

Report prepared for Dr. Angela McCaskill,
Associate Provost for Diversity, Gallaudet University

High School Diversity Experiences of Entering Gallaudet Students

(Contract Number 0000020421)

Submitted by

Ross E. Mitchell, Ph.D.

In cooperation with

Gallaudet Research Institute

Gallaudet University

September 27, 2011

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EXECUTIVE SUMMARY

This report serves as a first step toward informing Gallaudet University's efforts to promote and sustain an ethnoracially diverse undergraduate student body. Gallaudet is not alone in confronting persistent gaps in college admissions and continuing enrollment between white students and students of color in American four-year colleges and universities (American Council on Education, 2008). This report discusses the diversity of the applicants to and persisting students from the Gallaudet University freshman class of 2010-2011 in reference to the larger population of deaf and hard of hearing students enrolled in American high schools in 2009-2010, from which applicants to the freshman class were drawn. It goes on to analyze and discuss Gallaudet enrollment patterns for whether there are strategies to suggest for increasing ethnoracial representation.

The study is presented in two parts. First, a description of the ethnoracial diversity experienced among deaf and hard of hearing high school students is developed from the Gallaudet Research Institute's Annual Survey of Deaf and Hard of Hearing Children and Youth. Second, a description of the ethnoracial diversity experienced by students who applied to the undergraduate college of Gallaudet University, as well as those who continued through the steps resulting in matriculation, is developed by combining information from schools reported to the Annual Survey with application, admissions, and matriculation data from the Gallaudet University Office of Academic Quality (OAQ).

From a series of detailed analyses, the following conclusions are presented. Consistent with the literature for hearing college students, deaf and hard of hearing students who apply to and eventually enroll in Gallaudet University are more likely to be white, from less disadvantaged circumstances, and come from geographically proximal locations. Focusing on the fate of Gallaudet University's 2009-2010 applicants pool at each observed decision point (i.e.,

2009-10 admissions, 2010-11 enrollment deposit, 2010-11 matriculation, and 2011-12 return), as with hearing students, Gallaudet undergraduates are more likely to be white following each decision. Again, as predicted based on patterns observed among hearing college and university students, Gallaudet enrolls a large number of students from an understandably idiosyncratic set of feeder schools, namely, residential schools for the deaf.

Applicants to Gallaudet, for the most part, attended ethnoracially diverse high schools. However, for reasons yet to be determined, a large share of Black applicants was rejected, as well as a substantial proportion of applicants who were the only deaf or hard of hearing student in their schools. Similarly, the reason that the small share of Asian/Pacific Islander students who had enrolled dropped precipitously between the freshman and sophomore years should be investigated. On a more positive note, something successful is occurring that attracts and fairly well retains Hispanic students, particularly from the West. The regional origin is noteworthy given that, first, it is harder to attract and retain students of color who travel long distances to college, and, second, the western United States is certainly the region from which a large number of Hispanic students may be recruited.

Based on applications, Gallaudet University is certainly an attractive college possibility for students of color. Nonetheless, there are a number of barriers. Students of color are more economically disadvantaged, which makes their college enrollment and persistence more difficult. Additionally, this partial confound between ethnoracial group membership and economic disadvantage status is known to be associated with academic preparation. As a matter of probability, then, students of color are less likely to be as qualified for admission. That is, beginning with the screening of applicants for a positive admissions decision, the probability of

enrolling students of color declines, and at each step along the way to becoming a returning student, attrition reduces the proportion of students of color.

The next steps for this inquiry into the relationship between the high school experiences of deaf and hard of hearing students and their interest in and persistence at Gallaudet University should include the following. First, freshmen ought to be surveyed or interviewed to obtain students' own perceptions of their diversity experiences. Second, the Common Core Data for general public school enrollments and Private School Survey data for general private school enrollments can be merged with the Annual Survey to better understand the total high school experience of deaf and hard of hearing students who were but a small fraction of their regular school's total enrollment. Third, cooperation and extramural funding should be sought so that information may be obtained about such things as the extent of academic preparation, familial support, financial support, and high school support leading up to college for students of color. Finally, beyond interviewing students at Gallaudet, a number of variables describing the Gallaudet environment need to be explored: social support, on-campus residential opportunity, academic support, and both a curriculum and extra-curriculum that promotes the maintenance, if not improvement, of an ethnoracially diverse school community. Intentional consideration of these matters would improve any future study informing efforts to improve and maintain ethnoracial diversity in the undergraduate college at Gallaudet University.

High School Diversity Experiences of Entering Gallaudet Students

This report describes the relationship between the ethnoracial diversity experiences of deaf and hard of hearing high school students with their deaf or hard of hearing peers and ethnoracial diversity of the Gallaudet University freshman class of 2010-2011. Focusing on students enrolled in American high schools in 2009-2010, this report provides an analysis of data from the Annual Survey of Deaf and Hard of Hearing Children and Youth (Annual Survey) of that year and data from 2009-2010 applications, admissions, and 2010-2011 matriculation to the undergraduate college of Gallaudet University. Given increasing ethnoracial segregation across high schools (e.g., Orfield & Lee, 2007), and persistent gaps in college admissions and continuing enrollment between white students and students of color in American four-year colleges and universities (American Council on Education, 2008), this report reviews the available indicators for whether maintaining an ethnoracially representative and diverse student body appears to be as significant a challenge for Gallaudet University as it is for most colleges. Moreover, the enrollment patterns are analyzed for whether there are strategies to suggest for increasing ethnoracial representation.

The Annual Survey is highlighted because it is the only current source for characterizing school-based ethnoracial and deafness diversity experiences. Its strength is in identifying whether deaf and hard of hearing students have attended schools with other deaf or hard of hearing students. That strength is augmented by providing information about whether these high school students: share their educational experiences with other deaf and hard of hearing students in similar instructional settings, share the same degree of hearing loss or deafness, are similarly economically (dis)advantaged, are from the same region of the country, and have ethnoracially

diverse peers. Some of these relationships have been investigated for decades and are summarized by Mitchell and Karchmer (2011), but an update using the latest (2009-2010) Annual Survey data at our disposal is necessary at this time.

By using the Annual Survey to define the social demographic context of deaf and hard of hearing students' high school experiences among their deaf and hard of hearing peers, it is possible to identify whether students who apply to and attend Gallaudet University represent the diversity of educational experiences across the nation's schools and programs serving deaf and hard of hearing students, and whether Gallaudet applicants and enrollees have had more or less experience with demographic diversity than the nation's deaf and hard of hearing student population. Of course, even the best recruitment efforts cannot guarantee that high school students follow through by completing applications, and this is important because the applicants constitute the pool from which admissions decisions are made. Moreover, the most affirmative admissions policies and practices cannot compel students to matriculate following acceptance; admitted students may choose to attend other colleges or pursue other options following high school.

Given the constraints of the applicant pool and the matriculation decisions of admitted students, this study describes the representative diversity of Gallaudet freshmen (2010-2011) and their high school experiences with demographic diversity. Based upon findings in the research literature for hearing college students, we may discover here that Gallaudet freshmen, particularly those who persist, are more like to be white (e.g., Engberg & Wolniak, 2009; Perna, 2000), from less disadvantaged circumstances (e.g., Engberg & Wolniak, 2009; Perna, 2000), and come from geographically proximal locations (López-Turley, 2009) relative to those students who never enroll or drop out after their first year. Another pattern to watch for, based on

studies of hearing college students, is that there will be a feeder network of high schools that provide a disproportionate number of applicants and matriculants to Gallaudet University (e.g., Engberg & Wolniak, 2009; Roderick, Coca, & Nagaoka, 2011)

In brief, this study is presented in two parts. First, a description of the ethnoracial diversity experienced among deaf and hard of hearing high school students is developed from the Annual Survey. Second, a description of the ethnoracial diversity experienced by students who applied to the undergraduate college of Gallaudet University, as well as those who continued through the steps resulting in matriculation, is developed by combining information from schools reported to the Annual Survey with application, admissions, and matriculation data from the Gallaudet University Office of Academic Quality (OAQ).

Using the Annual Survey, the first part of this study updates answers to the following questions.¹

- 1.1. What proportion of deaf and hard of hearing high school students have few or no deaf or hard of hearing peers at their school?
- 1.2. What is the ethnoracial distribution of deaf and hard of hearing high school students?
- 1.3. Is there a relationship between ethnoracial identity and whether deaf and hard of hearing high school students attend a school with other deaf and hard of hearing students?
- 1.4. What is the distribution of deaf and hard of hearing high school students among instructional settings?
- 1.5. Is there a relationship between ethnoracial identity and the instructional settings experienced by deaf and hard of hearing high school students?

¹ Please note that the focus of this report is largely unique. That is, there are very few studies focusing on a large sample of deaf and hard of hearing students attending high school or are of typical high school age.

- 1.6. What is the distribution of hearing loss or deafness among deaf and hard of hearing students reported to the Annual Survey?
- 1.7. Is there a relationship between ethnoracial identity and the degree of hearing loss among deaf and hard of hearing high school students?
- 1.8. What is the proportion of deaf and hard of hearing high school students identified as economically disadvantaged?
- 1.9. Is there a relationship between ethnoracial identity and whether deaf and hard of hearing high school students are economically disadvantaged?
- 1.10. What is the proportion of deaf and hard of hearing high school students in each of the four major geographic regions of the United States?
- 1.11. Is there a relationship between ethnoracial identity and where deaf and hard of hearing students attend high school?

The first part of this study also provides answers to questions about the ethnoracial diversity experienced by deaf and hard of hearing high school students that have not been addressed in previous publications.

- 1.12. When there are more than six deaf or hard of hearing students in a high school, do these students have the same or different ethnoracial identities? In other words, how ethn racially diverse is the deaf and hard of hearing student population within schools?
- 1.13. When there are more than six deaf or hard of hearing students in a high school, do these students have similar or different degrees of hearing loss or deafness?
- 1.14. When there are more than six deaf or hard of hearing students in a high school, are these students placed in the same instructional setting?

- 1.15. When there are more than six deaf or hard of hearing students in a high school, do these students share the same economic disadvantage status?
- 1.16. Is there a relationship between degree of hearing loss or deafness and the instructional setting experienced by deaf and hard of hearing high schools students within the same school?
- 1.17. Is there a relationship between economic disadvantage status and the instructional setting experienced by deaf and hard of hearing high schools students within the same school?
- 1.18. Is there a relationship between ethnoracial identity and the instructional setting experienced by deaf and hard of hearing high schools students within the same school? In other words, are deaf and hard of hearing students ethnoracially segregated by instructional setting within the same high school?

Prior to investigating the relationship between the attributes of 2009-2010 applicants to Gallaudet University and the demographic and instructional characteristics of their high schools, the second part of the study begins by relating demographic attributes of the individual prospects for (i.e., applicants, admitted students, and those paying deposits as well) and matriculants to the most recent (2010-2011) freshman class that has completed its first year at Gallaudet University with the distribution of those same attributes for all students reported to the Child Count (U.S. Department of Education, 2010).

- 2.1. What is the ethnoracial distribution of prospects and matriculants? How does this compare to deaf and hard of hearing students in general (i.e., from the Child Count)?
- 2.2. What is the geographic distribution of prospects and matriculants? How does this compare to deaf and hard of hearing students in general?

The second part of the study continues by answering the following questions about the relationship between the high school environment students attended and whether that distribution of experiences for the admissions prospects and matriculants to the most recent (2010-2011) freshman class that has completed its first year at Gallaudet University is similar to the distribution of experiences for deaf and hard of hearing high school students generally.

- 2.3. What proportion of prospects and matriculants had few or no deaf or hard of hearing peers at their school? How does this compare to deaf and hard of hearing high school students in general (i.e., from the Annual Survey)?
- 2.4. What is the distribution of hearing loss or deafness at the schools prospects and matriculants attended compared with deaf and hard of hearing high school students in general?
- 2.5. Were instructional settings at the schools prospects and matriculants attended experienced in differing proportions than for deaf and hard of hearing high school students in general?
- 2.6. What is the proportion of prospects and matriculants who attended schools with economically disadvantaged deaf and hard of hearing students compared with deaf and hard of hearing high school students in general?
- 2.7. What was the ethnoracial distribution of deaf and hard of hearing high school students at the schools prospects and matriculants attended? How does this compare to deaf and hard of hearing high school students in general?
- 2.8. Which are the most influential among the identified factors relating to admission to and persistence at Gallaudet University? How do these factors interact, if at all?

METHOD

The two parts of this study have their own separate data preparation and analysis requirements. Before describing the specifics of data manipulation for variable creation, here is an overview of the preparation process for each part of the study. First, high school students² are selected from the individual-level Annual Survey data file³ and then school-level aggregate variables are created. The school-level variables are merged with the individual-level file. Second, school-level aggregate variables are created from the OAQ data file,⁴ which are then merged with both the individual- and school-level Annual Survey files. Similarly, the individual-level OAQ data file is merged with the school-level files for both the Annual Survey and the OAQ data. Below, the two parts of this study are defined in much greater detail.

Part 1—National Diversity

Data Preparation

Following Mitchell and Karchmer (2005), a youth's degree of hearing loss is coded as "less than severe," "severe," or "profound" based on the pure tone threshold better ear average (BEA) being less than 71 dB, 71 to 90 dB, or greater than 90 dB, respectively. For comparison with other studies of deaf and hard of hearing students in K-12 education (e.g., Blackorby & Knokey, 2006), youth's degree of hearing loss is also coded as "less-than-severe" or "severe-to-profound" (i.e. combining severe and profound). The instructional setting is defined as described in Mitchell and Karchmer (2011): "regular education setting" for those students reported to

² Note: Due to missing data for student's grade in school, or specification of whether the student is enrolled in a secondary (high school) setting, there may be a very few 14-year-old deaf or hard of hearing students selected for this analysis who are not actually high school students. That is, all of the available age, grade, and school data were used to identify which students are high school students, but not all student records had complete data.

³ For this study, the individual-level Annual Survey file was stripped of individual identifiers; only an arbitrary record number is included.

⁴ No individual identifiers (i.e., names, Social Security numbers, or other person-specific identifiers) were included in this file from the OAQ.

receive their instruction only in a regular classroom in the regular school setting; “resource room” for those students who receive at least some instruction in a resource room within the regular school setting; “self-contained classroom” for those students who are placed in a self-contained classroom within the regular school setting; and “special school” for all students who receive their instruction in a special school or center (e.g., residential school for the deaf, special day school for the deaf).

Ethnoracial identity in the Annual Survey has been recoded to be consistent with the data maintained by the OAQ. Any student responding as Hispanic regardless of separate racial identification is coded as Hispanic. All non-Hispanics are coded by their racial identification (White, Black, American Indian, Asian, or Pacific Islander). However, since there were no Pacific Islander students in the OAQ data for 2010-2011, Asian and Pacific Islander were combined into a single ethnoracial category. All multiracial students were combined with students providing no ethnoracial responses in to an “Unknown” category. There has been no recoding of data for economic disadvantage status (typically defined by eligibility for the federal free or reduced price lunch program). Geographic region is coded as the “West” (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming), “Midwest” (Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin), “South” (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia), and “Northeast” (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont)

The Annual Survey data were aggregated to provide school-level proportions enrolled (proportion of respondents) by each ethnoracial category, each hearing loss or deafness category, each instructional setting, and each economic disadvantage status. The economic disadvantage status proportion is missing for several schools because individual student data were not reported, whereas the other aggregate variables have fewer schools with missing data because the information is available for more students, so analyses including the economic disadvantage variable will be for a much smaller set of schools, as well as students.

Data Analysis

Questions 1.1 (deaf and hard of hearing student isolation), 1.2 (ethnoracial diversity), 1.4 (instructional settings), 1.6 (degree of hearing loss), 1.8 (economic disadvantage status), and 1.10 (geographic region) are answered by obtaining the response category frequencies (or enrollment percentiles) for each response category and illustrated using histograms (for interval-level enrollment counts) and bar graphs (for ordinal- and nominal-level response category frequencies). Questions 1.3 (ethnoracial group isolation), 1.5 (ethnoracial group segregation), 1.7 (ethnoracial group deafness), 1.9 (ethnoracial group economic disadvantage), and 1.11 (ethnoracial group geography) are answered using contingency table analysis (likelihood ratio chi-squared statistic with uncertainty coefficient to measure strength of the relationship; see, e.g., Mitchell & Mitchell, 2010; Reardon & Firebaugh, 2002) and illustrated using clustered bar graphs.

Questions 1.12 through 1.18 are all answered using a selected subset of the data, namely, only those schools with more than six deaf or hard of hearing students enrolled. This threshold was established because there are up to six ethnoracial categories, so a count of seven exceeds (by just one) the minimum count necessary for any school to represent the full potential diversity

on any measure considered here. Questions 1.12 (distribution of ethnoracial diversity), 1.13 (distribution of deafness diversity), 1.14 (distribution of instructional setting diversity), 1.15 (distribution of economic disadvantage diversity) are answered by obtaining the mean, median, and selected percentiles of the diversity distribution as well as visually depicted using histograms. Diversity is measured by the Simpson index (see, e.g., Patil & Taillie, 1982). This index of diversity ranges from zero (0), which means no diversity (only a single ethnoracial group represented among deaf and hard of hearing students in the high school), and one (1), which means complete diversity (all possible ethnoracial groups equally represented). Questions 1.16 (within school segregation by deafness), 1.17 (within school segregation by economic disadvantage), and 1.18 (within school ethnoracial segregation) are answered using contingency table analysis (decomposition of the total uncertainty coefficient into within and between school segregation by instructional setting; see, e.g., Mitchell, Batie, & Mitchell, 2010; Reardon, Yun, & Eitle, 2000).

Part 2—Gallaudet Diversity

Data Preparation

To connect the insights from the 2009-2010 Annual Survey findings to the most recent prospects for and matriculants to the 2010-2011 freshman class at Gallaudet University, additional data were obtained from the OAQ. The OAQ data file included records of individual students who applied to the undergraduate college of Gallaudet University in 2009-2010 with the following information: a unique record identifier (neither actual names nor traceable identifiers); the student's race/ethnicity (i.e., a race identifier and a separate Hispanic ethnicity identifier); high school identification information for linking Annual Survey and OAQ data (high school's name, city, and state—a region category designation identical to that in the Annual Survey was

assigned to each record using this state information); application received in 2009-2010 (yes or no); admission (acceptance sent in 2009-2010: yes or no); enrollment deposit received (yes or no); and matriculation (in 2010-2011: yes or no); and returned in 2011-2012 (yes or no).⁵

The OAQ data file was aggregated to the school level to provide proportions of applicants for each ethnoracial category, and proportions of students admitted, deposited, matriculated in 2010-2011, and returned for 2011-2012. Several schools were not part of the Annual Survey sample. To overcome this data deficit, in the case of schools for the deaf, available ethnoracial enrollment proportions and, if additionally available, economic disadvantage status proportions were retrieved from the World Wide Web.⁶ There were very few Gallaudet applicants who were not previously enrolled in a school for the deaf who could not be linked to high school enrollment data from the Annual Survey.

Data Analysis

Questions 2.1 (ethnoracial distribution), 2.2 (regional distribution), 2.3 (high school isolation), 2.4 (high school deafness distribution), 2.5 (high school setting distribution), 2.6 (high school economic disadvantage distribution), and 2.7 (high school ethnoracial distribution) are answered using contingency table analysis. Question 2.8 (prediction of admission and persistence) is answered using logistic regression analysis (e.g., Ryan, 1997, chapter 9) to determine not only which factors are most important (i.e., ethnoracial group, region of the U.S., and deaf and hard of hearing high school program size), but whether there are significant

⁵ Note: School names in the OAQ data have to be matched with the school names as reported to the Annual Survey, and these may not be recorded identically in the separate data management systems, but names are sufficiently similar that all possible matches can be made.

⁶ The following on-line data sources were used to obtain ethnoracial and economic disadvantage enrollment proportions for nearly all of the schools for the deaf not represented in the Annual Survey: DataQuest (<http://dq.cde.ca.gov/dataquest/>), education.com (<http://www.education.com/>), GreatSchools (<http://www.greatschools.org>), ksdeaf.org (2009-2010 Annual Report of the Kansas School for the Deaf available at <http://ksdeaf.org/About/2009-2010%20KSD%20Annual%20Report%20Final.pdf>), localschooldirectory.com (<http://www.localschooldirectory.com/>), and Public School Review (<http://www.publicschoolreview.com>) . When more than one source provided data, the most recently reported data were used.

interactions among these factors (e.g., ethnoracial diversity and region of the U.S. jointly may determine whether students are admitted and whether they persist).

RESULTS

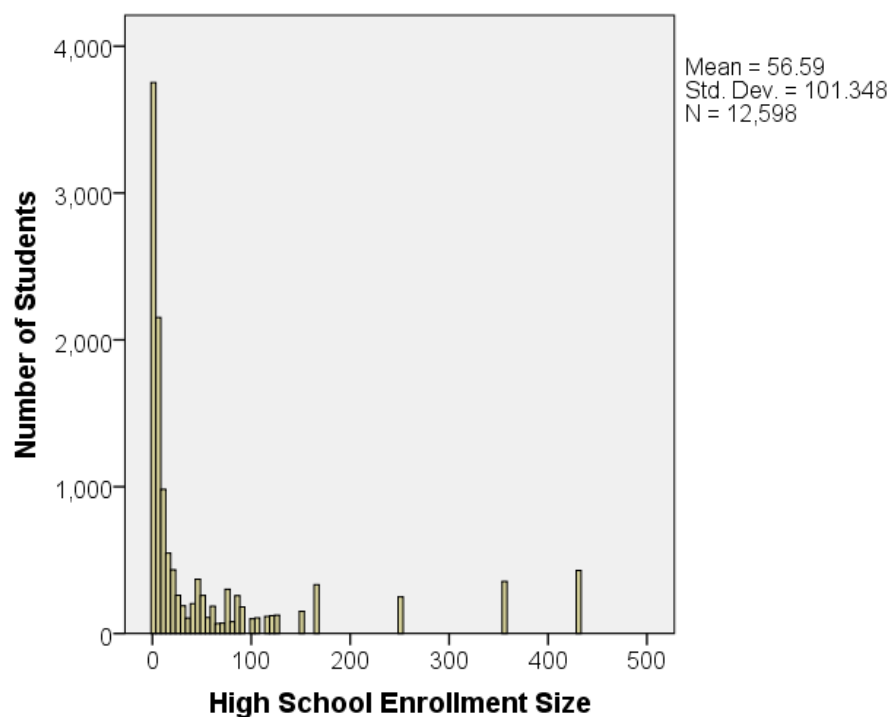
There are four sets of results reported here: two sets for Part 1—National Diversity; and two sets for Part 2—Gallaudet Diversity. First, there is an update of relevant but selected information about the nation’s deaf and hard of hearing high school students. This update is represented by the answers to Questions 1.1 through 1.11, which provide information about selected dimensions of demographic diversity. Second, there are findings from further investigation of the selected characteristics of the nation’s high school programs serving more than just a few deaf and hard of hearing students. These new findings are the answers to Questions 1.12 through 1.18, which explore the extent to which deaf and hard of hearing students in particular schools and programs are already in a demographically diverse educational setting. Third, there is a review of the relationship between ethnoracial and regional diversity among deaf and hard of hearing students, generally, and those deaf and hard of hearing students who applied to Gallaudet University in 2009-2010, which answers Questions 2.1 and 2.2. Finally, there is a report of the relationship between the specific diversity experiences of deaf and hard of hearing students in high school and whether they apply to, enroll in, or continue in the undergraduate program at Gallaudet University. This final report provides answers to Questions 2.3 through 2.8, which highlight points in the recruitment and retention process that are challenges to maintaining diversity in the undergraduate student body at Gallaudet University.

Part 1—National Diversity

Question 1.1—Deaf and Hard of Hearing Student Isolation

Just under half (49.0%) of the deaf and hard of hearing high school students reported to the Annual Survey had eight or fewer peers. Thirteen percent were the only deaf or hard of hearing student reported for their high school, and another 9.2% were reported to have only one deaf or hard of hearing peer (22.2% combined). More than two-fifths (42.4%) of the students were enrolled with two to five deaf or hard of hearing peers. Two-thirds (66.6%) of the students were in high schools with a total deaf and hard of hearing student enrollment of 34 or greater. (See Figure 1.1 for full distribution.)

Figure 1.1. Distribution of deaf and hard of hearing students across high school enrollment sizes, Annual Survey, 2009-2010.

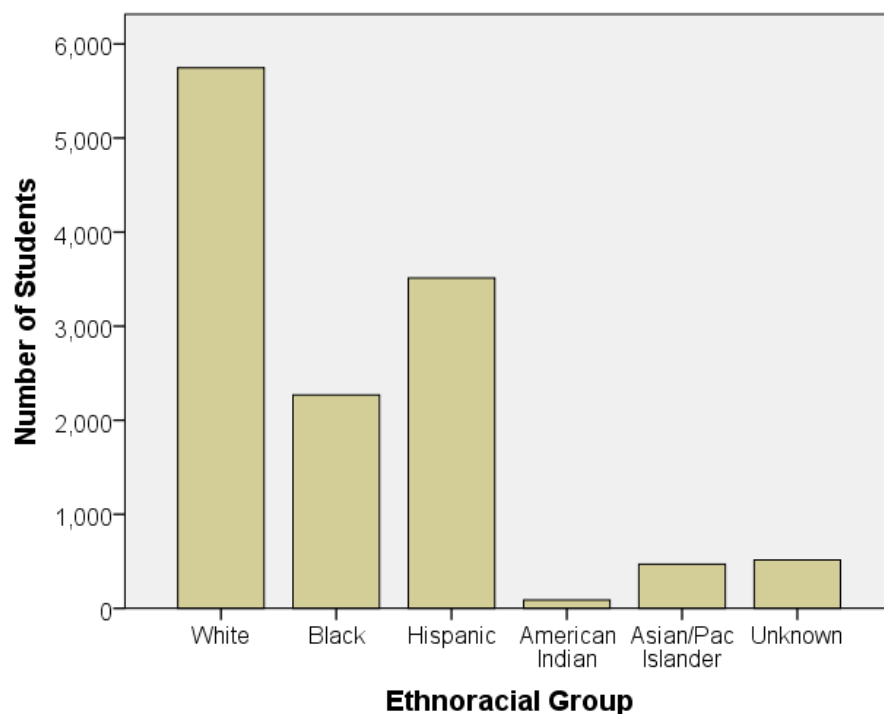


Question 1.2—Ethnoracial Diversity

Less than half (45.6%) of the deaf and hard of hearing high school students were identified as White as reported to the Annual Survey. Over one quarter (27.9%) were identified

as Hispanic. Eighteen percent (18.0%) were identified as Black, followed by 4.1% “Unknown” ethnoracial category, 3.7% Asian/Pacific Islander, and 0.7% American Indian. Since the Annual Survey has had some bias in which programs and states more fully respond (see Mitchell, 2004), a comparison with the IDEA Child Count is in order. Compared with slightly dated reports—Fall 2005—for students ages 6 to 21 years identified with hearing impairment (U.S. Department of Education, 2010, Table 1-16f), the Annual Survey sample is overrepresented among Black and Hispanic students (Child Count reports 16.3% and 21.9%, respectively), more so Hispanic than Black students, and underrepresented among White, Asian/Pacific Islander, and American Indian students (Child Count reports 55.6%, 4.8%, and 1.4%, respectively). White underrepresentation is more profound than Black overrepresentation, but less out of balance compared to Hispanic overrepresentation. Given the percentage of students with “Unknown” ethnoracial identity, the underrepresentation of American Indians, especially, and Asian/Pacific Islander high school students could easily become more balanced relative to older IDEA Child Count reference data. (See Figure 1.2 for ethnoracial distribution from the Annual Survey.)

Figure 1.2. Frequency distribution of deaf and hard of hearing students across ethnoracial categories, Annual Survey, 2009-2010.

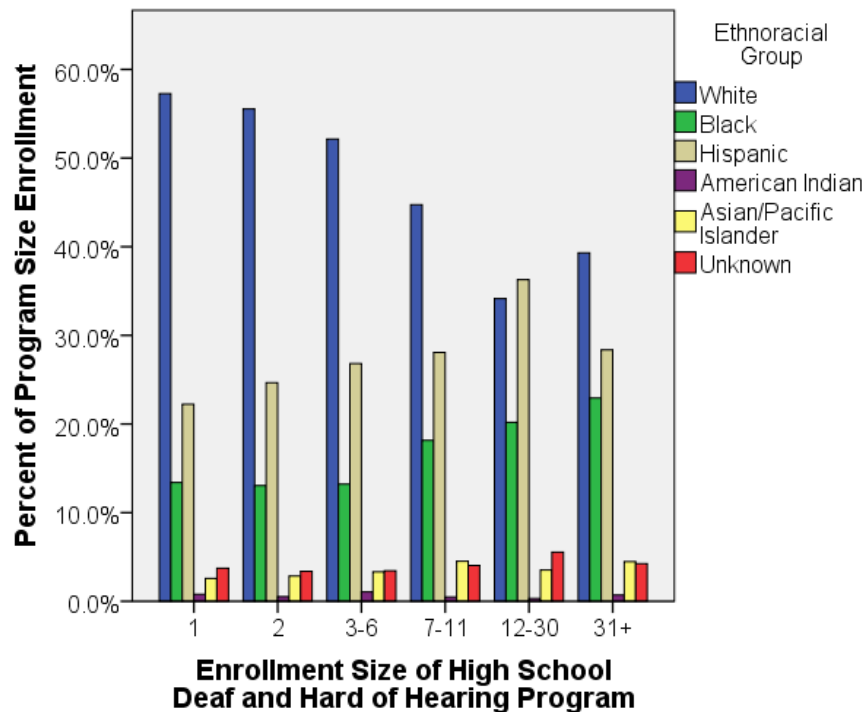


Question 1.3—Ethnoracial Group Isolation

The number of deaf and hard of hearing students enrolled in a high school, coded as six program size categories (1, 2, 3-6, 7-11, 12-30, and 31+), weakly predicts the ethnoracial distribution for each program size ($U = .013 \pm .002$; $p < .001$; $\chi^2_{LR}(25) = 418.6$). (Note: As a rule of thumb, weak prediction is $.010 \leq U < .090$; moderate prediction is $.090 \leq U < .250$; and strong prediction is $.250 \leq U$.) Shown in the clustered bar graph in Figure 1.3, with the exception of a more precipitous change of enrollment percentage for these two ethnoracial groups, White enrollment proportion steadily declines with increasing program size while Hispanic enrollment proportion steadily increases. The exception is the program size that is frequently observed for large high schools with a special deaf and hard of hearing program, and which typically includes at least some students receiving their instruction in self-contained classrooms (i.e., 12-30 students), in which case Hispanics are the plurality rather than White students. In other words,

White students are a larger share of schools for the deaf (31+ students) than they in large programs in the regular high schools (12-30 students). Similar to Hispanics, the proportion of Black students increases steadily, but the rise doesn't begin until program size exceeds 3-6 students.

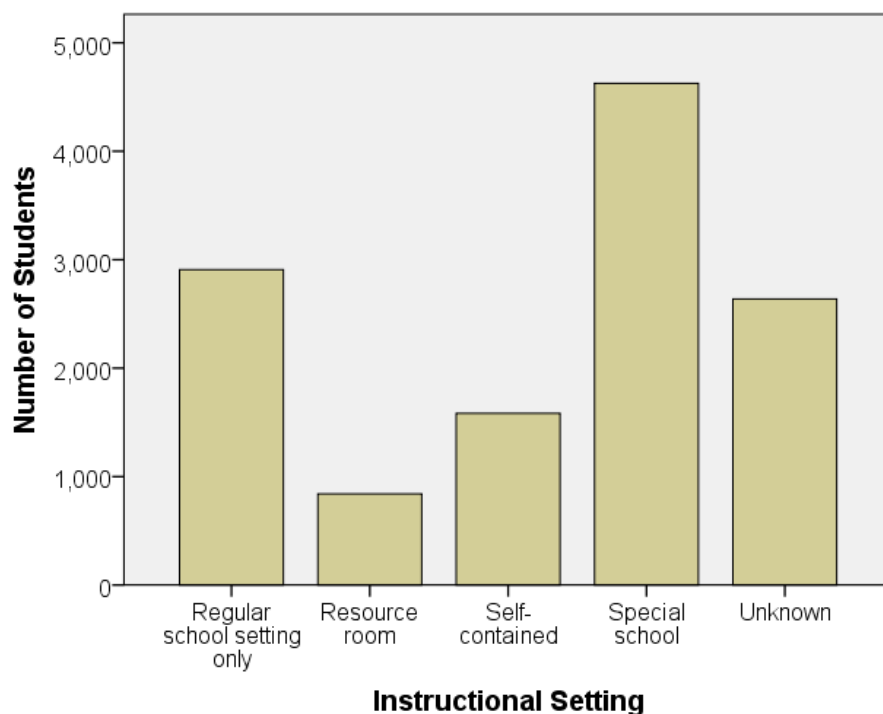
Figure 1.3. Clustered bar graph for the cross tabulation of deaf and hard of hearing high school categorical program size with ethnoracial groupings, Annual Survey, 2009-2010.



Question 1.4—Instructional Settings

Over one third (36.7%) of the deaf and hard of hearing high school students reported to the 2009-2010 Annual Survey attended a special school or center for the deaf. Less than a quarter (23.1%) was reported to be fully in the regular school setting, but over a fifth (20.9%) had an unknown instructional setting. The remaining fifth of the sample were split between receiving some or all of their instruction in a resource room (6.7%) or self-contained classroom (12.6%). (See Figure 1.4 for full distribution.)

Figure 1.4. Distribution of deaf and hard of hearing students across instructional settings, Annual Survey, 2009-2010.

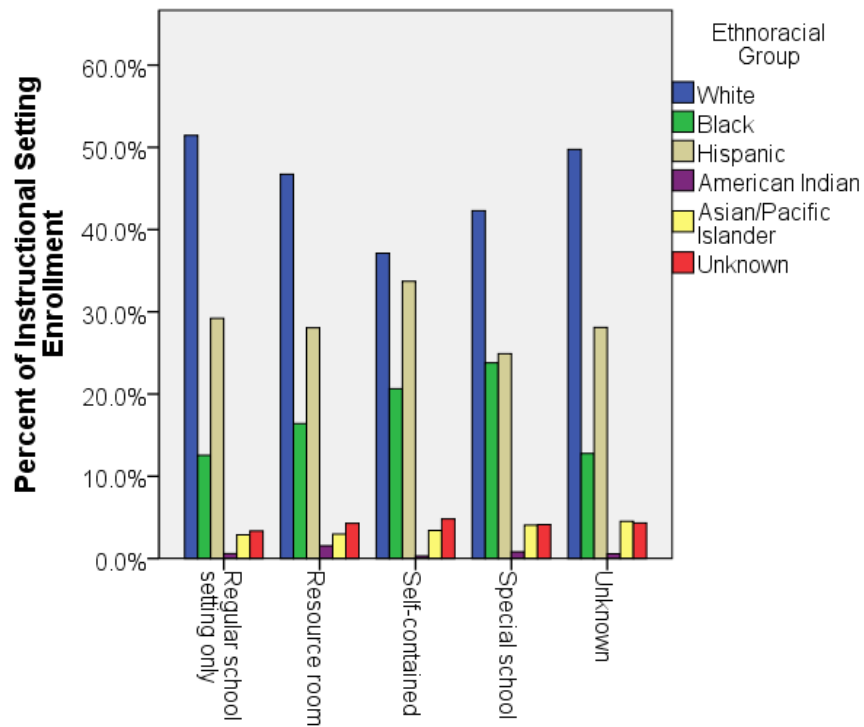


Question 1.5—Ethnoracial Group Segregation

The instructional setting in which deaf and hard of hearing high school students are enrolled very weakly predicts the ethnoracial distribution for each program size ($U = .010 \pm .002$; $p < .001$; $\chi^2_{LR}(20) = 320.3$). As shown in the clustered bar graph in Figure 1.5, in the three regular education settings (regular only, resource room, and self-contained), White enrollment proportion steadily declines with increasing separation from the mainstream (i.e., resource room is some separation and self-contained classroom is total separation for at least some part of the day) while the Black proportion steadily increases and the Hispanic enrollment proportion increases in the self-contained classroom. (Note: Due to very small counts, the increasing enrollment proportion of Asian/Pacific Islander and ethnoracially “Unknown” students with increasing separation is a less reliable pattern.). The fully separated special school or center enrollment takes on an interestingly different pattern. The White enrollment share is greater than

that found in self-contained classrooms while the Hispanic proportion is lower (in fact, lower than any other setting), and the Black enrollment proportion is highest in special schools. Finally, the enrollment distribution in “Unknown” instructional settings is nearly identical to that for deaf and hard of hearing high school students in the regular-school-only setting.

Figure 1.5. Clustered bar graph for the cross tabulation of deaf and hard of hearing high school instructional setting with ethnoracial groupings, Annual Survey, 2009-2010.

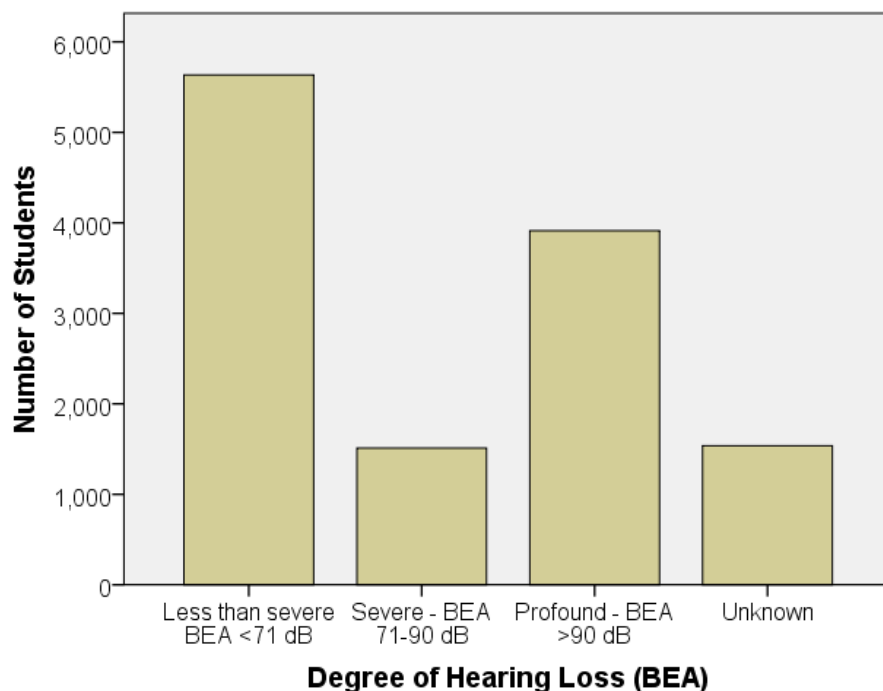


Question 1.6—Degree of Hearing Loss

The degree of hearing loss among the deaf and hard of hearing high school students reported to the 2009-2010 Annual Survey was determined by calculating the better ear average of the pure tone thresholds (measured in dB) at 500, 1000, and 2000 Hz. Less than half (44.7%) of students have a less than severe (BEA < 71 dB) hearing loss, nearly one in eight (12.0%) have a severe (BEA 71-90 dB) hearing loss, less than a third (31.1%) have a profound (BEA > 90 dB) hearing loss, and nearly one in eight (12.2%) have an unknown degree of hearing loss. (See Figure 1.6 for full distribution.) Combining the counts for severe and profound degrees of

hearing loss results in two almost equal-sized groups with known hearing loss (i.e., 44.7% less-than-severe and 43.1% severe-to-profound).

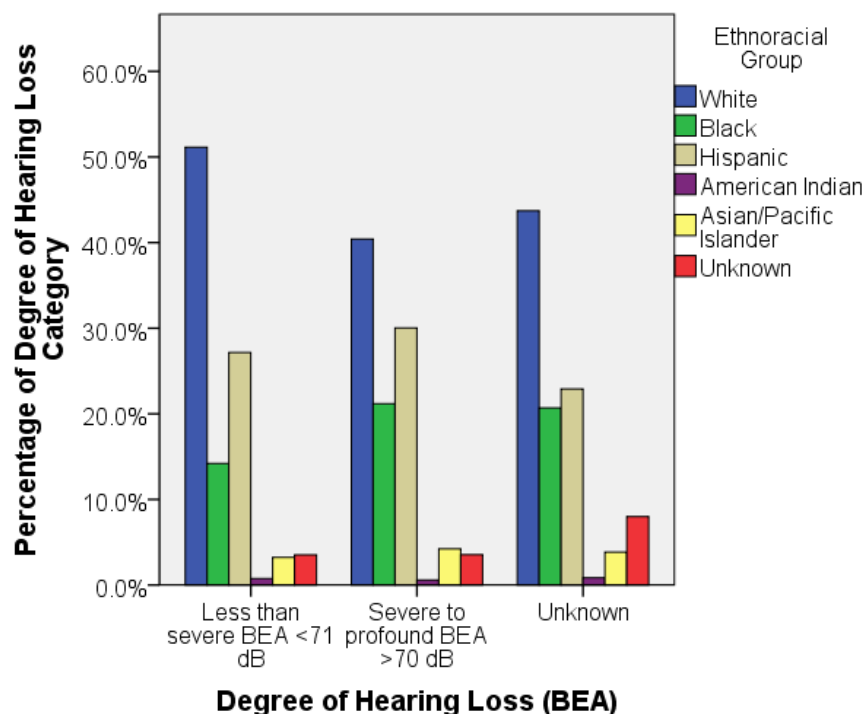
Figure 1.6. Distribution of deaf and hard of hearing students by their degree of hearing loss as measured by their audiometric better ear average (BEA), Annual Survey, 2009-2010.



Question 1.7—Ethnoracial Group Deafness

The degree of deafness among deaf and hard of hearing high school students hardly differs by ethnoracial group ($U = .007 \pm .002$; $p < .001$; $\chi^2_{LR}(10) = 241.8$). As shown in the clustered bar graph in Figure 1.7, the White proportion is a little greater among students with less-than-severe hearing loss while the Black proportion is lower relative to the other two categories. Clearly, the ethnoracial distributions are not identical for each degree of hearing loss category, but the measure of association is so small as to be almost negligible.

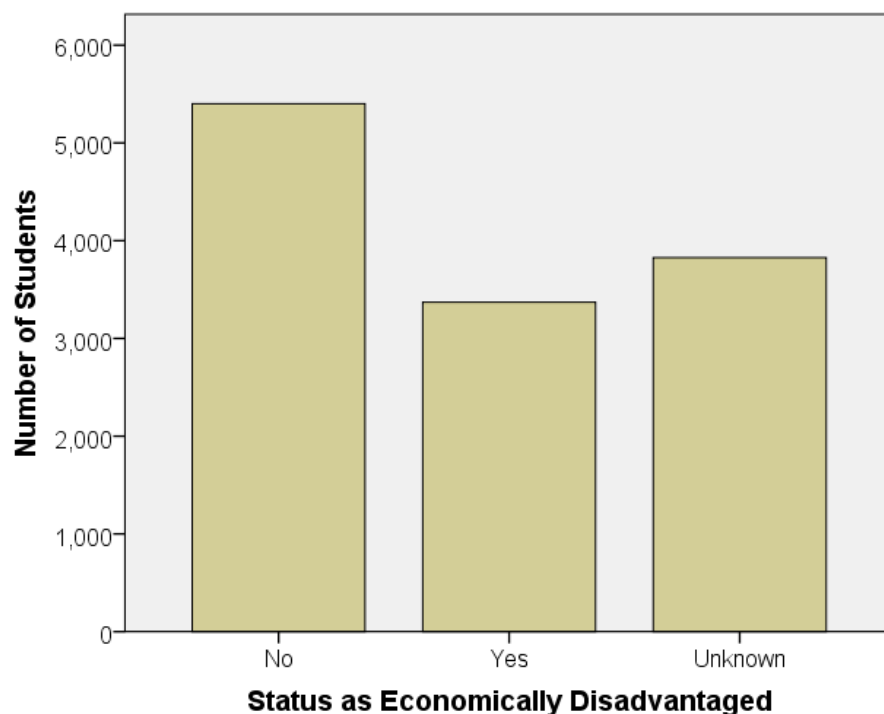
Figure 1.7. Clustered bar graph for the cross tabulation of deaf and hard of hearing high school student degree of hearing loss with ethnoracial groupings, Annual Survey, 2009-2010.



Question 1.8—Economic Disadvantage Status

Economic disadvantage status of deaf and hard of hearing high school students reported to the 2009-2010 Annual Survey is difficult to characterize due to a high proportion of students with unknown status; 30.4% of these high school students are missing any response to the question of whether they were identified as economically disadvantaged for the purpose of achievement group disaggregation required by the No Child Left Behind Act of 2001. Among those for whom data were reported (8,771 of the 12,598 students), just less than two in five (38.4%) are economically disadvantaged; the remainder (61.6%) are not economically disadvantaged. (See Figure 1.8 for full distribution.)

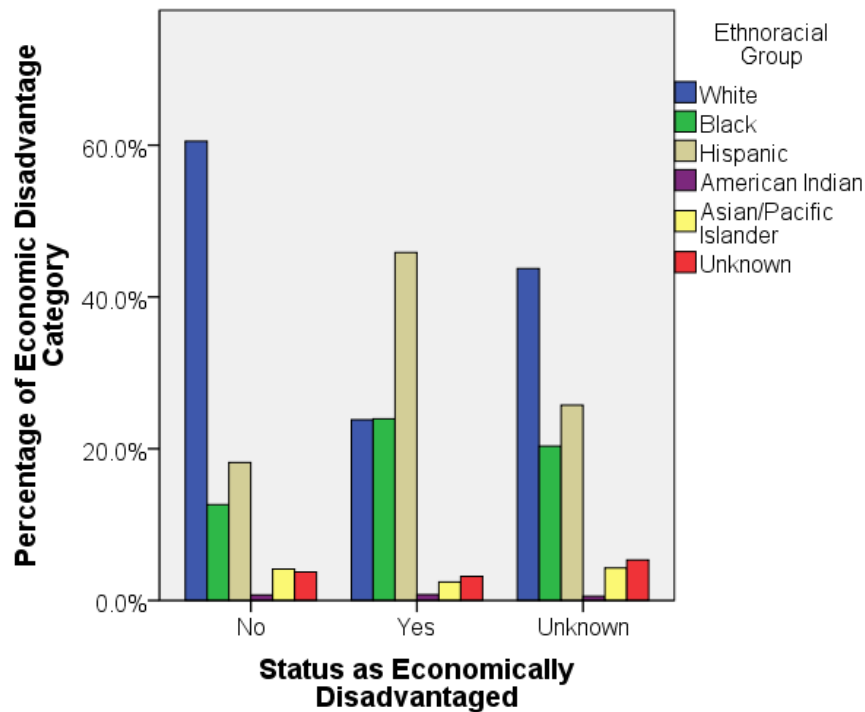
Figure 1.8. Distribution of deaf and hard of hearing students by their economic disadvantage status, Annual Survey, 2009-2010.



Question 1.9—Ethnoracial Group Economic Disadvantage

Economic disadvantage status predicts deaf and hard of hearing high school students' ethnoracial group membership with moderate strength ($U = .043 \pm .004$; $p < .001$; $\chi^2_{LR}(10) = 1,420.7$). As shown in the clustered bar graph in Figure 1.9, the White proportion is dramatically higher than either the Black or Hispanic proportions among students who were not identified as economically disadvantaged while the Hispanic proportion is clearly higher than either the White or Black proportions among those identified as economically disadvantaged. Black students are a higher proportion among those who are economically disadvantaged than they are among those not disadvantaged. The Unknown economic disadvantage status has a pattern that appears to be a mix of the two known statuses (roughly a 50:50 mix). Clearly, ethnoracial identity and economic disadvantage status are related.

Figure 1.9. Clustered bar graph for the cross tabulation of deaf and hard of hearing high school student economic disadvantage status with ethnoracial groupings, Annual Survey, 2009-2010.



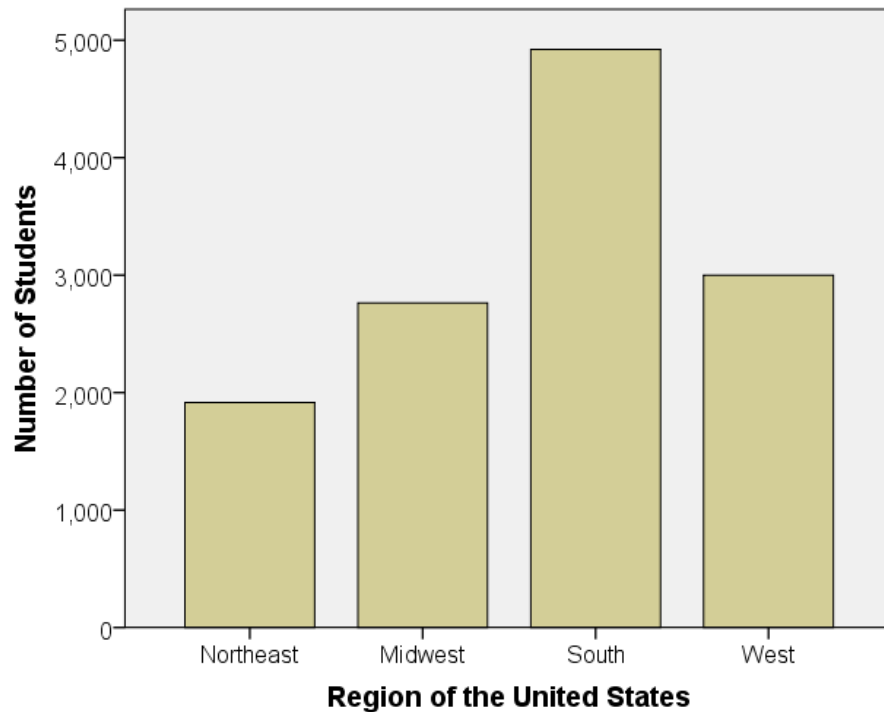
Question 1.10—Geographic Region

The geographic region in which of deaf and hard of hearing students attended high school, as reported to the 2009-2010 Annual Survey, is a little biased relative to the Child Count.⁷ Nearly two in five (39.1%) of students reported to the Annual Survey attend high schools in the South, while one third (33.2%) do according to the Child Count. Nearly a quarter (23.8%) attends high schools in the West, which is very close to the one quarter (25.1%) from the Child Count. The one quarter (25.2%) of that nation's students with hearing impairment in the Midwest, according to the Child Count, exceeds that reported to the Annual Survey (21.9%) for the same region by a modest amount. Finally, the share of deaf and hard of hearing high

⁷ This comparison is actually with all students ages 6 to 21 years of age identified with hearing impairments in the 50 United States and the District of Columbia, and is not limited to students 14 years of age or older. Nonetheless, there is no good reason to believe that there is a difference in the age distribution by region such that the Child Count proportions would change noticeably if limited to students 14 to 21 years of age.

school students in the Northeast reported to the Annual Survey (15.2%) also is a bit lower than the Child Count proportion (16.4%). (See Figure 1.10 for full distribution.)

Figure 1.10. Distribution of deaf and hard of hearing students by their geographic region in the United States, Annual Survey, 2009-2010.

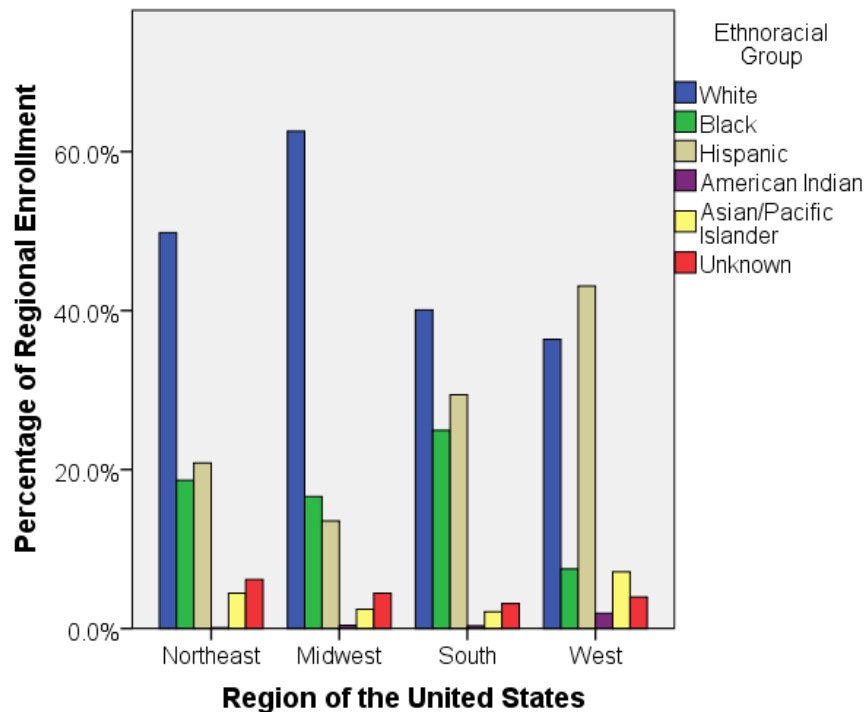


Question 1.11—Ethnoracial Group Geography

Geographic region predicts deaf and hard of hearing high school students' ethnoracial group membership with moderate strength ($U = .041 \pm .004$; $p < .001$; $\chi^2_{LR}(15) = 1,356.7$). As shown in the clustered bar graph in Figure 1.11, the White proportion is dramatically higher than either the Black or Hispanic proportions among students who went to high school in the Northeast or Midwest (Whites are the majority), but the White proportion in the South constitutes only a plurality and is lower than the Hispanic proportion in the West. Hispanic students are the plurality in the West and the second largest share (hardly greater than the Black student proportions) in the South and Northeast. The proportion of American Indian students and Asian/Pacific Islander students is largest in the West as well. Black students are the higher

proportion among those who went to high school in the South than any other region (lowest share in the West). There is no doubt that, like hearing high school students (and the total U.S. population), ethnoracial group representation among deaf and hard of hearing students is uneven across the geographic regions of this country.

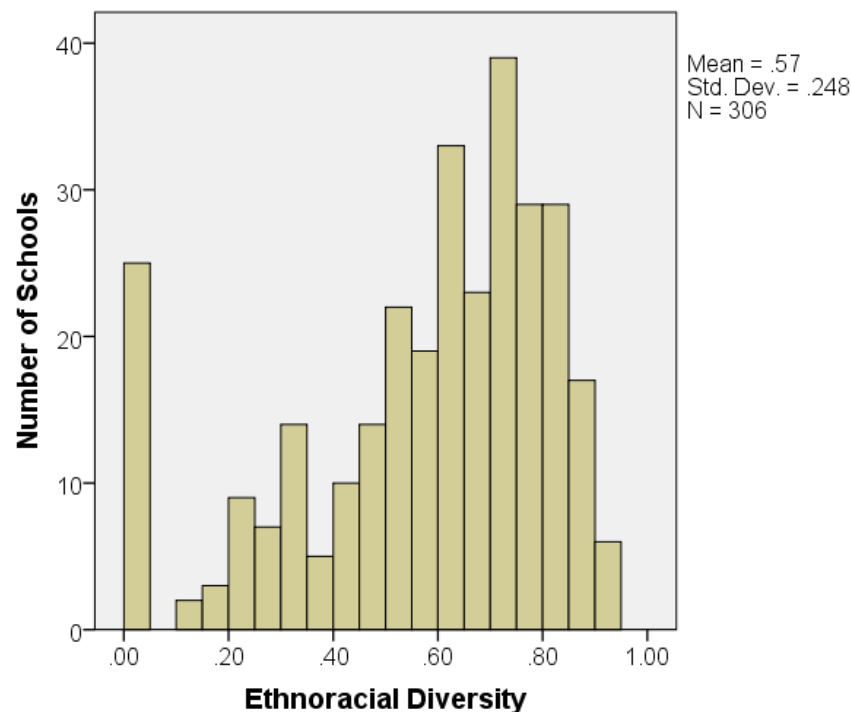
Figure 1.11. Clustered bar graph for the cross tabulation of deaf and hard of hearing high school student geographic region with ethnoracial groupings, Annual Survey, 2009-2010.



Question 1.12—Distribution of Ethnoracial Diversity

For the schools reported to the Annual Survey, ethnoracial diversity varies substantially across high schools enrolling more than six deaf and hard of hearing students. Diversity ranges from 0 to .940 (nearly complete diversity). The mean (average) school diversity is .572 and the median is .629 with half of the values falling between .463 and .765 (the interquartile range). As seen in Figure 1.12, a small fraction (7.8%) of high schools enrolling more than six deaf and hard of hearing students have no ethnoracial diversity whatsoever, but most schools have modest to substantial diversity.

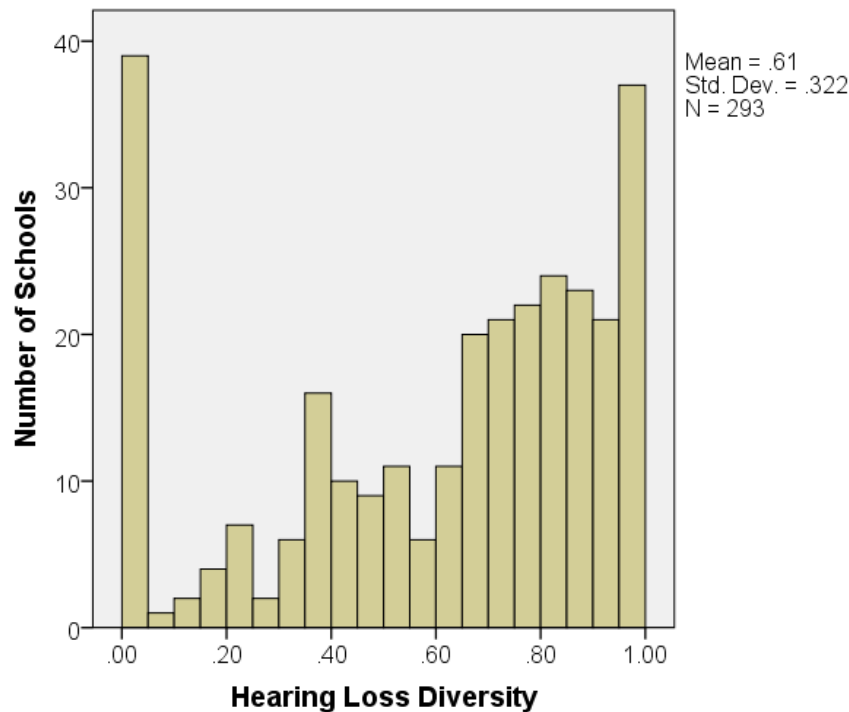
Figure 1.12. Distribution of ethnoracial diversity in high schools enrolling more than six deaf and hard of hearing students, Annual Survey, 2009-2010.



Question 1.13—Distribution of Deafness Diversity

The diversity of students by degree of hearing loss varies substantially across high schools enrolling more than six deaf and hard of hearing students. Diversity ranges from 0 to 1 (complete diversity, i.e., 50:50 ratio less-than-severe to severe-to-profound). The mean school diversity is .607 and the median is .703 with half of the values falling between .370 and .867 (the interquartile range). As seen in Figure 1.13, a small fraction (13.3%) of high schools enrolling more than six deaf and hard of hearing students have no hearing loss diversity (i.e., all either less-than-severe hearing loss or severe-to-profound hearing loss), but most schools have substantial diversity.

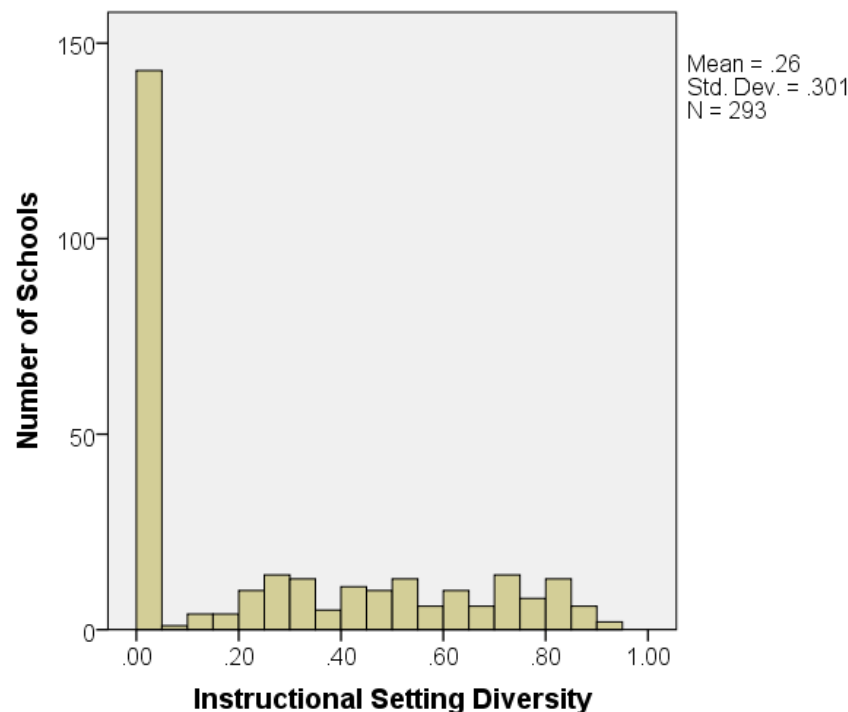
Figure 1.13. Distribution of degree of hearing loss diversity in high schools enrolling more than six deaf and hard of hearing students, Annual Survey, 2009-2010.



Question 1.14—Distribution of Instructional Setting Diversity

The diversity of students by instructional setting is much less variable than ethnoracial or hearing loss diversity across high schools enrolling more than six deaf and hard of hearing students. Diversity ranges from 0 to .910 (close to complete diversity). The mean school diversity is .264 and the median is .147 with half of the values falling between 0 and .526 (the interquartile range). As seen in Figure 1.14, nearly half (46.8%) of high schools enrolling more than six deaf and hard of hearing students have no instructional setting diversity (i.e., almost half of the schools have only one setting for instruction). Moreover, very few schools have substantial diversity (distribution of students) across instructional settings. In other words, high schools do not typically provide more than one or two instructional settings for deaf and hard of hearing students.

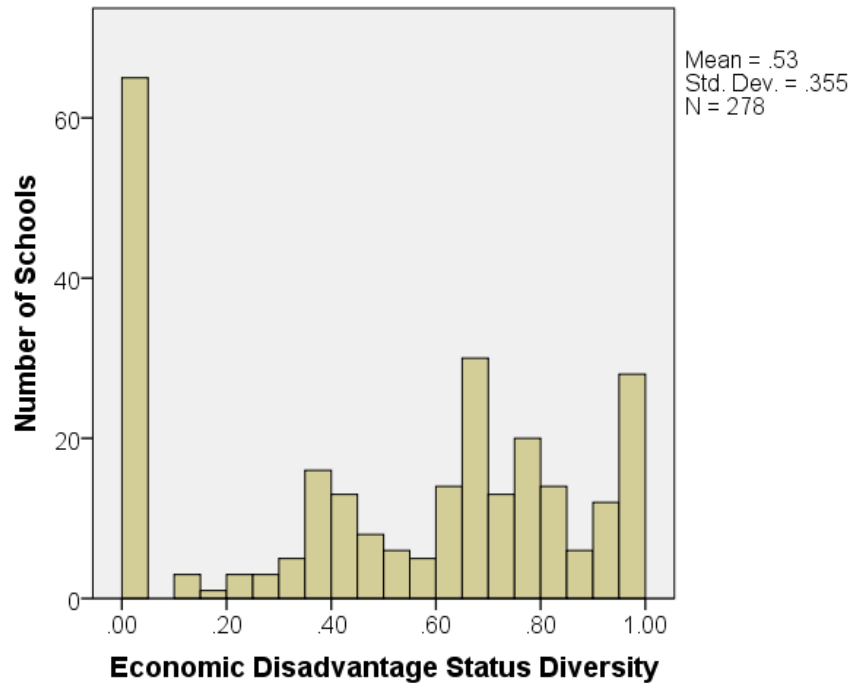
Figure 1.14. Distribution of instructional setting diversity in high schools enrolling more than six deaf and hard of hearing students, Annual Survey, 2009-2010.



Question 1.15—Distribution of Economic Disadvantage Diversity

The diversity of students by economic disadvantage status is less variable than ethnoracial or hearing loss diversity across high schools enrolling more than six deaf and hard of hearing students, but more variable than instructional setting diversity. The index of economic disadvantage status diversity ranges from 0 to 1 (complete diversity, which is a 50:50 ratio economically disadvantaged to not economically disadvantaged). The mean school diversity is .530 and the median is .640 with half of the values falling between .204 and .816 (the interquartile range). As seen in Figure 1.15, nearly a quarter (23.4%) of high schools enrolling more than six deaf and hard of hearing students have no economic disadvantage diversity (i.e., almost half of the schools have only one setting for instruction). However, the remaining schools exhibit moderate to substantial economic disadvantage status diversity.

Figure 1.15. Distribution of economic disadvantage status diversity in high schools enrolling more than six deaf and hard of hearing students, Annual Survey, 2009-2010.



Question 1.16—Within-School Segregation by Deafness

Within-school segregation by deafness for high schools with more than six deaf and hard of hearing students is derived from the Annual Survey in two steps. First, the total segregation by degree of hearing loss (less-than-severe or severe-to-profound) among instructional settings across all schools is obtained. The total national segregation is quite high ($U_{\text{Total}} = .371 \pm .016$; $p < .001$; $\chi^2_{\text{LR}}(990) = 4880.4$). Second, the national between-school segregation by degree of hearing loss is calculated. This value is similarly high ($U_{\text{Between}} = .341 \pm .016$; $p < .001$; $\chi^2_{\text{LR}}(584) = 4481.5$). However, the within-school segregation by degree of hearing loss among instructional settings is small ($U_{\text{Total}} - U_{\text{Between}} = U_{\text{Within}} = .030 \pm .016$; 8.1% of Total).

Question 1.17—Within-School Segregation by Economic Disadvantage

For high schools with more than six deaf and hard of hearing students reported to the Annual Survey, the total segregation by economic disadvantage among instructional settings across all schools is very high ($U_{\text{Total}} = .570 \pm .012$; $p < .001$; $\chi^2_{\text{LR}}(990) = 9054.7$). The national between-school segregation by economic disadvantage is also very high ($U_{\text{Between}} = .544 \pm .012$; $p < .001$; $\chi^2_{\text{LR}}(584) = 8630.4$). Nonetheless, the within-school segregation by economic disadvantage status among instructional settings is small ($U_{\text{Within}} = .026 \pm .012$; 4.6% of Total).

Question 1.18—Within-School Ethnoracial Segregation

Before describing the within-school ethnoracial segregation derived from the Annual Survey, the answer to Question 1.5 should be revisited. When considering only schools with more than six deaf and hard of hearing enrolled, rather than all high schools enrolling any number of deaf or hard of hearing students, the degree of ethnoracial segregation is quite different. Nationally, between-school segregation for schools with more than six deaf and hard of hearing students is high ($U_{\text{Between}} = .279 \pm .011$; $p < .001$; $\chi^2_{\text{LR}}(1460) = 5520.4$). The total ethnoracial segregation of deaf and hard of hearing students among instructional setting across all schools reported to the Annual Survey is, of course, also high ($U_{\text{Total}} = .309 \pm .011$; $p < .001$; $\chi^2_{\text{LR}}(2475) = 6107.5$)—the Total must be at least as large as the Between component. Nonetheless, as with the previous within-school segregation considerations, the magnitude of within-school ethnoracial segregation is small ($U_{\text{Within}} = .030 \pm .011$; 9.7% of Total).

Part 2—Gallaudet Diversity

Now, it is time to connect the 2009-2010 national description of diversity in deaf and hard of hearing high school programs with the 2009-2010 national applicant pool for Gallaudet University.

Question 2.1—Ethnoracial Distribution

Table 2.1 displays the ethnoracial group percentages for applicants to Gallaudet University in 2009-2010 at each decision point in their admissions, matriculation, and retention monitoring history, as well as the national ethnoracial group percentages for deaf and hard of hearing students. With a large share of students with unknown ethnoracial identification among applicants, it is difficult to be sure what the initial ethnoracial distribution is at the application phase. If all of those who are “unknown” are White, Black, or Hispanic, then it is possible that the applicant pool is fairly representative of the national population. Once admitted, and at each phase thereafter, the percentage of students with unknown ethnoracial identification drops substantially. At the same time, the share of White students steadily increases; the share of Black students drops; the percentage of Hispanic students fluctuates at levels close to that identified at the application phase; the share of American Indian students steadily declines; and the percentage of Asian/Pacific Islander students (effectively) steadily declines. Though a non-trivial percentage of students with unknown ethnoracial identification remains even at the last decision point (i.e., percentage of those who returned for 2011-2012), it is far from enough to undo the substantial underrepresentation of all students of color.

Table 2.1 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by ethnoracial group.

Ethnoracial Group	Applicant Status					Child Count (N=71,484)
	Applied (N=418)	Admitted (N=276)	Paid Deposit (N=233)	Matriculated (N=220)	Returned (N=162)	
White	51.7	63.4	66.5	67.7	72.2	55.6
Black	15.8	12.7	12.9	13.2	11.7	16.3
Hispanic	9.1	10.1	11.2	10.9	8.6	21.9
American Indian	1.7	1.1	0.9	0.9	0.6	1.3
Asian/Pacific Islander	5.0	4.3	4.7	3.6	1.9	4.9
Unknown	16.7	8.3	3.9	3.6	4.9	0.0

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); U.S. Department of Education (2010, Table 1-16f)

Question 2.2—Regional Distribution

Table 2.2 displays the regional location percentages for applicants to Gallaudet University in 2009-2010 at each decision point in their admissions, matriculation, and retention monitoring history, as well as the national percentages for deaf and hard of hearing students. For students from the Northeast, all subsequent decision points have percentages lower than that identified for initial applicants. Those from the Midwest have percentages that are always higher than that of initial applicants. Students from the South who applied are effectively at the same percent representation at the last decision point, though number fluctuated in between. For students from the West, percentages fluctuated, but the percentage among those who returned is higher than at any decision point. Compared to national percentages, students from the Northeast are a little overrepresented; students from the Midwest and West are appreciably underrepresented; and students from the South are substantially overrepresented. Given the geographic proximity of the South and Northeast to Gallaudet University (Washington, DC, which is in and surrounded by states in the South region), this overrepresentation is not surprising.

Table 2.2 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by region of the United States.

Region	Applicant Status					Child Count (N=71,439)
	Applied (N=418)	Admitted (N=276)	Paid Deposit (N=233)	Matriculated (N=220)	Returned (N=162)	
Northeast	20.3	20.3	18.8	19.3	17.3	16.4
Midwest	18.2	19.5	21.4	21.2	19.9	25.2
South	43.9	41.4	42.0	42.0	43.6	33.2
West	17.6	18.8	17.9	17.5	19.2	25.1

Notes: Column percentages may not total exactly 100.0 due to rounding. Child Count total does not include deaf and hard of hearing students in BIA schools because their enrollments were not reported by state.

Sources: Gallaudet University OAQ (2011); U.S. Department of Education (2010, Table 1-16f)

Question 2.3—High School Isolation

Table 2.3 displays the program size percentages for applicants to Gallaudet University in 2009-2010 at each decision point in their admissions, matriculation, and retention monitoring history. For students who were the only deaf or hard of hearing student in their high school (i.e., had no deaf or hard of hearing peers), who were 10.8% of applicants, their representation dropped significantly at the admissions decision point (to 5.4% of those admitted). Though slightly higher among the returning students (6.2%), the percentage of students with no peers remained roughly the same following the admissions decision. For students with just a single deaf or hard of hearing peer in high school, as well as those with 6 to 10 peers, their percentages remained effectively the same at all decision points (i.e., 12.4% and 3.6% at application, respectively, and 12.3% and 3.1% among returning students, respectively). There was very nearly a steady decline from the initial application percentage among those who had 2 to 5 peers (from 13.6% among applicants to 9.9% among returning students); and this pattern of decline was almost identical for applicant with 11 to 29 deaf or hard of hearing peers in high school (from 7.4% among applicants to 4.3% among returning students).

By far, the biggest sources of applicants were the high school programs that had more than 30 deaf and hard of hearing students enrolled (52.2%). The large programs were even more likely to be the source of admitted (60.9%), matriculating (62.3%), and returning students (64.2%). Compared to the Annual Survey, the large programs are dramatically overrepresented among applicants to Gallaudet University, a disparity that becomes exaggerated with each successive decision point, while all other program sizes are substantially underrepresented. (Note: Though the 1 peer programs appear to be overrepresented in Table 2.3, this may be an artifact of having assigned students who were truly the only one at their school to this program size category through missing value imputation; that is, the overwhelming pattern in the data is that students who applied to Gallaudet were not the only student in their program, so a single applicant from a school never previously reported to Annual Survey was assigned to the 1 peer program size category.)

Table 2.3 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by deaf and hard of hearing student high school program size (number of deaf or hard of hearing high school peers the student had in 2009-2010).

Program Size	Applicant Status					Annual Survey (N=12,598)
	Applied (N=418)	Admitted (N=276)	Paid Deposit (N=233)	Matriculated (N=220)	Returned (N=162)	
No peers	10.8	5.4	5.6	5.5	6.2	13.0
1 peer	12.4	12.0	12.9	12.7	12.3	9.2
2-5 peers	13.6	10.9	11.2	10.5	9.9	20.2
6-10 peers	3.6	3.3	3.4	3.2	3.1	12.6
11-29 peers	7.4	7.6	6.9	5.9	4.3	10.0
30+ peers	52.2	60.9	60.1	62.3	64.2	35.0

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Question 2.4—High School Deafness Distribution

Table 2.4 displays the percentages for each school deafness category (derived from thirds of the distribution of high school students with severe-to-profound hearing loss in the Annual

Survey) for applicants to Gallaudet University in 2009-2010 at each decision point in their admissions, matriculation, and retention monitoring history, as well as the national percentages for deaf and hard of hearing students. These results are for a much smaller share of the American applicants to Gallaudet University because their schools either refused to participate in the Annual Survey (which does not prevent identifying their program size) or were not identified for participation in the Annual Survey (which, in almost all cases, means these students were from the smallest programs). This same or slightly greater reduction in sample size will apply to all of the remaining analyses

A particular fact of this analysis must be emphasized before describing the results. The row categories define the reference percentages, so an additional column is not necessary. For example, in the “Applied” column of Table 2.4, the deafness distribution of applicant would match the Annual Survey reference percentages if each value in the column were 33.3% (exactly one third for each level). However, this is obviously not the case here, which is described further below. Also, to be clear, the first row compares the lower third of values in the deafness distribution, which means the third of the Annual Survey sample with the lowest proportions of fellow deaf and hard of hearing students with severe-to-profound hearing loss.

Now, to explore the details of Table 2.4, students who attended high schools in the lowest third of the deafness distribution (up to 10.5% of deaf and hard of hearing students with severe-to-profound hearing loss), accounted for only 8.9% of applicants, but steadily increased their representation to 13.% of those returning. Students who attended middle-third high schools (10.5% to 70.4% with severe-to-profound hearing loss), account for 29.9% of the applicants, but steadily declined to 20.7% of those returning. Students who attended highest-third high schools (more than 70.4% with severe-to-profound hearing loss) accounted for 61.2% of the applicants,

but took a slight jump to 66.3% of returning students. Compared to the Annual Survey, deaf and hard of hearing high school students with few severe-to-profound hearing loss peers were radically underrepresented, those from the wide middle range were somewhat underrepresented, and those from high schools with a large proportion of severe-to-profound hearing loss peers were radically overrepresented.

Table 2.4 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program deafness distribution categories from the Annual Survey (2009-2010).

Third of Deafness Distribution	Applicant Status				
	Applied (N=224)	Admitted (N=154)	Paid Deposit (N=129)	Matriculated (N=124)	Returned (N=92)
Lowest 3rd	8.9	9.1	10.1	10.5	13.0
Middle 3rd	29.9	27.9	28.7	26.6	20.7
Highest 3rd	61.2	63.0	61.2	62.9	66.3

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Question 2.5—High School Setting Distribution

Table 2.5 displays the percentages for each regular school setting proportion category (derived from sixths of the distribution of high school students receiving instruction in the regular school setting reported to the Annual Survey, instead of thirds, because nearly two thirds of students reported to the Annual Survey attended high schools offering a single instructional setting—no diversity) for applicants to Gallaudet University in 2009-2010 at each decision point in their admissions, matriculation, and retention monitoring history, as well as the national percentages for deaf and hard of hearing students. Students who attended high schools in the lowest two-thirds of the regular school setting distribution (up to 13.0% of deaf and hard of hearing students in the regular school setting), accounted for only 87.1% of applicants, and finished at a nearly identical 87.0% of those returning. Students who attended penultimate-sixth

high schools (13.0% to 66.7% in the regular school setting), accounted for 8.5% of the applicants, but their share declined to 5.4% of those returning. Students who attended highest-sixth high schools (more than 66.7% in the regular school setting) accounted for 4.5% of the applicants, but increased to 7.6% of returning students. Compared to the Annual Survey, deaf and hard of hearing high school students with relatively few peers in the regular school setting are radically overrepresented at every decision point, while those in the middling range and with a high proportion of peers in the regular school setting were profoundly underrepresented.

Table 2.5 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program regular setting for instruction distribution categories from the Annual Survey (2009-2010).

Segments of Regular Setting Distribution	Applicant Status				
	Applied (N=224)	Admitted (N=154)	Paid Deposit (N=129)	Matriculated (N=124)	Returned (N=92)
Lowest 2-3rds	87.1	87.7	86.8	87.9	87.0
Penultimate 6th	8.5	7.1	7.8	6.5	5.4
Highest 6th	4.5	5.2	5.4	5.6	7.6

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Question 2.6—High School Economic Disadvantage Distribution

Table 2.6 displays the percentages for each school economic disadvantage proportion category (derived from thirds of the distribution of high school students identified as economically disadvantaged reported to the Annual Survey) for applicants to Gallaudet University in 2009-2010 at each decision point in their admissions, matriculation, and retention monitoring history, as well as the national percentages for deaf and hard of hearing students. Students who attended high schools in the lowest third of the economic disadvantage distribution (up to 6.0% of deaf and hard of hearing students were economically disadvantaged), accounted for only 10.4% of applicants, and finished at a slightly 11.3% of those returning. Students who

attended middle-third high schools (6.0% to 54.0% were economically disadvantaged), accounted for 42.8% of the applicants, but fell to 39.2% of those admitted and essentially remained at that level (39.4% of those returning). Students who attended highest-third high schools (more than 54.0% were economically disadvantaged) accounted for 46.8% of the applicants, but jumped to 50.4% of those admitted and essentially remained at that level (49.3% of returning students). Compared to the Annual Survey, deaf and hard of hearing high school students with relatively few economically disadvantaged peers are radically underrepresented at Gallaudet University. Those from high schools with a modest proportion of economically disadvantaged peers are somewhat overrepresented; and those with a substantial majority of economically disadvantaged peers are substantially overrepresented. (Note: Available data for this analysis were most problematic, so the patterns that have been described here should be interpreted with great caution.)

Table 2.6 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program economic disadvantage distribution categories from the Annual Survey (2009-2010).

Third of Economic Disadvantage	Applicant Status				
	Applied (N=173)	Admitted (N=125)	Paid Deposit (N=104)	Matriculated (N=100)	Returned (N=71)
Lowest 3rd	10.4	10.4	10.6	11.0	11.3
Middle 3rd	42.8	39.2	39.4	39.0	39.4
Highest 3rd	46.8	50.4	50.0	50.0	49.3

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Question 2.7—High School Ethnoracial Distribution

Table 2.7 displays the percentages for each school White student enrollment proportion category (derived from thirds of the distribution of high school students identified as White as reported to the Annual Survey) for applicants to Gallaudet University in 2009-2010 at each

decision point in their admissions, matriculation, and retention monitoring history, as well as the national percentages for deaf and hard of hearing students. Students who attended high schools in the lowest third of the White student enrollment distribution (up to 24.7% of deaf and hard of hearing students were White)—the schools with the highest proportions of students of color—accounted for only 15.2% of applicants, and their share steadily declined at each decision point to 6.3% of those returning. Students who attended middle-third high schools (24.7% to 58.0% were White), accounted for 54.2% of the applicants, and they remained at a nearly constant proportion at each decision point (54.1% of those returning). Students who attended highest-third high schools (more than 58.0% were White) accounted for 30.7% of the applicants, and their share steadily increased at each decision point to 39.6% of returning students. Compared to the Annual Survey, deaf and hard of hearing high school students with relatively few White peers are radically underrepresented at Gallaudet University. Those from high schools with a modest proportion of White peers are substantially overrepresented; and those with a significant majority of White peers are fairly well represented but, in the end, slightly overrepresented.

Table 2.7 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program White enrollment distribution categories from the Annual Survey (2009-2010).

Third of White Enrollment Distribution	Applicant Status				
	Applied (N=264)	Admitted (N=190)	Paid Deposit (N=159)	Matriculated (N=153)	Returned (N=111)
Lowest 3rd	15.2	12.6	10.1	9.2	6.3
Middle 3rd	54.2	52.1	54.1	54.9	54.1
Highest 3rd	30.7	35.3	35.8	35.9	39.6

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Question 2.8—Prediction of Admission and Persistence

Before exploring the importance of various factors in predicting the admission and persistence of Gallaudet students, a few of changes to the reference group are required for technical reasons. First, due to the unevenness in the regional and program origin of students for whom ethnoracial identification is unknown, these students had to be eliminated from this final analysis. Second, due to the very small number of American Indians applying to and persisting in the freshman class of 2010-2011, they have also been excluded from this final analysis. That is, four ethnoracial groups are preserved: Whites, Blacks, Hispanics, and Asian/Pacific Islanders. Finally, due to the very small number of returning students from high school programs in which they were the only deaf or hard of hearing student, the program size category “No peers” is excluded from this final analysis. For precise comparison purposes, tables reflecting this subset of Gallaudet applicants are provided in the Appendix, Revisions: Part 2—Gallaudet Diversity. However, none of the patterns of changes from application in 2009-2010 to returning in 2011-2012 differ for this subset; only the distribution across categories changes (e.g., the proportions of white students and students attending large [30+ peers] programs are relatively larger; see Tables A.1 and A.3).

Of the remaining 317 applicants in 2009-2010 from American high schools, 237 (74.8%) were admitted to the freshman class of 2010-2011; and of the remaining 201 matriculants in 2010-2011, 144 (71.6%) returned in 2011-2012. The three factors selected to predict these admissions and retention patterns were ethnoracial identification and two high school attributes, namely, program size and region of the United States. The two high school attributes were chosen because program size captures the strong reliance of Gallaudet University on applications from students who have attended schools for the deaf (i.e., the largest program size category and,

occasionally, the second largest category), and geographic region, though imperfectly, indicates proximity to Gallaudet (i.e., Washington, DC, is in the South, so more applicants, if not persisting students, are expected from the South). Moreover, interactions between ethnoracial identity and each of the two high school attributes are added to the prediction models because large programs tend to be more ethnoracially diverse and region of the United States is associated with the ethnoracial distribution of students (i.e., the joint effect of these factors may provide additional predictive power over the pair considered separately).

In the prediction of who is admitted among the applicants in 2009-2010, only ethnoracial identity makes a significant and moderate contribution ($\chi^2(3) = 24.46$; $p < .001$; Nagelkerke $R^2 = .110$). All ethnoracial groups, except Hispanics, are significantly less likely than Whites, who are the reference group, to be admitted from among the applicant pool (Blacks: $e^b = .240$, $p < .001$; Hispanics: $e^b = 1.018$, $p = .970$; Asian/Pacific Islanders: $e^b = .300$, $p = .016$). (Note: No effect is when the odds ratio is one, $e^b = 1$; outcomes favoring the reference group have $e^b < 1$, which is the case here.) Program size improves the overall prediction strength (Nagelkerke $R^2 = .145$) and percentage for classification of students as admitted or not, from 74.8% to 77.0%, but the change due to including program size in the model may be noise in the data rather than real indication of an effect on admissions ($\chi^2(4) = 8.35$; $p = .080$; compare with the conventional requirement that $p \leq \alpha < .050$). Including region in the prediction model adds effectively nothing at all ($\chi^2(4) = .829$; $p = .843$; Nagelkerke $R^2 = .149$). Though the joint effect (interaction) of ethnoracial identity and program size does not appear to add significantly to the prediction of which students are admitted ($\chi^2(3) = 5.97$; $p = .113$), overall prediction strength (Nagelkerke $R^2 = .162$) and percentage for classification of students as admitted or not (77.3%) are a little higher. The interaction between ethnoracial identity and region is completely ignorable.

Predicting who returns in 2011-2012 among those who matriculated in 2010-2011 is best modeled as simply and more weakly dependent on student ethnoracial identity ($\chi^2(3) = 9.00$; $p = .029$; Nagelkerke $R^2 = .063$). Classification percentage correct improves from 71.6% to 72.6% using ethnoracial identity as the sole predictor. This time, the definite exception is Black students. That is, Asian/Pacific Islanders are clearly less likely than White students to return to Gallaudet University while the lower odds for Hispanics are just above the conventional criterion, and the lower odds for Blacks are not statistically significant (Blacks: $e^b = .528$, $p = .150$; Hispanics: $e^b = .411$, $p = .053$; Asian/Pacific Islanders: $e^b = .176$, $p = .022$). This time, program size adds effectively nothing at all ($\chi^2(4) = 1.352$; $p = .852$; Nagelkerke $R^2 = .072$). The addition of region to the model is not significant as well ($\chi^2(3) = 3.81$; $p = .283$). The joint effect (interaction) of ethnoracial identity and program size definitely does not add significantly to the prediction of which students are admitted ($\chi^2(3) = 1.955$; $p = .582$), and the interaction between ethnoracial identity and region is completely ignorable.

CONCLUSIONS

Consistent with the literature for hearing college students, deaf and hard of hearing students who apply to and eventually enroll in Gallaudet University are more likely to be white, from less disadvantaged circumstances, and come from geographically proximal locations. As we follow the pool of 2009-2010 applicants to Gallaudet University through to those who remain as returning students in 2011-2012, as with hearing students, Gallaudet undergraduates are more likely to be white compared to those admitted. Again, as predicted based on patterns observed among hearing college and university students, Gallaudet enrolls a large number of students from an understandably idiosyncratic set of feeder schools, namely, residential schools for the deaf.

It turns out that the 2009-2010 applicants, for the most part, attended ethnoracially diverse high schools. This means that the 2010-2011 matriculants had fairly good diversity experiences before coming to Gallaudet. However, the diversity within the applicant pool was neither preserved in the profile of admitted applicants nor sustained among those students who persisted at Gallaudet beyond their freshman year. For reasons yet to be determined, a large share of Black applicants was rejected, as well as a substantial proportion of applicants who were the only deaf or hard of hearing student in their schools. Similarly, the reason that the small share of Asian/Pacific Islander students who had enrolled dropped precipitously between the freshman and sophomore years should be investigated. On a more positive note, something successful is occurring that attracts and fairly well retains Hispanic students, particularly from the West. The regional origin is noteworthy given that, one, it is harder to attract and retain students of color who travel long distances to college, and, two, the western United States is certainly the region from which a large number of Hispanic students may be recruited.

In sum, maintaining ethnoracial diversity in the college at Gallaudet University is challenged by the same circumstances that affect college diversity generally. Based on applications, however, Gallaudet University is certainly an attractive college possibility for students of color. Nonetheless, there are a number of barriers. Students of color are more economically disadvantaged, which makes their college enrollment and persistence more difficult. Additionally, this partial confound between ethnoracial group membership and economic disadvantage status is known to be associated with academic preparation. As a matter of probability, then, students of color are less likely to be as qualified for admission. That is, beginning with the screening of applicants for a positive admissions decision, the probability of

enrolling students of color declines, and at each step along the way to becoming a returning student, attrition reduces the proportion of students of color.

Limitations

Unfortunately, due to the timing and short period of time for this study, no freshmen survey or interview data have been collected to obtain students' own perceptions of their diversity experiences. Also, as noted in the original proposal, Common Core Data for general public school enrollments and Private School Survey data for general private school enrollments were not available in time to be merged for the purpose of defining school-wide ethnoracial diversity where deaf and hard of hearing students were a small fraction of the total school enrollment. Should the opportunity arise to continue this work in the next fiscal year (2011-2012), the potential exists to overcome both of these limitations.

More serious limitations have to do with two other constraints on this study. First, the focus here has been on ethnoracial diversity to the near exclusion of other factors that are considered more powerful but harder to study than social demographics. Such things as academic preparation, familial support, financial support, and high school support leading up to college are critical, especially for students of color. Second, a number of variables describing the Gallaudet environment were not included. Measures that would identify whether there was an environment of social support, on-campus residential opportunity, academic support, and both a curriculum and extra-curriculum that promotes the maintenance, if not improvement, of an ethnoracially diverse school community—all identified ingredients in a recipe for improved retention of all students, and especially students of color—were not utilized. Again, intentional consideration of these matters would improve any future study informing efforts to improve and maintain ethnoracial diversity in the undergraduate college at Gallaudet University.

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APPENDIX

Revisions: Part 2—Gallaudet Diversity

This appendix presents the result from recalculation of percentage distributions for Tables 2.1 through 2.7, which reflect the reduction in the number of ethnoracial and program size categories described in the answer to Question 2.8—Major Determinants of Admission and Persistence.

Table A.1 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by ethnoracial group.

Ethnoracial Group	Applicant Status					Child Count (N=70,554)
	Applied (N=317)	Admitted (N=237)	Paid Deposit (N=211)	Matriculated (N=200)	Returned (N=144)	
White	63.4	69.6	69.2	70.0	75.7	56.3
Black	19.9	13.9	13.7	14.0	12.5	16.5
Hispanic	10.7	11.8	12.3	12.0	9.7	22.2
Asian/Pacific Islander	6.0	4.6	4.7	4.0	2.1	5.0

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); U.S. Department of Education (2010, Table 1-16f)

Table A.2 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by region of the United States.

Region	Applicant Status					Child Count (N=70,554)
	Applied (N=317)	Admitted (N=237)	Paid Deposit (N=211)	Matriculated (N=200)	Returned (N=144)	
Northeast	18.0	17.3	17.5	18.5	16.0	16.5
Midwest	18.6	20.3	21.3	21.0	20.1	25.4
South	45.7	43.5	42.7	42.5	44.4	33.3
West	17.7	19.0	18.5	18.0	19.4	24.8

Notes: Column percentages may not total exactly 100.0 due to rounding. Child Count total does not include deaf and hard of hearing students in BIA schools because their enrollments were not reported by state.

Sources: Gallaudet University OAQ (2011); U.S. Department of Education (2010, Table 1-16f)

Table A.3 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by deaf and hard of hearing student high school program size (number of deaf or hard of hearing high school peers the student had in 2009-2010).

Program Size	Applicant Status					Annual Survey (N=10,965)
	Applied (N=317)	Admitted (N=237)	Paid Deposit (N=211)	Matriculated (N=200)	Returned (N=144)	
1 peer	13.6	13.1	13.7	13.5	13.2	10.5
2-5 peers	14.5	11.4	11.8	11.0	9.7	23.3
6-10 peers	4.4	3.8	3.8	3.5	3.5	11.5
11-29 peers	7.9	7.2	6.6	6.0	4.9	14.5
30+ peers	59.6	64.6	64.0	66.0	68.8	40.2

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Table A.4 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program deafness distribution categories from the Annual Survey (2009-2010).

Third of Deafness Distribution	Applicant Status				
	Applied (N=186)	Admitted (N=135)	Paid Deposit (N=119)	Matriculated (N=115)	Returned (N=83)
Lowest 3rd	5.9	6.7	7.6	7.8	9.6
Middle 3rd	30.1	28.1	29.4	27.8	21.7
Highest 3rd	64.0	65.2	63.0	64.3	68.7

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Table A.5 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program regular setting for instruction distribution categories from the Annual Survey (2009-2010).

Segments of Regular Setting Distribution	Applicant Status				
	Applied (N=186)	Admitted (N=135)	Paid Deposit (N=119)	Matriculated (N=115)	Returned (N=83)
Lowest 2-3rds	88.7	90.4	89.1	89.6	89.2
Penultimate 6th	8.6	6.7	7.6	7.0	6.0
Highest 6th	2.7	3.0	3.4	3.5	4.8

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Table A.6 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program economic disadvantage distribution categories from the Annual Survey (2009-2010).

Third of Economic Disadvantage	Applicant Status				
	Applied (N=143)	Admitted (N=109)	Paid Deposit (N=96)	Matriculated (N=92)	Returned (N=64)
Lowest 3rd	7.7	6.4	7.3	7.6	6.3
Middle 3rd	42.7	39.4	39.6	39.1	39.1
Highest 3rd	49.7	54.1	53.1	53.3	54.7

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

Table A.7 Percentage of 2009-2010 Gallaudet University applicants at each phase of admissions (2009-2010), matriculation (2010-2011), and retention (2011-2012) monitoring by high school program White enrollment distribution categories from the Annual Survey (2009-2010).

Third of White Enrollment Distribution	Applicant Status				
	Applied (N=222)	Admitted (N=168)	Paid Deposit (N=148)	Matriculated (N=143)	Returned (N=102)
Lowest 3rd	13.5	11.3	9.5	9.1	5.9
Middle 3rd	58.1	56.5	56.8	57.3	56.9
Highest 3rd	28.4	32.1	33.8	33.6	37.3

Note: Column percentages may not total exactly 100.0 due to rounding.

Sources: Gallaudet University OAQ (2011); Annual Survey (2010)

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