap for enrolling in a 4-year institution, the unrealized expectations gender gap for Asians has favored women consistently, with men failing to realize their expectations at a rate greater than have women.

Four-year degree unrealized expectations gender gap by SES

Although the unrealized expectations gender gap has not fluctuated as widely among students from different SES quintiles as it has among students of different racial/ethnic groups, the variability is still noteworthy. Figure 3 shows the unrealized expectations gender gap relative to expecting a 4-year degree and enrolling in a 4-year institution 2 years after high school by SES. With two exceptions, men of all levels of SES have failed to realize their expectations at a rate greater than their female peers. This has resulted in an unrealized expectations gender gap that has persisted irrespective of SES

Figure 3. Four-Year Degree Unrealized Expectations Gender Gap by SES



	NLS, 1972–1974	HS&B, 1980–1982	NELS, 1992–1994	ELS, 2004–2006
SES-Q1	2.4%	2.5%	-2.5%	2.0%
SES-Q2	8.9%	4.8%	8.2%	0.9%
SES-Q3	8.1%	-2.8%	5.8%	3.1%
SES-Q4	4.3%	10.6%	4.2%	3.1%
SES-Q5	4.3%	6.3%	8.6%	2.9%

for 35 years. Except among the 1990s cohort, the unrealized expectations gender gap has remained the same for the lowest SES quintile since the 1970s at 2%. Historically, the lowest SES quintile has had the smallest unrealized expectations gender gap for expecting a 4-year degree and enrolling in a 4-year institution within 2 years post high school. The unrealized expectations gender gap has decreased for all other SES quintiles since the 1970s with the largest decrease occurring among the poor working class (SES-Q2).

Any postsecondary education unrealized expectations gender gap

Similar to their expectations for bachelor's degrees, both men and women have increased their educational expectations of attaining any level of postsecondary education over the past 35 years. Again, women's expectations outpaced men's expectations, increasing from 75% in 1972 to 90% in 2004 (a 15 percentage point increase) while men's expectations for any level of postsecondary education over that same period increased by 5 percentage points. As we already know, during this time women's enrollment also outpaced men's, increasing from 67% to 83% while men's increased from approximately 70% to 75%.

We drew from students' expectations and enrollment behavior to calculate the percentage of men and women from each cohort who had unrealized expectations in enrolling in any postsecondary institution. We then calculated the gap between these levels of unrealized expectations (e.g., percentage of men with unrealized expectations – percentage of women with unrealized expectations). Figure 4 shows an increasing unrealized expectations gender gap—indicating a female advantage—for enrolling in any postsecondary institution 2 years after high school. Although some level of gender gap has existed since the 1970s (1.4%), this gap has increased to 5.4% among the most recent cohort. This suggests that since the 1970s, among high school graduates, men have failed to realize their expectations of pursuing any postsecondary education at a greater rate than have women. This trend has persisted and steadily increased through the 2006 cohort.

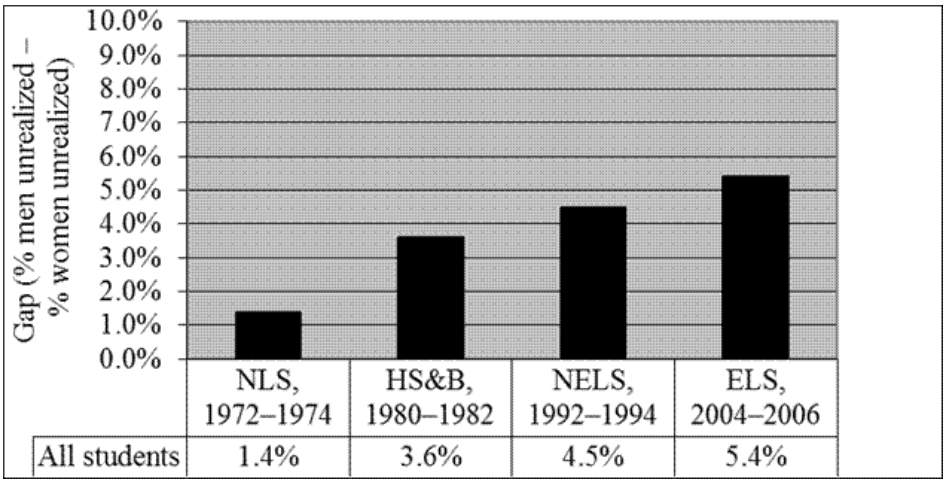
Any postsecondary education unrealized expectations gender gap by race/ethnicity

Figure 5 shows the variability of the unrealized expectations gender gap relative to expecting any level of postsecondary education and enrolling in a postsecondary institution 2 years after high school by racial group over time. With the exception of Asian and Native American students from the two earliest cohorts, the trend in the unrealized expectations gender gap for any postsecondary enrollment by race was clear: men consistently have failed to realize their educational expectations for any postsecondary education at a rate greater than women. Moreover, the unrealized expectations gender gap for any postsecondary education has increased for nearly every racial group since the 1990s.

Any postsecondary education unrealized expectations gender gap by SES

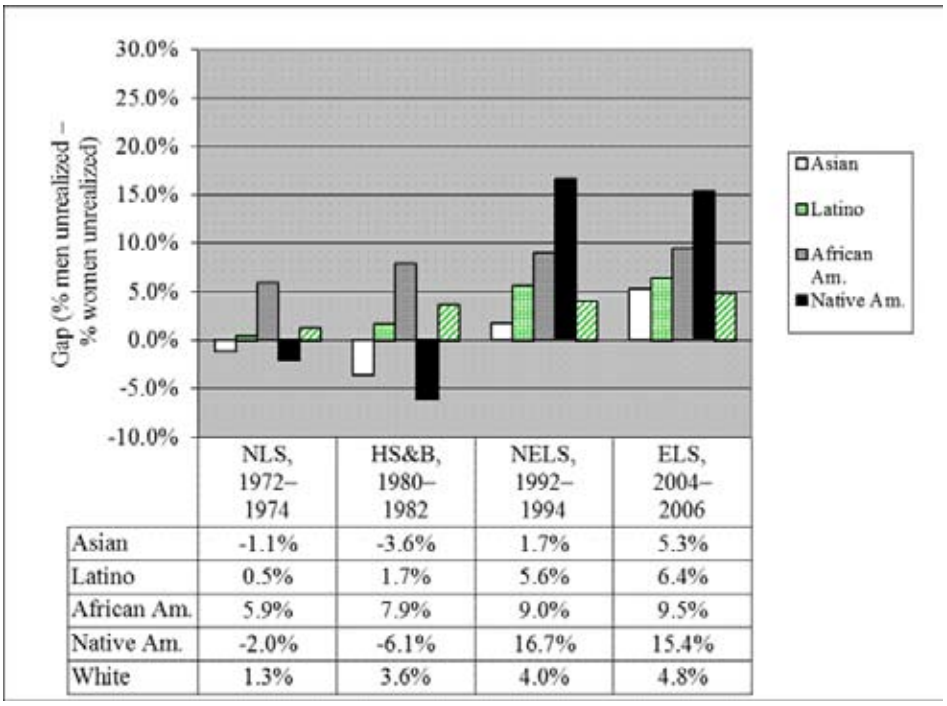
Figure 6 shows the unrealized expectations gender gap for expecting any level of postsecondary education and enrolling in any postsecondary institution 2 years after high school by SES quintile. This figure demonstrates a clear pattern with no exceptions: men have failed to realize their educational expectations at a consistently higher rate than women for the past 35 years. Although the unrealized expectations gender gap was consistently largest within the lowest SES quintile, the quintile with the second-highest gender gap has varied over time. For example, in the 1970s

Figure 4. Any Postsecondary Education Unrealized Expectations Gender Gap



	NLS, 1972–1974	HS&B, 1980–1982	NELS, 1992–1994	ELS, 2004–2006
All students	1.4%	3.6%	4.5%	5.4%

Figure 5. Any Postsecondary Education Unrealized Expectations Gender Gap by Race/Ethnicity



	NLS, 1972–1974	HS&B, 1980–1982	NELS, 1992–1994	ELS, 2004–2006
Asian	-1.1%	-3.6%	1.7%	5.3%
Latino	0.5%	1.7%	5.6%	6.4%
African Am.	5.9%	7.9%	9.0%	9.5%
Native Am.	-2.0%	-6.1%	16.7%	15.4%
White	1.3%	3.6%	4.0%	4.8%

and 1980s cohorts the quintile with the second-largest unrealized expectations gender gap was the fourth quintile. SES and the unrealized expectations gender gap became more tightly coupled in the 1990s cohort, however, and was fully realized in the most recent cohort, with the second-lowest SES quintile posting the second-highest unrealized expectations gender gap. Since 1994, men from the lowest SES quintiles have failed to realize their educational expectations at a rate greater than their female peers and at a rate disproportionately higher than their more socioeconomically advantaged peers.

DISCUSSION

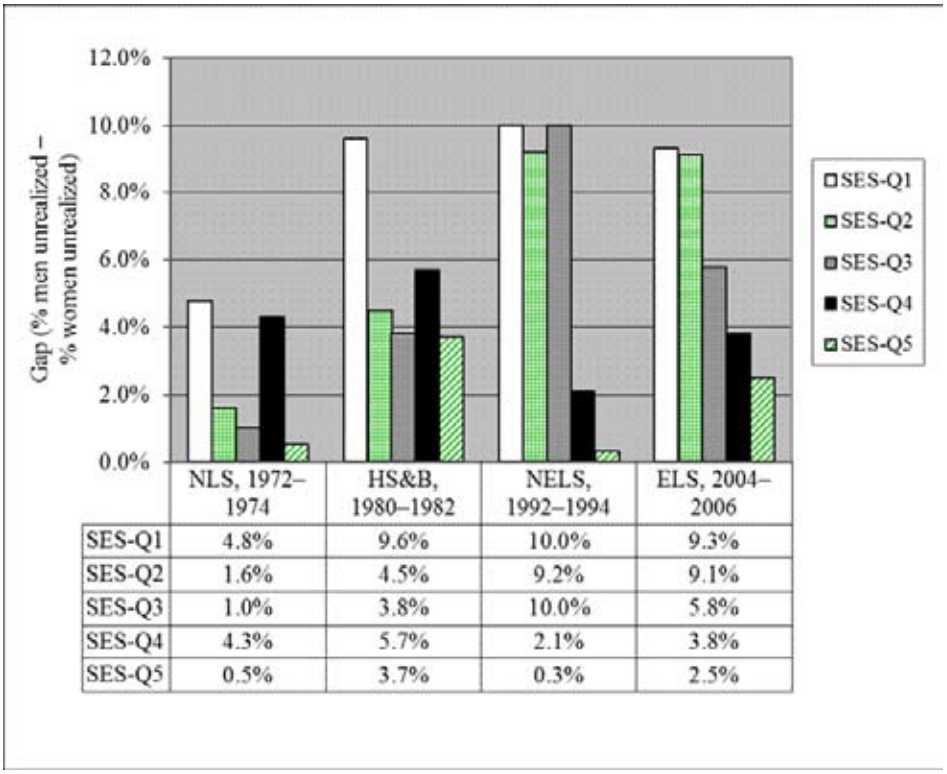
Our findings demonstrate how operational definitions of key concepts—"unrealized expectations" in this case—may change results, conclusions, and implications. We contrast how the two definitions we constructed yielded results that differed substantially in direction and magnitude, highlighting the importance of linking results to the methods and assumptions that led to those results. Understanding the connection between assumptions, operational definition, method, and results has implications for researchers planning future studies on expectations, enrollment, and other aspects of the college transition. In addition to the institutional research angle that our findings illuminate, they demonstrate how different assumptions, operational definitions, methods, and results could lead an institution to undertake completely different strategic planning decisions and initiatives.

Drawing on four cohorts of nationally representative high school graduates from the United States, our example of examining unrealized expectations has interesting and useful implications of its own. Interestingly, many of the important findings arise specifically because we analyzed the concept of "expecting postsecondary education" in two distinct ways. Using multiple operational definitions of unrealized expectations and 35 years of data resulted in a more complex and nuanced picture of how gender gaps have changed over time.

Men Fail to Realize Their Expectations at a Rate Greater Than Women

The results show a clear trend regarding unrealized expectations, irrespective of the definition used. In the aggregate, men have failed to realize their expectations at a rate greater than women, and though shifting and vary-

Figure 6. Any Postsecondary Education Unrealized Expectations Gender Gap by SES



	NLS, 1972–1974	HS&B, 1980–1982	NELS, 1992–1994	ELS, 2004–2006
SES-Q1	4.8%	9.6%	10.0%	9.3%
SES-Q2	1.6%	4.5%	9.2%	9.1%
SES-Q3	1.0%	3.8%	10.0%	5.8%
SES-Q4	4.3%	5.7%	2.1%	3.8%
SES-Q5	0.5%	3.7%	0.3%	2.5%

ing in degree, this has been true for the past 35 years. The fact the unrealized expectations gender gap has existed for the past 35 years is interesting, given the ubiquitous question levied by popular media in the past decade, "Where are the boys?" (see Fonda, 2000; Smith, 2011; Sommers, 2001). Although this question has been asked with greater frequency in recent years, there has been a persistent gender gap in unrealized expectations in which men have failed to realize their educational expectations at a rate greater than their female peers for the past 35 years.

Unrealized expectations for a 4-year degree

It seems that the concern with gender demographics has been most prevalent on 4-year postsecondary campuses, yet the unrealized expectations gender gap for enrolling in a 4-year institution 2 years after high school has decreased steadily over the past 35 years. Male high school graduates in the 2006 cohort failed to realize their expectations at a level nearly equal to their female peers, with approximately 34% of both men and women having unrealized expectations. This near-gender parity in unrealized expectations within the 2006 cohort existed across three of the five racial groups, two of which (Latinos and African Americans) have received great focus given their history of under-representation in baccalaureate postsecondary education. Additionally, across the five SES quintiles the total percentage of the unrealized expectations gender gap in the most recent cohort was at a 35-year low. It is important to keep these findings in context. Although the unrealized expectations gender gap has generally decreased over the past 35 years, this obscures the overall difference in unrealized expectations for different racial groups. For example, across the four cohorts, 21%–35% of Asian and White students have typically failed to realize their 4-year degree expectations by enrolling in a 4-year institution within two years of high school graduation irrespective of gender. This is in sharp contrast to Latino (51%–56%), African American (41%–51%), and Native American (40%–65%) students who, over time, have been far less likely to realize their educational expectations.

Unrealized expectations for any postsecondary education

Although the unrealized expectations gender gap for expecting a 4-year degree has decreased over the past 35 years, our findings showed an opposite trend for students expecting any level of postsecondary education and enrolling in a postsecondary institution within 2 years after high school. Consistently and increasingly, men have failed to realize their expectations at a rate greater than have women. The unrealized expectations gender gap for any postsecondary education was found among all racial groups but was largest for students of color and most pronounced among Native Americans. Similarly, our findings indicated that men from the two lowest SES quintiles, particularly since the mid 1990s, have failed to realize their expectations at a rate greater than have women, and at a rate generally greater than their peers. These findings may be of particular interest to those in institutional research, planning, and strategic enrollment management offices at 2-year institutions because they point directly to a leak in the pipeline between high school and pursuit of some level of postsecondary education, despite a stated expectation to do so.

Definitions Matter

Despite the fact that men have failed to realize their expectations at a rate greater than women consistently over the past 35 years, we found our two definitions of the unrealized expectations gender gap yielded substantively

different findings in terms of direction and magnitude, especially for trends over time and particularly when examined by race/ethnicity and SES. In our first definition, the unrealized expectations gender gap referred to the percentage difference between men and women who expected a 4-year degree but failed to enroll in a 4-year institution within 2 years after high school. In our second definition, the unrealized expectations gender gap referred to the percentage difference between men and women who expected any postsecondary education and failed to enroll in any postsecondary institution within 2 years after high school. Comparing Figures 1 and 4 and the clear reversal in direction of the gender gap in unrealized expectations, it is apparent the operational definition used influenced our findings.

Under our operational definitions, we found that although women's 4-year degree expectations have increased over the past 35 years, since the 1990s women have enrolled in alignment with those expectations at a lower rate than they did in earlier cohorts, and thus the gender gap in unrealized expectations has steadily decreased over time. Women are over-represented in community colleges (ED, 2010), however; based on our definition, these women—who may be attending 2-year colleges with the intention to transfer to a 4-year institution—were defined as having unrealized expectations. Our definition of unrealized expectations may have contributed to women appearing to have become less likely to realize their 4-year degree expectations over time. Recent evidence (C. Reynolds, 2012; Surette, 2001), however, suggests that women who attend 2-year colleges with the intention of transferring to a 4-year institution do so with a lower propensity than their male peers and those women who do transfer are less likely than men to earn their 4-year degree, and realize lower labor market wages. The role of 2-year colleges in the entire process of realizing 4-year degree expectations and how this may differ for men and women and may be compounded by race/ethnicity and SES deserves more attention.

A final implication of our research, using our two definitions of "unrealized expectations," is that conclusions are directly tied to operational definitions and assumptions about key concepts. As noted earlier, had degree attainment been used as the measure of "realization" as opposed to enrollment consistent with expectations 2 years after high school, the present study's findings may underestimate the gender gap in unrealized educational expectations. In light of these findings and the acknowledgment of how other conceptions of unrealized expectations can influence results and subsequent recommendations for policy and practice, researchers must consider the body of literature as a whole so as not to overstate any one finding (see Wells et al., 2011). Better yet, perhaps more research should present side-by-side results using different operational definitions and/or methods. If the findings are similar, then they are that much more robust. If they are different, particularly in direction as evidenced in the present study, it is a more accurate representation of the phenomenon's complexity and makes clear why it is so difficult to give bullet-point synopses of statistics and trends in higher education. For institutional researchers, side-by-side results using different operational definitions and/or methods can provide clearer results to inform strategic policy and planning decisions.

In essence, the answer to whether the unrealized expectations gender gap is growing or diminishing is . . . it depends. It depends on many factors about which the researcher makes subjective decisions. This becomes truer when further complicating the inquiry by race and SES. "It depends" may be a difficult story for institutional researchers to tell their senior administrators or other policymakers because it fails to provide easy-to-digest headlines, sound bites, or action items, but it more accurately represents the complex educational landscape. The two sets of results presented are inextricably tied to a particular definition of "realization" that can and should be challenged, and, when compared to related research, will continue to complicate the notion of how realizing one's expectations—or in this case failing to realize one's expectations—differs for men and women. Addressing the unrealized expectations gender gap in ways that do not penalize or diminish the vital gains made by women over the past 35 years requires an understanding of how multiple definitions and intersecting identities like race/ethnicity and SES influence gendered trends.

We suspect the "it depends" notion that comes out of these findings is not limited to gender gaps in realizing educational expectations but exists in other domains as well. It is our hope that institutional researchers, practitioners, and policymakers alike will use the nuanced complexity of this historical trend analysis to inform their approaches to institutional analyses, program decisions, and policy design in the multitude of areas influenced by higher education.

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